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GROUP THREAT, POLICE OFFICER DIVERSITY AND THE  
DEADLY USE OF POLICE FORCE

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# Group Threat, Police Officer Diversity and the Deadly Use of Police Force

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## Abstract

Officer-involved killings and racial bias in policing are controversial political issues. Prior research indicates that (perceived) group threat measured in terms of population shares and race-specific crime rates are important explanations for variations in police killings across cities in the United States. We argue that a diverse police force that proportionally represents the population it serves mitigates group threat and thereby reduces the number of officer-involved killings. Count models support our argument. They show that officer-involved killings of African Americans are higher in cities with factors commonly associated with group threat, including ethnic/racial polarization and black-on-white homicides. A diverse police force, however, reduces the influence of group threat lowering the number of officer-involved killings of African Americans. The findings represent one of the first analysis of a highly relevant contemporary issue based on a recent and high-quality dataset from 2013 to 2015. By highlighting the interaction between group threat and the proportional representation of minority groups in police departments, our research advances group conflict and threat theories with important theoretical and policy implications for law enforcement and representative bureaucracies more broadly.

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## Introduction

Around 12.02 pm on August 9, 2014, Michael Brown – an 18-year old African-American teenager – was fatally shot by Darren Wilson, 28, a white Ferguson police officer. Accounts of the incident differ widely, but the event and others like it drew national attention to killings of African Americans at the hands of police. The renewed interest in police killings and racial disparities in the use of police force more broadly continues to reverberate across the country. Yet, research on contextual variations in police killings is surprisingly rare. It generally relies on unreliable data about “justifiable homicides of felons” irregularly reported to the Federal Bureau of Investigation (FBI) (Jacobs and O’Brien 1998; Smith 2003; Willits and Nowacki 2014; Zimring and Arsiniega 2015). This article uses a new and contemporary dataset on officer-involved killings to examine variations in police use of deadly force across cities in the United States. Extending intergroup conflict and threat theories, we argue that a diverse police force that proportionally represents the population it serves mitigates group threat and thereby reduces the number of officer-involved killings. Perceived levels of threat posed by racial and ethnic minorities is a prominent account in research on variations in formal levels of social control such as police use of force. A diverse and inclusive police force, however, has the potential to reduce tensions and thereby weaken the influence of factors that are commonly associated with perceived group threat. Increased police legitimacy, the knowledge and empathy of minority officers, and more frequent interracial interactions within the police might attenuate tensions between the police and African-American communities. Homogenous departments, in contrast, might strengthen the notion of the us versus them or “blue versus black”. This argument implies both a direct effect of police diversity and, more importantly, a negative interaction between various factors of group threat and an inclusive police force.

To examine our argument, we construct a comprehensive database of all officer-involved killings between 2013 and 2015 based on verified crowd-sourced information from “Fatal Encounters” (Burghart 2016).<sup>3</sup> For each major city, we link the number of officer involved killings to population data from the U.S. Census, crime data from the F.B.I. Uniform Crime Reports, and information on police agencies from the Law Enforcement Management and Administrative Statistics (LEMAS) data series collected by the Bureau of Justice Statistics. Our analysis provides one of the first contemporary views on the determinants of police use of deadly force based on a recent and high quality database from 2013 to 2015. Using negative binomial regression, we find that officer-involved killings of blacks but not non-Hispanic whites are higher in cities with factors commonly associated with group threat, including ethnic/racial polarization and black-on-white homicides. A diverse police force, however, reduces the influence of these group threat factors lowering the number of officer-involved killings of blacks. The findings make new and substantial contributions to our understanding of a highly contentious social, cultural and political issue. By highlighting the interaction between group threat and the proportional representation of minority groups in police departments, our research advances group conflict and threat theories with important theoretical and policy implications for law enforcement and representative bureaucracies more broadly.

## **Minority Threat and the Deadly Use of Police Force**

Over 20 years after the Rodney King beating sparked a public outcry about racism in the police force, the excessive use of force remains a matter of great concern and a divisive political issue making national headlines. A prominent explanation of racial and ethnic

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<sup>3</sup> Data are available publicly at <http://www.fatalecounters.org/spreadsheets/> (last visited April 25, 2016).

disparities in many areas of criminal justice including the deadly use of police force builds on political or threat explanations. Based on broader theories of race relations and group threat (Blalock 1967; Blumer 1958), this explanation focuses on the ways in which dominant or privileged groups use the police, criminal law and other state instruments to maintain racial hierarchies and inequalities when their interests are threatened (Baumer, Messner, and Rosenfeld 2003; Jacobs, Carmichael, and Kent 2005; Jacobs and O'Brien 1998; Liska 1992; Smith and Holmes 2014; Stults and Baumer 2007; Turk 1966). Racial disparities in arrests, sentencing, the use of (deadly) police force and other coercive crime control mechanisms are partly driven by deeply rooted social divisions that separate dominant and subordinate racial and ethnic groups (Chambliss 2001; Liska 1992; Smith and Holmes 2014).

Most empirical work in this tradition focuses on the *minority threat hypothesis*. It states that the minority population share or in-migration increases the perceived level of threat in the general population, which in turn raises support for aggressive policing strategies including the use of police force or at least gives the police additional leeway (Liska 1992). Empirical studies generally support the idea that the relative size of the black population is related to different aspects of social control such as the size of the police force, arrests, incarceration rates and other (Eitle, D'Alessio, and Stolzenberg 2002; Jackson and Carroll 1981; Jacobs and Carmichael 2002; Jacobs and O'Brien 1998; Legewie 2016; Liska 1992; Smith and Holmes 2014; Stults and Baumer 2007). Focusing on the deadly use of force, Jacobs and O'Brien (1998) use data from the early 1980s and find that the number of officer-involved killings of blacks is higher in areas with a large proportion and recent in-migration of African-Americans. Ross (2015) similarly links racial disparities in officer-involved shootings to the portion of black residents and the overall level of inequality. Other researchers move beyond the focus on the presence or in-migration of minority groups. Instead, they argue that polarized settings in which two equal-sized

opponents face each other are the most contentious situations (Esteban and Ray 1994; Montalvo and Reynal-Querol 2005).

Recent work tries to explicate the mechanisms that explain the relation between the share of minority residents and the level and intensity of crime control (Eitle et al. 2002; King and Wheelock 2007; Stults and Baumer 2007). Stults and Baumer (2007), for example, explicitly measure perceived economic and political threat, whites' fear of crime and prejudice as key components of the underlying process. They find that fear of crime and perceived economic threat account for a substantial part of the relation between minority population share and police size. Along similar lines, Eitle et al (2002) distinguish between political, economic and crime threat. Using county-level data from South Carolina, they find that black-on-white crime substantially increases black arrest rates. Black-on-black crime as well as political and economic threat, however, are unrelated to arrests. Together, these findings highlight the importance of considering crime-related threat as a possible explanation of police use of (deadly) force aside from the traditional focus on population shares.

The "racial threat" thesis highlights the importance of inter-group tensions and conflict for the deadly use of police force. The core prediction from this literature is that various factors that are associated with perceived levels of threat increase the deadly use of police force against minorities. In the following analysis, we focus on out-group size and in-migration, ethnic/racial polarization and black-on-white crime as important measures of group threat. They capture both the traditional focus on population shares and composition (out-group size and ethnic/racial polarization) as well as the threat of (black) crime argument highlighted by a number of recent studies (Eitle et al. 2002; Stults and Baumer 2007). Despite the prominence of threat based explanations, previous research has largely ignored the racial/ethnic composition of the police department as a potentially important moderating factor. Here, we argue that a diverse police force that

proportionally represents the population it serves mitigates group threat and thereby reduces the number of officer-involved killings.

### **Group threat and the racial composition of the police force**

Group threat theories generally emphasize the interest of the dominant group as a driving factor for minority threat. Recent work, however, also highlights that police are a distinct social group with their own interests including concerns about safety, legal protection, public image and in other areas (Holmes 2000; Smith and Holmes 2014). These interests influence police behavior including responses to minority citizens on the street such as the use of police force. Indeed, Holmes argues that the “salience of threats perceived directly by the police should be more important than distal threats to the dominant group in predicting their street-level responses to minorities” (Holmes 2000:350). Along similar lines, Legewie (2016) shows that violent attacks against police officers increase the subsequent use of police force against African-Americans but not against other groups. From this perspective, group conflict based on the notion of the police against minority groups and the perceived level of threat among officers are important drivers of police use of (deadly) force. The contemporary debate reinforces this perspective with “blue lives matter” emerging as a counter movement to “black lives matter”. The focus on police departments as a distinct social group also highlights potentially mitigating factors. Here, we argue that a diverse police force that proportionally represents the population it serves mitigates group threat and thereby reduces the number of officer-involved killings.

Diversifying the force and minority representation in policing emerged as an important issue in the 1960s (Stokes 1997). Partly in response to the urban riots and concerns about tensions between police and minority groups, many argued that law enforcement agencies should ethnically and racially represent the communities they serve. Indeed,

“virtually every national report on the police over the past twenty years has recommended increased employment of minorities and women” (Walker 1985:555) including President Obama’s 21st Century Task Force on Policing. The increasing calls for a proportional representation of minorities in the ranks of the police led to a series of political and administrative steps to hire African American officers (Stokes 1997; Walker and Katz 2011).

