Stop, Frisk, and Assault? Racial Disparities in Police Use of Force During Investigatory Stops

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Abstract

Black civilians are more likely to be stopped by police than White civilians net of relevant factors. Less is known about whether or not racial inequalities exist in police use of force during stops. Using data on over two million police stops in New York City from 2007-2014 and drawing on literatures on race, policing, and the Black Lives Matter movement, we test hypotheses regarding the associations between race, civilian behavior, age, and police use of force. We also investigate whether recent reforms reduced any observed inequality in police violence during stops. Findings show that Black and White civilians experience fundamentally different interactions with police. Black civilians are particularly more likely to experience potential lethal force when police uncover criminal activity and this disparity is greatest for Black youth compared to White youth. Overall, if there were no racial disparities in police use of force, we estimate that approximately 61,000 fewer stops of Black civilians would have included police use of force and 1,000 fewer stops would have included potential lethal force from 2007-2014. Further, while reform efforts substantially reduced the number of stops annually, inequalities in police use of force persist.

Introduction

Police make contact with nearly 44 million Americans annually in the United States (Hyland et al 2015). While the overall rate of contact remained stable from 2002 to 2011, urban residents around the country experienced a substantial increase in investigative police stops, known as stop-and-frisks. In New York City specifically, the number of stop-and-frisks increased three-fold from 2003 to 2009 and were disproportionately concentrated among racial and ethnic minorities (Meares 2014). Indeed, Black NYC residents are approximately 2.5 times more likely to be stopped than White residents, net of germane factors including neighborhood context and crime rates (Gelman, Fagan, and Kiss 2007). Yet beyond the act of being stopped, less is known about whether inequality exists in terms of what happens once individuals are stopped.

As the state's legitimized form of physical coercion over citizens, racial disparities in police use of force are perhaps one of the most extreme examples of racial inequality. This is, in part, why accusations of racial bias in police use of force have been and continue to be a common focal point of civil unrest in the United States. From the 1960s in cities such as Detroit, Philadelphia, and Chicago, to the recent protests that coalesced under the #BlackLivesMatter moniker in response to the deaths of young Black victims such as Michael Brown in Ferguson, Freddie Gray in Baltimore, and Laquan McDonald in Chicago, and others, accusations of unjustified use of force against Black victims persist. Indeed, recent investigations by the Department of Justice into those cities found evidence of civil rights violations by police, as did investigations into Albuquerque, Cleveland, and Seattle police amongst others. Protesters assert that the well-documented racial inequalities in the likelihood of being stopped are exacerbated by policing bias in the likelihood that force is used during stops, and that the bias is particularly

harmful for black youth. Public discourse focuses on civilian behavior during police encounters, with many suggesting that Black people are more likely to be doing something wrong at the time than White people, thus precipitating police use of force. In this scenario, civilian behavior, not racial bias, is thought to drive police use of force. Despite these competing explanations for police use of force, no systematic research testing these propositions exists.

The dearth of research on this topic is in part due to data limitations, however, this has recently begun to change. Since the 1990s, data collection by police has become increasingly common, but agencies only began disseminating data in the last few years. The New York Police Department (NYPD) was among the first to publicly release detailed data on investigatory stops as part of a legal settlement (*Daniels et al. v. City of New York* 1999). Subsequent analyses of this data helped convince a federal judge to declare NYPD's stop-and-frisk policy unconstitutional due to racial bias (*Floyd v. City of New York* 2013). Even before that ruling though, New York began to roll back the use of stop-and-frisk. Stops dropped from a high of 685,724 in 2011 to under 50,000 in 2014. While critics considered NYPD's shift away from stop-and-frisk and the court's ruling to be monumental victories, it is unknown whether this dramatic drop reduced racial inequality in police violence during stops.

We fill these voids in existing research, focusing specifically on New York City. We test the claim, re-energized by the Black Lives Matter movement, that Black civilians, especially Black youth, are more likely to be subject to physical force during a police encounter than White civilians, after adjusting for other factors related to police use of force. We also examine whether or not Black individuals are more likely to experience police violence during stops that end in arrest and/or the recovery of contraband or a weapon than Whites, as criminal behavior is a common alternative explanation for high profile instances of police use of force against Black

civilians. Additionally, we assess whether recent NYPD reforms to the use of investigatory stops as a policing practice and changes in officer training affect any observed inequalities in police use of force.

New York City is a compelling research setting because it is widely viewed as a model for proactive policing. In response to a crime wave in the early 1990s, the NYPD implemented an especially visible, aggressive stop-and-frisk policy which was then expanded into the next decade. Moreover, there is little reason to expect New York to be an outlier in the broader pattern of police use of force in the United States. In fact, given that the NYPD was subject to some of the strongest early contemporary critiques of racial discrimination after the police shooting of Amadou Diallo in 1999, which the City settled via lawsuit, and that New York was under judicial oversight for racial disparities in stop and frisk during our observation period, the City may represent a conservative test of racial disparities in police use of force. On the other hand, New York was also the site of several large Black Lives Matter protests after Eric Garner's death and the subsequent acquittal of Officer Pantaleo. Regardless, a recent report analyzing police use of force in a multicity sample found similar patterns across jurisdictions ranging in size, demographics, and region. Although