Over the following decades, the proportion of African-American officers increased substantially. In 2013, it reached 13.0% in our sample of cities compared to 16.3% among the residents.<sup>4</sup> The overall increase conceals substantial variations across cities in the United States. Minority members remain underrepresented in most police departments (see Figure 2 on page 27). Prominently, the protests in Ferguson confronted a predominantly black community with a nearly all-white police force (4 out of 53 sworn officers in the Ferguson Police Department are black). Few empirical studies have examined the relation between the racial composition of the police department and police use of force. An important exception is Smith (2003), who studies the influence of police officer diversity on the number of officer-involved killings using F.B.I. data from the Supplementary Homicide Report (Zimring and Arsiniega 2015; see below for a detailed discussion of different data sources). His findings indicate that officer diversity is *unrelated* to the number of police killings. Aside from revisiting Smith findings with better data, our argument extends previous research.

Based on previous work on minority representation in police departments and broader sociological theories, we argue that minority representation not only reduces police killings directly but also mitigates group threat and thereby lowers the number of officer-involved killings. In particular, police officer diversity influences policing through four processes. First, minority representation increases police legitimacy among minority

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<sup>4</sup> The estimates are based on LEMAS data (see below for further details).



residents, which has important implications for police citizen interactions (Bell 2002; Theobald and Haider-Markel 2008; Weitzer 2000). Following the literature on symbolic representation, public attitudes and behavior towards state bureaucracies can change simply based on the characteristics of representatives or non-elected officials (Gay 2002; Mansbridge 1999; Theobald and Haider-Markel 2008). Minority representation signals that police officers share similar values and experiences. The officers are seen as more knowledgeable about minority concerns and culture, which increases trust among minorities. Recent empirical evidence from police-citizen interactions (Theobald and Haider-Markel 2008) and many other areas such as political institutions (Banducci, Donovan, and Karp 2004; Gay 2002; Scherer and Curry 2010) supports this argument. Increased trust and legitimacy, in turn, attenuate tensions between the police and African-American communities and potentially deescalates police citizen interactions (Bell 2002; Theobald and Haider-Markel 2008).

Second, minority officers might not only change the perception of the police among the public but they are also more knowledgeable and empathetic about minority concerns and culture themselves. This knowledge and empathy might influence their own behavior and affect the overall department culture spreading to other officers. Similar to substantive representation in parliaments, minority presence in the police introduces different views that are aligned with and reflect minority interests (Sun and Payne 2004). A number of studies indicate that black officers are less biased toward black citizens (Antonovics and Knight 2009; Anwar and Fang 2006; Fagan et al. 2016; Fagan and Geller 2010) although other findings are mixed (Sun and Payne 2004). The role of black police associations over the last decades also highlights the influence on the overall policing community (Walker, Spohn, and DeLone 2012:180). After the Rodney King beating, the National Black Police Association (NBPA), for example, highlighted that racism is widespread in the police. Today, NBPA continues to push for an end to police brutality and supports federal legislation that prohibits racial profiling. This response to recent events

stands in contrast to the reaction of other police organizations. It highlights how minority officers provide a different perspective that influences policing culture and moderate tensions between the police and African American communities. This perspective may partly be driven by a sense of linked fate between black officers and black citizens that produces empathy in their interactions with each other (Dawson 1994; Simien 2005).

Third, a higher number of minority officers in the police provide opportunities for contact and interactions between white and minority officers. The experiences and information from these interactions increase familiarity and reduce hostility “potentially changing the police agency’s culture toward a more positive view of minority communities” (Goldstein 1977; Smith 2003). This argument is closely related to inter-group contact theory. Contact theory generally posits that contact between groups facilitates inter-group relations by improving attitudes towards the out-group and by reducing stereotypes (Pettigrew 1998). Allport’s (1954) classical formulation of the theory and many subsequent studies focus on situational factors such as equal status, common goals, and cooperation as conditions for the positive effect of inter-group interactions. Police-citizen interactions usually do not fulfill these conditions with a clear hierarchy and often opposing goals between the officer and the citizen. Interactions between officers, however, do. They are generally among equal or similar status positions. The interactions involve cooperation to achieve a common goal. Accordingly, interactions between white and minority police officers and the direct contact with close friends or coworker can improve attitudes towards the out-group among all officers, mitigate negative sentiments and reduce stereotypes about African-Americans.

Fourth, minority officers can weaken the solidarity within the police community particularly when confronted threats (Smith 2003; Walker et al. 2012:180). The link between solidarity and diversity has been studied across the social sciences. In an influential article, Portes and Sensenbrenner (1993) distinguish between four sources of social

capital. They argue that *bounded solidarity* is not based on shared values or reciprocal exchanges between individual, but on “the situated reaction of a class of people faced with common adversities [...] It is limited to members of a particular group who find themselves affected by common events in a particular time and place” (Portes and Sensenbrenner 1993:1325). From this perspective, homogenous police departments are likely to respond to perceived threats with higher solidarity that is based on the notion of “us” against “them” or blue versus black. Along similar lines, research on friendship networks suggests denser ties and consequently solidarity in homogenous settings. The response by African American police organizations to the Rodney King beating or recent events and the linked fate perspective described above support this argument. It highlights how minority officers introduce a different perspective that undermines a uniform response to certain events and perceived threats.

Together these factors might reduce the overall level of police use of (deadly) force and weaken the role of factors that are commonly associated with group conflict and threat. Increased police legitimacy, the knowledge and empathy of minority officers and more frequent interracial interactions within the police might attenuate tensions between the police and African-American communities. Weakened police solidarity might undermine the notion of the police versus black youth. Homogenously white departments, in contrast, might strengthen the notion of the us versus them or “blue versus black”. Accordingly, a diverse and inclusive police force has the potential to reduce tensions and thereby weaken the influence of factors that are commonly associated with perceived group threat. Based on this argument, we expect that minority representation not only reduces the number of officer-involved killings directly but also mitigates the role of factors that are commonly associated with group threat. This argument implies both a direct effect of police diversity and, more importantly, a negative interaction between various factors of group threat and an inclusive police force.

## Data and Methods

To address our question, we examine variations in the number of police-involved deaths of African-Americans and non-Hispanic whites across major cities in the United States. In particular, we focus on all cities with more than 50,000 residents that are part of the 2013 Law Enforcement Management and Administrative Statistics (LEMAS) sample. LEMAS includes almost all police departments with over 100 officers and a random sample of departments with less officers. About three in four (476 of the 635) U.S. cities with a population of over 50,000 are included in LEMAS and are the basis for our sample.

To measure the number of police killings in each city, we construct a comprehensive database of all officer-involved killings between 2013 and 2015 based on verified crowd sourced information from “Fatal Encounters” (Burghart 2016). We define police-involved deaths as any interaction with the police that results in death as a consequence of police use of force. This definition excludes accidents caused by suspects themselves (e.g. a fleeing suspect who causes a deadly car crash) or deadly domestic violence incidences involving off-duty police officers. The focus incidents related to police use of force is important insofar as it focuses on officer-involved killings that are potentially related to our core theoretical argument. For each city, we link the number of officer involved killings to population data from the U.S. Census, crime data from the F.B.I. Uniform Crime Reports, and information on police agencies from the Law Enforcement Management and Administrative Statistics (LEMAS) data series collected by the Bureau of Justice Statistics. Using negative binomial regression, we model the number of officer-involved killings of blacks as a function of population characteristics, crime rates, our three threat related measures and the racial/ethnic composition of the police department.

## Constructing a Comprehensive Database on Police Killings

As widely publicized in the media and discussed in recent academic publications, the government does not collect reliable information on police killings (Hirschfield 2015; Ross 2015; Zimring and Arsiniega 2015).<sup>5</sup> The most commonly used official information source is the annual F.B.I. Supplementary Homicide Reports (SHR), a special data series that is part of the Uniform Crime Reports (UCR) (Jacobs and O'Brien 1998; Sorensen, Marquart, and Brock 1993; Willits and Nowacki 2014).<sup>6</sup> SHR is an important data source for research on homicides but has limitations for work on officer-involved deaths. It includes a category for “felon killed by police” that tallies about 400 cases per year. Reporting by state and local police agencies is voluntary and “felon killed by police” narrowly refers to justifiable police homicides excluding unjustifiable, officer-involved deaths (Hirschfield 2015; Loftin et al. 2003). Indeed, comparisons with recent crowd-sourced and media-initiated data collection projects suggest that the SHR captures only about one third of police-involved deaths (Loftin et al. 2003). To address this problem, we construct a comprehensive database of all officer-involved killings between 2013 and 2015 based

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<sup>5</sup> Here are some of the media reports: Washington Post (<http://blogs.wsj.com/numbers/why-the-data-on-justifiable-homicide-just-wont-do-1725/>), the New York Times (<http://www.ny-times.com/2015/05/01/us/no-sharp-rise-seen-in-police-killings-though-increased-focus-may-suggest-otherwise.html>), the Guardian (<http://www.theguardian.com/us-news/2015/mar/18/police-killings-government-data-count>) and FiveThirtyEight (<http://fivethirtyeight.com/features/how-many-americans-the-police-kill-each-year/>).

<sup>6</sup> There are two alternative, official data sources. First, the Centers for Disease Control and Prevention's National Vital Statistics System (NVSS) is based on death certificates and includes a category for homicide by “legal intervention”. Second, the Bureau of Justice Statistics published an independent count of “arrest-related homicides” from 2003 to 2009 but suspended the data series and acknowledged that the count is not complete (Burch 2011; Planty et al. 2015). The yearly count for both alternative data sources resembles the data from the Supplementary Homicide Reports and is far below recent crowd-sourced and media-initiated data collection projects (Loftin et al. 2003). A third official data source with some promise is the Centers for Disease Control and Prevention's National Violent Death Reporting System but as of January 2016 it only covers 32 states (Barber et al. 2016).

on verified, crowd-sourced information from “Fatal Encounters”. The construction of our dataset is based on four steps.

First, we use information collected by “Fatal Encounters” (Burghart 2016) as a starting point. The goal of Fatal Encounters is to “create a comprehensive national database of people who are killed through interactions with police” from 2000 to today (Burghart 2016). It is the most comprehensive data collection project that tracks officer-involved killings over multiple years (for a comparison of different data sources see Table 1 and subsection “Data Quality”). The project relies on paid researchers, public records requests and crowd-sourced data. As of January 2016, the archive considers the information complete from 2013 to 2015, with 1,209, 1,251 and 1,294 cases for each of the three years. Fatal Encounters includes information on any interaction with police that results in death. This definition is broader compared to our own and includes accidents and deadly domestic violence involving police officers as perpetrators. Accordingly, we exclude about 120 cases for each of the years that do not fit our definition of officer-involved killing.

Second, we verified and completed missing information for each of the 3,485 records. While the database is comprehensive and well-maintained, there are occasional errors and missing information. Most important, information on victim race is missing for about 30% of all cases and considered unreliable for others. To address this problem, we use two independent coders from Amazon Mechanical Turk to verify and complete the information for all 3,485 cases.<sup>7</sup> In particular, we gave each coder the victim’s name, date

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<sup>7</sup> Amazon Mechanical Turk (<https://www.mturk.com/mturk>) is an online platform or marketplace that allows researchers (known as Requesters) to post jobs (usually small data collection or coding tasks and surveys). Workers can select existing jobs and complete them for a monetary payment. The platform provides access to over 500,000 workers and thereby makes it possible to complete data collection and coding task within hours instead of months. A common critique of the platform is that it often involves sub-minimum wage labor. To ensure a fair compensation of workers, we coded 100 cases ourselves and used the time estimate to calculate an hourly wage of \$14.

of the incident and the state in which it occurred. They were asked to collect information on the race of the victim, the involved police agencies and the city in which the incident occurred from newspaper sources. Accordingly, the key variables were essentially collected three times (by Fatal Encounters and our two coders). We personally cross-validated all cases for which the information from Fatal Encounters, the first and second coders were not identical. This cross-validation and the comparison between the two independent coders ensures the quality and accuracy of the data verification process. Aside from verifying key information, the procedure completes information on the race of the victim for 74% of the cases with missing information on victim's race.

Third, we use name and place-based imputation for the remaining cases with missing information on race. Our procedure largely resembles Enos' approach (2016). It relies on the "probability that a victim's surname is associated with a particular race or ethnicity according to U.S. Census Bureau counts of names by race". For example, Smith as the most common name in the United States is "73.35% white, 22.22% black, 0.4% Asian and Pacific Islander, 0.85% American Indian, 1.63% mixed race, and 1.56% Hispanic". Following Enos (2016), we take the frequencies for each victim's surname and combine them with the racial demographics of the census block where the victim lived. These two sources of information are combined using Bayes' rule (see Enos 2016 for details on the approach). As a result, we obtain a probability that each victim is white, black, Hispanic, Asian and Pacific Islander, American Indian, or mixed race.

To account for the uncertainty inherent in these probabilities and the overall imputation procedure, we obtain ten plausible race/ethnicities for each case with missing information based on random draws from a multinomial distribution using the name and place-based probabilities as parameters for the distribution. A victim that is 80% white and 20% black based on their name and residents, for example, might receive eight plausible race values "white" and two plausible race "black" (note that for most cases the probability for one of the different racial/ethnic groups is above 80%). Similar to multiple

*Table 1 - Comparison of Data Sources on Police Killings, 2015*

Source	Method and Definition	Cases	Unique Cases	Missing Cases	% Race Missing
Fatal Encounters	Crowd-sourced information, police reports, monitoring of news outlets, freedom of information requests. Definition: All interactions with the police that result in death (including off-duty officers).	1,294	166	0	22.5%
The Counted (The Guardian)	Police reports, witness statements, monitoring regional news outlets, research groups and open-source reporting projects. Definition: Any deaths arising directly from encounters with law enforcement.	1,140	22	10	2.0%
Washington Post	News reports, public records, Internet databases and original reporting. Definition: All shooting deaths from on-duty police officers.	990	4	142	2.8%
Our Data	See description in text.	1,162	-	-	0%

*Note: The data from all three sources was downloaded on January 14, 2016.*

imputation, we repeat all of our analyses for each of the different plausible values and combine the result using Rubin's (2004) repeated imputation summary statistics (for a similar approach to measurement error see Blackwell, Honaker, and King 2015; or Legewie and Schaeffer 2016 for an application to a different area). As a result, the final analyses account for the uncertainty from the imputation procedure.

Finally, we link our database with population data from the U.S. Census, crime data from the F.B.I. Uniform Crime Reports, and information on police agencies from the Law Enforcement Management and Administrative Statistics (LEMAS) data series collected by the Bureau of Justice Statistics. Linking each record to these different data sources requires matching keys for police agencies and census designated places (or counties if the incident does not fall in a census designated place). In both cases, we use name-based matching with manual corrections for cases without exact matches. As a result, we obtain the Originating Agency Identifier (ORI) code from the "Law Enforcement



Agency Identifiers Crosswalk” database created by Bureau of Justice Statistics<sup>8</sup> and the census designated place 5-digit code. These matching keys allow us to link each case to various data-sources including population data from the U.S. Census, crime data from the F.B.I. Uniform Crime Reports, and information on police agencies from the Law Enforcement Management and Administrative Statistics (LEMAS) data series.

The result of this procedure is a comprehensive database on officer-involved killings between 2013 and 2015. The database not only includes verified information on all officer-involved killings but also links this information to other data sources. Linking these different data sources is a key part of understanding the determinants of police. Figure 1 shows the geographical distribution of all 3,485 cases across the United States.

*Figure 1 - Officer-Involved Killings, 2013-2015*



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<sup>8</sup> The crosswalk includes over 36,000 law enforcement agencies in the United States and assigns each agency the Originating Agency Identifier (ORI) code, which makes it possible to merge various data sources that have no common match keys.

### *Data Quality*

We use two alternative data sources to evaluate the quality and completeness of our data on officer-involved killings. In particular, we compare our database with The Counted from The Guardian and The Washington Post's list of police killings.<sup>9</sup> Both are independent datasets that collect information on people killed by police in the United States in 2015. Table 1 compares the different data sources. For 2015, Fatal Encounter (FE) includes 166 unique cases that are not part of the other datasets and zero missing cases (a comparison for 2013 and 2014 is not possible because the other two datasets only focus on 2015 and beyond). We exclude many of the unique cases from our own database because FE uses a broad definition of officer-involved killings that includes family-related murders involving off-duty officers and other incidents (see beginning of section for details).

Most important, there is not a single case in the Washington Post and the Counted database that is not part of FE. With about 30% of missing information, however, the quality of information on victim's race is substantially lower in the original FE database. Our coding procedure described above substantially improves on that and is closely aligned with The Counted and The Washington Post estimates. For 2015, there are just 14 cases or 1.1% for which the race coding is not the same so that the error rate is very small. Overall, the comparison with the two alternative data sources indicates that (a) Fatal Encounters is the most complete enumeration of officer-involved shootings in 2015; (b) it is the only collection effort that covers multiple years, and (c) the quality of the information on victim's race is low in the original database but substantially improved through our own data collection. The multiple year feature of the FE data is important considering

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<sup>9</sup> The two databases are available at <http://www.theguardian.com/us-news/ng-interactive/2015/jun/01/the-counted-police-killings-us-database> and <https://www.washingtonpost.com/graphics/national/police-shootings/> (both accessed on Feb 1, 2016).

that our analyses of officer-involved killings can aggregate data across multiple years to avoid scarcity by city due of the low number of cases for many jurisdictions.

## Estimation Strategy and Model Specification

In our general analytic model, we use the number of officer-involved killings of African Americans and non-Hispanic whites in each city as the dependent variable and various group-threat measures, crime rates and minority representation in the police force as the main independent variables. The outcome is a count variable confined to positive integers. Poisson regressions are well suited to model such count data. However, the underlying distribution assumes that the mean and variance are equal (Gelman and Hill 2007:114). An alternative is to model the number of police killings with negative binomial regressions to allow for excess variability (over-dispersion) among the outcome (Gelman and Hill 2007:115; Long and Freese 2005:Cha. 8).<sup>10</sup> Formally, the model can be expressed as

$$\lambda_i = \exp(\alpha + \mathbf{D}_i\delta + \theta U_i + \mathbf{X}_i\beta + \zeta_i)$$

where  $i$  is the index for city and  $\lambda_i$  the number of officer involved killings in city  $i$ . The coefficients in the vector  $\delta$  for the different group threat measures in the matrix  $\mathbf{D}_i$  estimate the relation between the main independent variables and the outcome variable conditional on the covariates in  $\mathbf{X}_i$ . The minority representation index defined below is represented by  $U_i$  with the corresponding coefficient  $\theta$ . To evaluate our argument that minority representation mitigates group threat, we extend our models with a set of two-

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<sup>10</sup> An inflated number of zero counts are another common concern with count data (Gelman and Hill 2007:126). Zero-inflated models address this problem by using two components that correspond to different processes. The first is a binary model to analyze structural zeros and the second is a count model to predict the counts. There is, however, no reason to believe that the number of police killings is driven by two distinct processes (Allison 2012:Cha. 9 also see <http://statisticalhorizons.com/zero-inflated-models>).

way interaction terms between each of the group-threat measures and the minority representation index  $\gamma_1(D_i^{(1)} \times U_i)$  etc.

In a separate set of regressions, we use exposure variables to model the *rate* and not the *count* of police killings (Osgood 2000). The exposure variable (also called offset) is defined as the natural logarithm of the population size in 100,000's with a coefficient that is fixed to 1. This exposure variable accounts for the fact that the "risk" of being killed by the police depends on the size of the respective population. As a result, the additional regressions analyze the rate of police killings per 100,000 residents across major cities in the United States and *not* the number.

### **Variables and Missing Data**

The variables used in the analysis are based on the U.S. Census, crime data from the F.B.I. Uniform Crime Reports, and information on police agencies from the Law Enforcement Management and Administrative Statistics (LEMAS) data series collected by the Bureau of Justice Statistics. The dependent variable is the number of officer-involved killings in each city between 2013 and 2015 (see last section for description of data). Aggregating multiple years of data is important considering the low number of cases in most jurisdiction. The main independent variables are population and crime-related measures of group threat and minority representation in police departments measured on the city level or for the corresponding police department. Table 2 includes a list of all variables together with basic summary statistics.

Table 2 - Description and Summary Statistics of Variables by Source

Variable	Description	Mean	SD
Pol. Killings of Blacks	Number of Officer-involved killings of blacks	0.87	2.67
Pol. Killings of Whites	Number of Officer-involved killings of whites	1.03	2.31
<i>Census and American Community Survey</i>			
Population	City population in 100,000s	1.90	3.21
Population (Black)	Black city population in 100,000s (offset)	0.32	0.81
Population (White)	White city population in 100,000s (offset)	0.87	1.10
Prop. White	Proportion white residents	0.54	0.22
Prop. Black	Proportion black residents	0.14	0.16
Change in Prop. Black	Change in prop. black residents btw 2000 and 2010	0.01	0.04
Black/White Income Ratio	Ratio of black median household income to white median household income	0.72	0.24
Prop. Divorced	Proportion of divorced residents	0.11	0.02
Prop. Crowded Housing Units	Proportion of crowded housing units with 1.5+ persons per room	0.04	0.05
Gini Index	Measure of income inequality in city	0.45	0.04
Prop. Poverty	Proportion of residents living in poverty	0.18	0.08
Ethnic Polarization	Index of Ethnic Polarization (EP)	0.73	0.15
<i>Uniform Crime Reports, Various Data Series</i>			
Arrests Black (log)	Number of black arrests for homicides, violent or property crimes, and weapon charges (logged)	3.88	9.19
Arrests White (log)	Number of white arrests for homicides, violent or property crimes, and weapon charges (logged)	5.79	8.95
Violent Crime Rate	Number of violent crimes per 100,000 residents	490.89	351.44
Officers per 100,000	Number of police officers per 100,000 residents	181.11	72.82
Homicide Rate: Black on Black	Average number of black on black homicides over five year period (2009-2013) per 100,000 residents	1.71	3.07
Homicide Rate: Black on White	Average number of black on white homicides over five year period (2009-2013) per 100,000 residents	0.35	0.43
<i>Law Enforcement Management and Administrative Statistics (LEMAS)</i>			
Proportional Representation Index (PRI)	Ratio of percent Black-sworn police officers in the police department to percent Black residents	0.75	0.93
<i>Other Sources</i>			
Black Mayor	Binary indicator for black city mayor	0.07	0.26
South	Binary indicator for southern state	0.30	0.46

Note: All continuous variables except PRI are standardized for the analysis. The summary statistics for black/white arrests are in 1,000s. The analyses include the logged number of arrests.

We focus on four main independent variables. First, we measure the *proportion of African-American* in each city in 2010 and the *change in the African-American population* between 2000 and 2010. The variables are based on data from the 2000 and 2010 United States Census using census “places” as the geographical unit.<sup>11</sup> Second, we use the population shares from the census for each city (or census place) to measure the level of *ethnic/racial polarization* using the index of Ethnic Polarization (EP) (Montalvo and Reynal-Querol 2005).<sup>12</sup>

Third, we measure the *black-on-white homicide rate* based on data from the UCR Supplementary Homicide Report (SHR) from 2009 to 2013. Similar to the outcome variable, cross-racial homicides are rare. To address this problem, we define our measure as the average number of black-on-white homicides per 100,000 residents over a five-year period. A second advantage of using multiple years is that not all police departments consistently report data to the SHR system so that in some cases we average over a shorter period. The models also condition for black-on-black homicide rate as a control variable defined in the same way (see below).

Finally, we measure *minority representation in police departments* with the Proportional Representation Index (PRI) based on the Equal Employment Opportunity Index (Hickman and Piquero 2009; Lewis 1989; Smith 2003). It is defined as the “ratio of percent Black-sworn police officers within the police department to percent Black residents”. A value of one indicates that the proportion of black officers in the police department is the same as the proportion of black residents in the city it serves. Most cities, however, have lower values indicating that black officers are underrepresented in the police force (see

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<sup>11</sup> In very few cases, a 2010 city was not incorporated in 2000 and therefore not part of the census places file. For these cases, we used the 2000 census tracts that fall within the 2010 city limits to estimate the population in 2000.

<sup>12</sup> Formally, the index is defined as  $EP = 1 - \sum_{i=1}^I ((0.5 - s_i)/0.5)^2 s_i$ , where  $s$  is the population share of group  $i$  and  $I$  is the number of groups in a given city.

Figure 2 for a distribution of the index across our sample). The measure is based on data from the 2013 Law Enforcement Management and Administrative Statistics (LEMAS) data series collected by the Bureau of Justice Statistics. In irregular intervals, LEMAS collects information from state and local law enforcement agencies including almost all police department with 100 or more officers and a nationally-representative sample of smaller departments.

Our analyses include a number of control variables. First, we include several population characteristics based on the U.S. Census and the American Community Survey 2010-2013 3-year estimates. The measures are (a) the logged population size in 100,000s, (b) the black/white income ratio, (c) the black poverty rate defined as the proportion of African-American residents that are poor, (d) the proportion of divorced residents as a measure of family stability, (e) the Gini index as a measure of income inequality, and (f) the proportion of crowded housing units (1.5 or more residents per room). These measures capture important population characteristics of the city that have played a significant role in research on policing and other areas of social and economic conditions. They are closely tied to previous work on physical disorder, crime, neighborhood disadvantage and even police use of (deadly) force (Jacobs and O'Brien 1998; Sampson and Groves 1989; Taylor and Covington 1988). As such, they play an important role as potentially confounding city characteristics.

Second, we include two measures of crime. The violent crime rate is based on the Uniform Crime Report data series "Offenses Known and Clearances by Arrest". The measure captures the overall level of crime and is defined as the number of violent crimes per 100,000 residents.<sup>13</sup> The overall level of violent crime has played an important role in

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<sup>13</sup> The definition of violent crimes is based on the Uniform Crime Reports (UCR) part I. Violent crimes include murder, manslaughter, forcible rape, robbery, and aggravated assault.

previous research on officer-involved killings (Ross 2015). It is generally seen as an alternative to threat-based explanation of police use of force insofar as police might simply use more (deadly) force when they encounter more violent crime (Fyfe 1980; Ross 2015:2; Smith 2003). The second measure of crime is based on policing: we control for the (logged) number of race-specific (black or white) arrests from the UCR “Arrests by Age, Sex, and Race” data-series. This variable accounts for the disproportionate minority exposure to police, a potential source of tension and conflict (Tyler et al., 2014; Geller et al., 2014). It ensures that our estimates refer to police killings relative to arrests as a proxy for police-citizen interactions. Given the number of arrests, the analyses capture whether police officers act differently and presumably feel more threatened in interactions with minority citizens. Finally, we include three additional variables from various sources. The number of sworn officers per 100,000 residents from the UCR data series “Law Enforcement Officers Killed and Assaulted”, whether or not the city has a black mayor, and whether or not the city is located in a southern state.

Some of the covariates based on the various Uniform Crime Report (UCR) data series have missing values. Data from the Supplementary Homicide Report used for the black-on-white homicide rate are particularly affected by this issue (Maltz 1999). Overall, out of 476 cities in our sample, 95 cases have missing values on at least one of the variables (20.0%). The main analyses presented in this paper are based on case-wise deletion. Supplementary analysis use multiple imputation based on the chained equation approach to address this problem (Van Buuren and Groothuis-Oudshoorn 2011). Aside from the variables and interaction terms that are part of the final analyses, we include additional covariates based on previous years of UCR data. For example, the imputation model includes a measure of black-on-white homicides rates from 2004 to 2008 to improve the imputation of the contemporary measures used in our analyses. These additional variables substantially improve our imputation model.



## Results

We begin our analysis by focusing on common measures of minority threat including the share of and change in the minority population, ethnic/racial polarization and black-on-white homicide rates. This analysis revisits and expands Jacobs and O'Brien's findings (1998) about the structural determinants of police killings in the 1980s. Table 3 presents the results from four negative-binomial regression models. They show the relation between various population characteristics, crime rates and other factors with the number of officer-involved killings between 2013 and 2015 across 381 cities in the United States. Model I and II present the results for African Americans and Model III and IV for whites as a comparison.

Model I shows that the proportion of African-Americans in the population is associated with the number of officer-involved killings of blacks, after controlling for a rich set of covariates. Indeed, the coefficient estimate indicates that a one standard deviation increase in the proportion of black residents – for example, from the mean of 15.3% to 32.5% – corresponds to an increase of the number of officer involved killings of blacks by 49%. In contrast to Jacobs and O'Brien (1998) and others, however, we do not see this positive coefficient estimate for the proportion of black residents as support for the minority threat hypothesis. Instead, the number of police killings of blacks might simply be higher in cities with a larger black population because there are more black residents.

Model II includes an exposure (or offset) term to address this question. It predicts the *rate* and not the *count* of black police killings. The result supports our argument. It shows that the proportion of African-American residents does not increase the rate of police killings of African Americans. Accordingly, the *number* of police killings of blacks is higher in cities with a larger black population, but *rate* of black police killings is unrelated to the proportion of black residents. Similarly, the change in the black population is

unrelated to the number of police killings of blacks. These results challenge the minority threat hypothesis based simply on population shares.

We next analyze alternate minority threat measures. These indicators go beyond the focus on population shares. In particular, Model I - IV include a measure of ethnic/racial polarization and black-on-white homicide rate. Both variables substantially increase the number of officer-involved killings of black but not of whites. In particular, the incidence-rate ratio for ethnic/racial polarization is 1.396, indicating that a one standard deviation change in ethnic/racial polarization corresponds to a 39.6% higher number of police killings of blacks. A one standard deviation increase in the black-on-white homicide rate similarly corresponds to a 51.0% increase in the number of police killings of blacks. These findings are consistent for both the count and rate model that includes black population as an exposure variable (Model II), although one of the relevant coefficients is only marginally significant in the rate model. The black-on-black homicide rate, however, is unrelated to the number of police killings with a negative and statistically insignificant point estimate. Officer-killings of whites are driven by different factors. They are unrelated to ethnic/racial polarization, black-on-white homicide rates and minority population shares. Instead, the number of white arrests is an important predictor suggesting that (deadly) force against whites is higher when officers are involved in more (potentially violent) interactions with white residents.

These findings not only revisit Jacobs and O'Brien's work, it improves on it based on contemporary and higher-quality data. These findings also extend their results in important ways. They provide clear support for a group-threat perspective but challenge the focus on population shares as one of the key measures in previous research. The findings indicate that the number of officer-involved killings of blacks is substantially higher in polarized settings where the African-American and White population are equally sized and in those with a higher black-on-white homicide rate. Similar to related research on the size of the police force and the black arrest-rate, the findings support previous

Table 3 - Group Threat and Killings by Police Officers across U.S. Cities, 2013 – 2015

	Shootings of Blacks		Shootings of Whites	
	Model I (Count)	Model II (Rate)	Model III (Count)	Model IV (Rate)
Population (log)	1.308*** (0.151)	0.487*** (0.146)	0.841*** (0.173)	-0.175 (0.174)
Prop. White	0.076 (0.195)	-0.010 (0.201)	0.177 (0.175)	-0.382* (0.177)
Prop. Black	0.536*** (0.161)	-0.183 (0.161)	-0.338 (0.226)	-0.346 (0.229)
Change in Prop. Black	-0.156* (0.080)	-0.108 (0.078)	0.170 (0.101)	0.168 (0.101)
Black/White Income Ratio	-0.213 (0.155)	-0.230 (0.166)	-0.115 (0.099)	-0.089 (0.098)
Arrests Black (log)	-0.012 (0.129)	-0.339** (0.130)		
Arrests White (log)			0.356* (0.167)	0.355* (0.167)
Violent Crime Rate	0.048 (0.083)	0.068 (0.082)	0.190 (0.103)	0.180 (0.102)
Prop. Divorced	-0.032 (0.115)	0.070 (0.117)	0.344** (0.106)	0.347** (0.106)
Prop. Crowded Housing Units	0.024 (0.125)	0.075 (0.126)	0.174 (0.119)	0.220 (0.121)
Gini Index	-0.094 (0.123)	-0.070 (0.124)	0.108 (0.111)	0.104 (0.111)
Prop. Poverty	0.052 (0.124)	-0.035 (0.125)	-0.240* (0.121)	-0.223 (0.120)
Black Mayor	0.069 (0.190)	0.161 (0.183)	-0.165 (0.324)	-0.164 (0.324)
Officers per 100,000	0.037 (0.079)	0.111 (0.080)	-0.241* (0.109)	-0.239* (0.108)
South	0.034 (0.177)	0.069 (0.177)	0.124 (0.182)	0.138 (0.183)
Ethnic/Racial Polarization	0.334** (0.129)	0.255 (0.138)	0.007 (0.105)	-0.149 (0.108)
Homicide Rate: Black on Black	-0.350*** (0.096)	-0.170 (0.094)	0.138 (0.152)	0.165 (0.153)
Homicide Rate: Black on White	0.412*** (0.094)	0.257** (0.095)	0.121 (0.100)	0.122 (0.100)
Constant	-1.647 (0.890)	3.125*** (0.905)	-3.731** (1.326)	-2.994* (1.326)

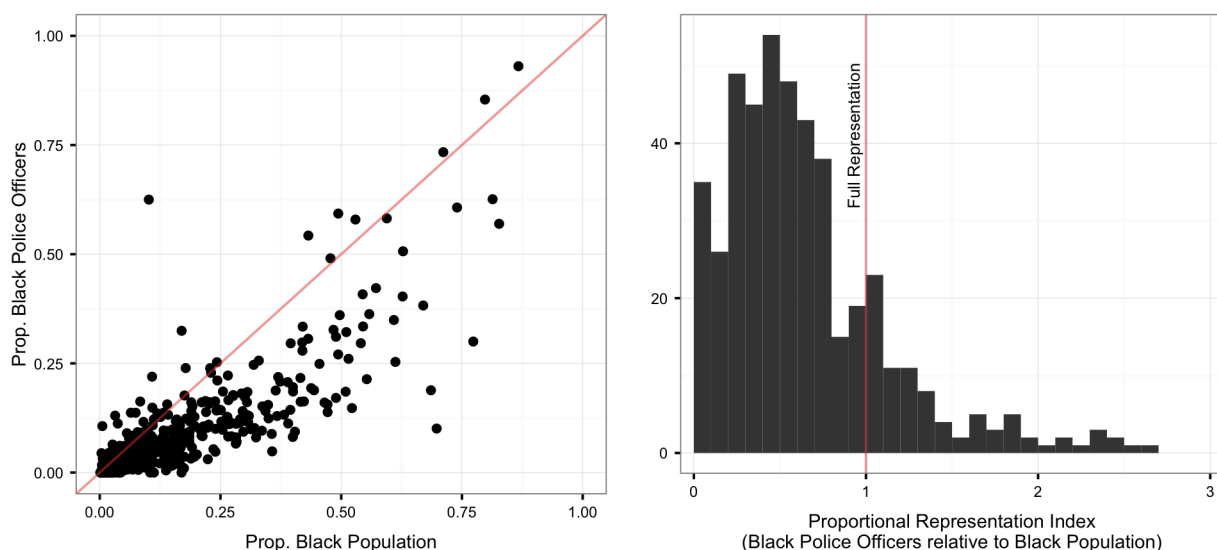
Note: N=381; Estimates based on negative-binomial regressions. Rate models include offset defined as the logged Black/White population in 100,000s.  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ ; std. errors in parentheses

research that highlights crime-threat as one of the key mechanisms that explains group threat.

## Group Threat and Minority the Race Gap in America’s Police Departments

In the second part of our analysis, we focus on the effect of minority representation in police departments on the use of deadly police force. Our argument suggests that the proportional representation of African-Americans in the police force not only reduces the number of officer-involved killings but more importantly mitigates various factors associated with group threat. To examine this argument, we extend our model with the proportional representation index (PRI) and a number of interaction terms between the index and our measures of group threat. The index is defined as the share of black police officers divided by the share of the black population. Figure 2 shows the share of black police officers and black population on the left side and the distribution of the index on the right side across the cities in our sample. A value of one indicates equal representation insofar the share of African-Americans in the police force is the same as the share in the general population. Lower values as in most cities across the United States indicate an underrepresentation of blacks in the police. Table 4 presents regression models that show

Figure 2 - The Race Gap in Police Agencies across the United States, 2013



the effect of the proportional representation index together with the interaction terms on the number of officer-involved killings of blacks. Models I and II first show the effect of the index itself. The point estimate is negative and substantial indicating that the number of officer-involved killings of blacks is lower in cities with proportional representation of blacks in the police force. However, the coefficient estimate is not statistically significant in the rate model (p-value 0.35) so that we cannot draw clear conclusions about the relation between the rate of police killings and the representation of African-Americans in the police force. This finding is in line with previous research based on weak data. Using data from the F.B.I. Supplementary Homicide Reports, Smith (2003) similarly finds no clear relation between the racial composition of the police force and officer-involved killings. Accordingly, the finding about an overall effect of Black officer representation on the number of officer-involved killings of blacks is inconclusive.

Models II – VI extend the regressions with additional interaction terms between the representation index and our two measures of group threat: polarization and black-on-white killings. For both variables, the interaction term is negative and substantial, indicating that the proportional representation of black officers decreases the effect of other factors that are commonly associated with group threat. In particular, the incidence-rate ratio of ethnic/racial polarization and the black-on-white homicide rate is 1.30 and 1.28 respectively when the proportional representation index is at the mean of 0.74. At this level, a one standard deviation change in ethnic/racial polarization and the black-on-white homicide rate corresponds to a 30% and 28% increase in officer-involved killings of blacks respectively. In cities with a higher level of African-American representation in the police department, however, the size of the effect decreases or, correspondingly, increases at lower representation levels.

Figure 3 illustrates this pattern for polarization and the black-on-white homicide rate. It shows the incidence-rate ratio for a one standard deviation change in ethnic/racial

Table 4 - Representation of Black Police Officers and Police Killings of Blacks, 2013 – 2015

	Model I (Count)	Model II (Rate)	Model III (Count)	Model IV (Rate)	Model V (Count)	Model VI (Rate)
Population (log)	1.413** (0.154)	0.521** (0.150)	1.434** (0.153)	0.538** (0.150)	1.425** (0.155)	0.519** (0.151)
Prop. White	0.035 (0.197)	-0.030 (0.202)	0.023 (0.196)	-0.044 (0.202)	0.032 (0.194)	-0.027 (0.200)
Prop. Black	0.539** (0.161)	-0.189 (0.161)	0.518** (0.161)	-0.209 (0.161)	0.579** (0.161)	-0.158 (0.161)
Change in Prop. Black	-0.158 (0.081)	-0.108 (0.079)	-0.160 (0.083)	-0.105 (0.080)	-0.173* (0.084)	-0.117 (0.080)
Black/White Income Ratio	-0.233 (0.161)	-0.236 (0.167)	-0.261 (0.161)	-0.252 (0.167)	-0.209 (0.161)	-0.202 (0.168)
Arrests Black (log)	-0.101 (0.131)	-0.367** (0.132)	-0.110 (0.130)	-0.373** (0.132)	-0.096 (0.133)	-0.354** (0.134)
Violent Crime Rate	0.079 (0.084)	0.078 (0.083)	0.095 (0.083)	0.090 (0.083)	0.139 (0.088)	0.121 (0.087)
Prop. Divorced	-0.058 (0.116)	0.062 (0.118)	-0.068 (0.115)	0.052 (0.117)	-0.083 (0.117)	0.045 (0.118)
Prop. Crowded Housing Units	0.073 (0.125)	0.088 (0.127)	0.087 (0.124)	0.100 (0.126)	0.019 (0.130)	0.052 (0.131)
Gini Index	0.009 (0.130)	-0.032 (0.130)	0.037 (0.129)	-0.002 (0.130)	0.014 (0.129)	-0.025 (0.130)
Prop. Poverty	-0.035 (0.128)	-0.061 (0.128)	-0.064 (0.128)	-0.085 (0.128)	-0.043 (0.127)	-0.069 (0.127)
Black Mayor	0.098 (0.188)	0.170 (0.183)	0.139 (0.189)	0.199 (0.183)	0.126 (0.187)	0.193 (0.182)
Officers per 100,000	0.027 (0.078)	0.108 (0.079)	0.026 (0.077)	0.107 (0.079)	0.013 (0.078)	0.101 (0.080)
South	0.040 (0.175)	0.074 (0.177)	0.053 (0.174)	0.087 (0.177)	0.057 (0.175)	0.095 (0.178)
Ethnic/Racial Polarization	0.327* (0.129)	0.252 (0.138)	0.611** (0.172)	0.476** (0.175)	0.270* (0.132)	0.204 (0.141)
Homicide Rate: Black on Black	-0.332** (0.097)	-0.162 (0.094)	-0.331** (0.097)	-0.159 (0.094)	-0.349** (0.097)	-0.177 (0.094)
Homicide Rate: Black on White	0.389** (0.095)	0.247** (0.095)	0.377** (0.095)	0.236* (0.096)	0.663** (0.149)	0.460** (0.150)
Proportional Representation Index (PRI)	-0.609* (0.247)	-0.226 (0.242)	-0.594** (0.206)	-0.248 (0.202)	-0.672** (0.240)	-0.257 (0.236)
PRI x Ethnic/Racial Polarization			-0.455**	-0.356*		

			(0.175)	(0.167)		
PRI x Homicide Rate: Black on White					-0.543*	-0.417
					(0.235)	(0.236)
Constant	-0.651	3.453**	-0.632	3.480**	-0.708	3.340**
	(0.948)	(0.964)	(0.935)	(0.950)	(0.965)	(0.980)

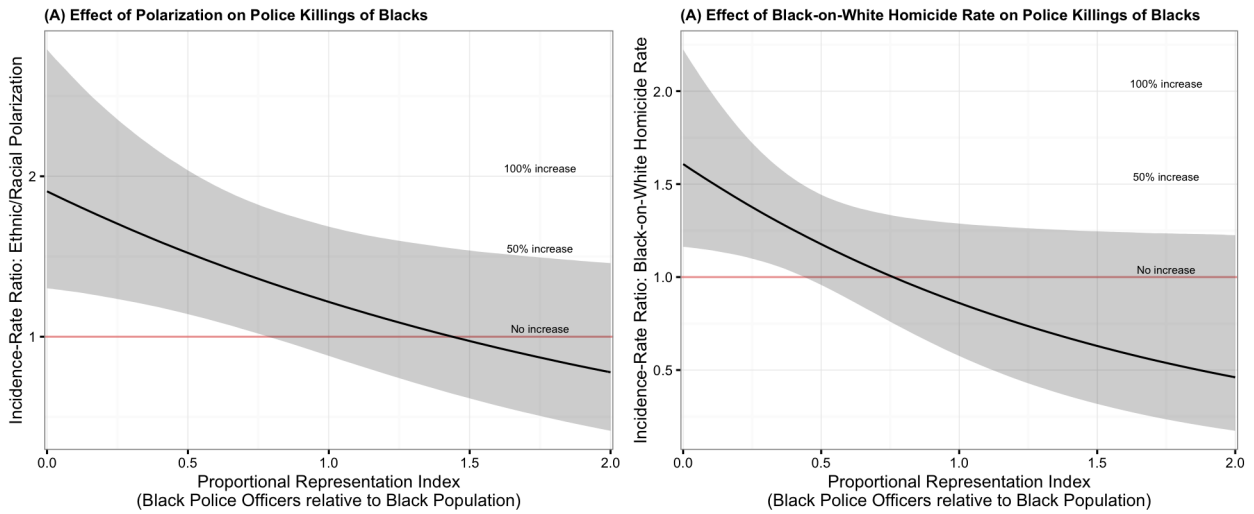
*Note: N=381; Estimates based on negative-binomial regressions. Rate models include offset term defined as the logged number of Blacks in 100,000s. The Proportional Representation Index (PRI) is defined as the proportion of black police officers relative to the proportion of black residents.*

*p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001; standard errors in parenthesis.*

polarization (Figure 3a) and a similar change in the black-on-white homicide rate (Figure 3b) as a function of the proportional representation index. In cities with a representation index of zero (no African-American police officers), the coefficient estimates are large with an almost 100% and 60% increase in the number of officer-involved killings of blacks for a one standard deviation change for polarization and the black-on-white homicide rate respectively. As the representation of African-Americans in the police improves, however, the effect of a one standard deviation change in both polarization and the black-on-white homicide rate decreases substantially. At the extreme with twice as many African-American police officers as residents or a representation index of 2 (4.8% of departments have an index above two), the point estimates are negative but statistically insignificant.

Overall, these findings provide strong support for our argument. While it remains unclear whether the representation of African-American in the police is related to the number of officer-involved killings itself, the interaction terms indicate that inclusive police departments that proportionally represents the population it serves are less sensitive to various threat factors. A diverse police force mitigates group threat and thereby reduces the number of officer-involved killings.

Figure 3 - Effect of the Prop. of White Officers on Police Killings



## Conclusion

Understanding the determinants of officer involved killings across the United States is a nascent research area with few empirical studies (Hirschfield 2015; Zimring forthcoming). Aided by a comprehensive and unique data collection effort, this study makes important progress toward understanding the driving factors of police killings in the contemporary United States. The findings offer three explanations of police shootings. First, our results indicate that group threat is not simply driven by population shares and in-migration of out-group members as suggested by previous studies. Instead, the number and rate of officer involved killings of African-Americans is substantially higher in cities with a high level of ethno-racial polarization where two equal-sized groups face each. This finding moves beyond the focus on the presence or in-migration of minority groups. It highlights the importance of group conflict theories focused on polarization (Esteban and Ray 1994; Montalvo and Reynal-Querol 2005) for officer-involved killings.



Second, similar to a number of recent studies on group threat, crime threat and in particular racial crime threat, seems to be an important driving factor. Indeed, the *black-on-white* homicide rate is a significant predictor of officer-involved killings whereas *black-on-black* homicides are unrelated to police killings. These results provide support for the threat of black crime hypothesis. The finding that police killings of African-Americans increase as a function of the black-on-white homicide rate is consistent with a body of social science evidence of police discrimination toward minority citizens observed by social scientists under a wide variety of sampling and measurement conditions (Epp, Maynard-Moody, and Haider-Markel 2014; Gelman, Fagan, and Kiss 2007; Kochel, Wilson, and Mastrofski 2011; Legewie 2016; see, generally O’Flaherty 2015). Several studies find that when blacks victimize whites, the high value attached to a white victim and the racial fears of authorities engender severe treatment (Baldus, Woodworth, and Pulaski 1990; Paternoster, Brame, and Bacon 2007).

Third, minority representation in the police might not reduce the number of officer-involved killings itself, but their presence mitigates different dimensions of threat. Indeed, our findings indicate that the relation between polarization/black-on-white homicide rate and the number of officer-involved killings is weaker in settings with a proportional representation of minority group in the police force. These findings make new and substantial contributions to our understanding of a highly contentious social, cultural and political issue. They indicate that group threat continues to be an important driver of officer-involved killings, even after controlling for the factual reality of killings of police.

Our research also has implications for a decades old push to diversify the police force. Prior research on the benefits of a diverse police force reached no conclusion. Other than a normative argument, there was no reliable evidence that a diverse police force was either more effective in responding to crime, or able to bridge the racial breach in trust in the police. Our results provide evidence that a diverse police force that proportionally represents the population it serves might not necessarily reduce the number of officer-

involved killings directly, but mitigates the role of various factors associated with group threat and thereby eases the tensions between the police and African-American communities.

Our study also has broader implications for group-threat theories and minority representation in state agencies and bureaucracies. Previous research on group threat has generally emphasized the interest of the dominant group as a driving factor for minority threat (for an exception see Holmes 2000; Smith and Holmes 2014). From this perspective, police use of (deadly) force is driven by structural factors that create pressure to maintain racial hierarchies and inequalities. Our argument, however, highlights the importance of considering the police as a distinct social group that contributes to the ways in which group threat plays out. From this perspective, the police force can aggravate or alleviate intergroup conflict, such as through the diversity of police officers. This argument extends previous research on inter-group conflict and group threat that has largely focused on population dynamics without considering the mediating role of state agencies. It also points to the importance of minority representation in bureaucracies as a social good. While previous research has largely focused on the role of descriptive representation in parliament or public office for substantive representation on policy issues (e.g. Lloren 2015) or on minority and women representatives as role models (e.g. Beaman et al. 2012), our research shows that minority representation in bureaucracies or the police can mitigate conflict and group threat.

While our dataset on police killings overcomes important data limitations from previous research and the analyses control for all common measures in previous research, the findings are limited by the observational nature of the data (Legewie 2012; Morgan and Winship 2014). Future research should use experimental or quasi-experimental designs to examine the role of a diverse police force for the police use of (deadly) force and other outcomes.

## References

- Allison, Paul. 2012. *Logistic Regression Using SAS: Theory and Application*. Cary, N.C: SAS Institute.
- Allport, Gordon W. 1954. *The Nature Of Prejudice*. Cambridge: Perseus Books.
- Antonovics, Kate and Brian G. Knight. 2009. "A New Look at Racial Profiling: Evidence from the Boston Police Department." *Review of Economics and Statistics* 91(1):163–77.
- Anwar, Shamena and Hanming Fang. 2006. "An Alternative Test of Racial Prejudice in Motor Vehicle Searches: Theory and Evidence." *American Economic Review* 96(1):127–51.
- Baldus, David C., George Woodworth, and Charles A. Pulaski. 1990. *Equal Justice and the Death Penalty: A Legal and Empirical Analysis*. Boston: Northeastern University Press.
- Banducci, Susan A., Todd Donovan, and Jeffrey A. Karp. 2004. "Minority Representation, Empowerment, and Participation." *Journal of Politics* 66(2):534–56.
- Barber, Catherine et al. 2016. "Homicides by Police: Comparing Counts From the National Violent Death Reporting System, Vital Statistics, and Supplementary Homicide Reports." *American Journal of Public Health* 106(5):922–27.
- Baumer, Eric P., Steven F. Messner, and Richard Rosenfeld. 2003. "Explaining Spatial Variation in Support for Capital Punishment: A Multilevel Analysis." *American Journal of Sociology* 108(4):844–75.

- Beaman, Lori, Esther Duflo, Rohini Pande, and Petia Topalova. 2012. "Female Leadership Raises Aspirations and Educational Attainment for Girls: A Policy Experiment in India." *Science* 335(6068):582–86.
- Bell, Jeannine. 2002. *Policing Hatred: Law Enforcement, Civil Rights, and Hate Crime*. NYU Press.
- Blackwell, M., J. Honaker, and G. King. 2015. "A Unified Approach to Measurement Error and Missing Data: Overview and Applications." *Sociological Methods & Research*.
- Blalock, Hubert M. 1967. *Toward a Theory of Minority-Group Relations*. New York: Capricorn Books.
- Blumer, Herbert. 1958. "Race Prejudice as a Sense of Group Position." *The Pacific Sociological Review* 1(1):3–7.
- Burch, Andrea M. 2011. "Arrest-Related Deaths, 2003-2009 - Statistical Tables."
- Burghart, Brian. 2016. "Fatal Encounters: A Step toward Creating an Impartial, Comprehensive and Searchable National Database of People Killed during Interactions with Law Enforcement."
- Chambliss, William J. 2001. *Power, Politics, and Crime*. Boulder, Colo: Westview Press.
- Dawson, Michael C. 1994. *Behind the Mule: Race and Class in African-American Politics*. Princeton University Press.
- Eitle, D., S. J. D'Alessio, and L. Stolzenberg. 2002. "Racial Threat and Social Control: A Test of The Political, Economic, and Threat of Black Crime Hypotheses." *Social Forces* 81(2):557–76.

- Enos, Ryan D. 2016. "What the Demolition of Public Housing Teaches Us about the Impact of Racial Threat on Political Behavior." *American Journal of Political Science* 60(1):123–42.
- Epp, Charles R., Steven Maynard-Moody, and Donald P. Haider-Markel. 2014. *Pulled Over: How Police Stops Define Race and Citizenship*. University of Chicago Press.
- Esteban, Joan-María and Debraj Ray. 1994. "On the Measurement of Polarization." *Econometrica* 62(4):819–51.
- Fagan, Jeffrey, Anthony A. Braga, Rod K. Brunson, and April Pattavina. 2016. "Stops and Stares: Street Stops, Surveillance, and Race in the New Policing." *Fordham Urban Law Journal* 43. Retrieved April 25, 2016 (<http://papers.ssrn.com/abstract=2758852>).
- Fagan, Jeffrey and Amanda Geller. 2010. *Profiling and Consent: Stops, Searches and Seizures after Soto*. Rochester, NY: Social Science Research Network. Retrieved April 25, 2016 (<http://papers.ssrn.com/abstract=1641326>).
- Fyfe, James J. 1980. "Geographic Correlates of Police Shooting: A Microanalysis." *Journal of Research in Crime and Delinquency* 17(1):101–13.
- Gay, Claudine. 2002. "Spirals of Trust? The Effect of Descriptive Representation on the Relationship between Citizens and Their Government." *American Journal of Political Science* 46(4):717–32.
- Gelman, Andrew, Jeffrey Fagan, and Alex Kiss. 2007. "An Analysis of the New York City Police Department's 'Stop-and-Frisk' Policy in the Context of Claims of Racial Bias." *Journal of the American Statistical Association* 102(479):813–23.

- Gelman, Andrew and Jennifer Hill. 2007. *Data Analysis Using Regression and Multi-level/Hierarchical Models*. Cambridge: Cambridge University Press.
- Goldstein, Herman. 1977. "Policing a Free Society." *Policing a Free Society Cambridge, Mass: Ballinger Pub. Co.*
- Hickman, Matthew J. and Alex R. Piquero. 2009. "Organizational, Administrative, and Environmental Correlates of Complaints About Police Use of Force Does Minority Representation Matter?" *Crime & Delinquency* 55(1):3–27.
- Hirschfield, Paul J. 2015. "Lethal Policing: Making Sense of American Exceptionalism." *Sociological Forum* 30(4):1109–17.
- Holmes, Malcolm D. 2000. "Minority Threat and Police Brutality: Determinants of Civil Rights Criminal Complaints in U.S. Municipalities." *Criminology* 38(2):343–68.
- Jackson, Pamela I. and Leo Carroll. 1981. "Race and the War on Crime: The Sociopolitical Determinants of Municipal Police Expenditures in 90 Non-Southern US Cities." *American Sociological Review* 46(3):290–305.
- Jacobs, David and Jason T. Carmichael. 2002. "The Political Sociology of the Death Penalty: A Pooled Time-Series Analysis." *American Sociological Review* 67(1):109–31.
- Jacobs, David, Jason T. Carmichael, and Stephanie L. Kent. 2005. "Vigilantism, Current Racial Threat, and Death Sentences." *American Sociological Review* 70(4):656–77.
- Jacobs, David and Robert M. O'Brien. 1998. "The Determinants of Deadly Force: A Structural Analysis of Police Violence." *American Journal of Sociology* 103(4):837–62.

- King, Ryan D. and Darren Wheelock. 2007. "Group Threat and Social Control: Race, Perceptions of Minorities and the Desire to Punish." *Social Forces* 85(3):1255–80.
- Kochel, Tammy Rinehart, David B. Wilson, and Stephen D. Mastrofski. 2011. "Effect of Suspect Race on Officers' Arrest Decisions." *Criminology* 49(2):473–512.
- Legewie, Joscha. 2012. "Die Schätzung von Kausalen Effekten: Überlegungen Zu Methoden Der Kausalanalyse Anhand von Kontexteffekten in Der Schule." *Kölner Zeitschrift Für Soziologie Und Sozialpsychologie* 64(1):123–53.
- Legewie, Joscha. 2016. "Racial Profiling and Use of Force in Police Stops: How Local Events Trigger Periods of Increased Discrimination." *American Journal of Sociology* 122(2).
- Legewie, Joscha and Merlin Schaeffer. 2016. "Contested Boundaries: Explaining Where Ethno-Racial Diversity Provokes Neighborhood Conflict." *American Journal of Sociology* 122(1):125–61.
- Lewis, William G. 1989. "Toward Representative Bureaucracy: Blacks in City Police Organizations, 1975-1985." *Public Administration Review* 49(3):257.
- Liska, Allen E. 1992. *Social Threat and Social Control*. Albany: SUNY Press.
- Lloren, Anouk. 2015. "Women's Substantive Representation: Defending Feminist Interests or Women's Electoral Preferences?" *The Journal of Legislative Studies* 21(2):144–67.
- Loftin, Colin, Brian Wiersema, David McDowall, and Adam Dobrin. 2003. "Underreporting of Justifiable Homicides Committed by Police Officers in the United States, 1976-1998." *American Journal of Public Health* 93(7):1117–21.

- Long, J. Scott and Jeremy Freese. 2005. *Regression Models for Categorical Dependent Variables Using Stata*. 2nd ed. College Station, Texas: Stata Press.
- Maltz, Michael D. 1999. *Bridging Gaps in Police Crime Data*.
- Mansbridge, Jane. 1999. "Should Blacks Represent Blacks and Women Represent Women? A Contingent 'Yes.'" *The Journal of Politics* 61(03):628–57.
- Montalvo, José G. and Marta Reynal-Querol. 2005. "Ethnic Polarization, Potential Conflict, and Civil Wars." *American Economic Review* 796–816.
- Morgan, Stephen L. and Christopher Winship. 2014. *Counterfactuals and Causal Inference: Methods and Principles for Social Research*. Cambridge: Cambridge University Press.
- O'Flaherty, Brendan. 2015. *The Economics of Race in the United States*. Cambridge, MA: Harvard University Press.
- Osgood, D. Wayne. 2000. "Poisson-Based Regression Analysis of Aggregate Crime Rates." *Journal of Quantitative Criminology* 16(1):21–43.
- Paternoster, Raymond, Robert Brame, and Sarah Bacon. 2007. *The Death Penalty: America's Experience with Capital Punishment*. New York: Oxford University Press.
- Pettigrew, Thomas F. 1998. "Reactions Toward the New Minorities of Western Europe." *Annual Review of Sociology* 24(1):77–103.
- Planty, Michael et al. 2015. *Arrest-Related Deaths Program: Data Quality Profile*. U.S. Department of Justice. Retrieved April 26, 2016 (<http://www.publicsafety.gc.ca/lbrr/archives/cnmcs-plcng/cn33640-eng.pdf>).



- Portes, Alejandro and Julia Sensenbrenner. 1993. "Embeddedness and Immigration: Notes on the Social Determinants of Economic Action." *American Journal of Sociology* 98(6):1320–50.
- Ross, Cody T. 2015. "A Multi-Level Bayesian Analysis of Racial Bias in Police Shootings at the County-Level in the United States, 2011–2014." *PLoS ONE* 10(11):e0141854.
- Rubin, Donald B. 2004. *Multiple Imputation for Nonresponse in Surveys*. John Wiley & Sons.
- Sampson, Robert J. and W. Byron Groves. 1989. "Community Structure and Crime: Testing Social-Disorganization Theory." *American Journal of Sociology* 94(4):774–802.
- Scherer, Nancy and Brett Curry. 2010. "Does Descriptive Race Representation Enhance Institutional Legitimacy? The Case of the U.S. Courts." *The Journal of Politics* 72(01):90–104.
- Simien, Evelyn M. 2005. "Race, Gender, and Linked Fate." *Journal of Black Studies* 35(5):529–50.
- Smith, Brad and Malcolm D. Holmes. 2014. "Police Use of Excessive Force in Minority Communities: A Test of the Minority Threat, Place, and Community Accountability Hypotheses." *Social Problems* 61(1):83–104.
- Smith, Brad W. 2003. "The Impact of Police Officer Diversity on Police-Caused Homicides." *Policy Studies Journal* 31(2):147–62.
- Sorensen, Jonathan R., James W. Marquart, and Deon E. Brock. 1993. "Factors Related to Killings of Felons by Police Officers: A Test of the Community Violence and Conflict Hypotheses." *Justice Quarterly* 10(3):417–40.

- Stokes, L. D. 1997. "Minority Groups in Law Enforcement." in *Contemporary policing: Personnel, issues and trends*, edited by M. L. Dantzker. Boston: Butterworth Heine-  
man.
- Stults, Brian J. and Eric P. Baumer. 2007. "Racial Context and Police Force Size: Evaluat-  
ing the Empirical Validity of the Minority Threat Perspective." *American Journal  
of Sociology* 113(2):507–46.
- Sun, Ivan Y. and Brian K. Payne. 2004. "Racial Differences in Resolving Conflicts: A  
Comparison between Black and White Police Officers." *Crime & Delinquency*  
50(4):516–41.
- Taylor, Ralph B. and Jeanette Covington. 1988. "Neighborhood Changes in Ecology and  
Violence." *Criminology* 26(4):553–90.
- Theobald, N. A. and D. P. Haider-Markel. 2008. "Race, Bureaucracy, and Symbolic Rep-  
resentation: Interactions between Citizens and Police." *Journal of Public Admin-  
istration Research and Theory* 19(2):409–26.
- Turk, Austin T. 1966. "Conflict and Criminality." *American Sociological Review* 31(3):338–  
52.
- Van Buuren, Stef and Karin Groothuis-Oudshoorn. 2011. "Mice: Multivariate Imputa-  
tion by Chained Equations in R." *Journal of Statistical Software* 45(3).
- Walker, Samuel. 1985. "Racial Minority and Female Employment in Policing: The Impli-  
cations of 'glacial' Change." *Crime & Delinquency* 31(4):555–72.
- Walker, Samuel and Charles M. Katz. 2011. *The Police in America: An Introduction*. Dubu-  
que, Iowa: McGraw-Hill.

Walker, Samuel, Cassia Spohn, and Miriam DeLone. 2012. *The Color of Justice: Race, Ethnicity, and Crime in America*. Cengage Learning.

Weitzer, Ronald. 2000. "Racialized Policing: Residents' Perceptions in Three Neighborhoods." *Law & Society Review* 34(1):129–55.

Willits, Dale W. and Jeffrey S. Nowacki. 2014. "Police Organisation and Deadly Force: An Examination of Variation across Large and Small Cities." *Policing and Society* 24(1):63–80.

Zimring, Franklin E. forthcoming. *When Police Kill: The Character and Control of Violence in Uniform*. Cambridge MA: Harvard University Press (forthcoming).

Zimring, Franklin E. and Brittany Arsiniega. 2015. "Trends in Killing of and by Police: A Preliminary Analysis." *Ohio State Journal of Criminal Law* 13(1):247–64.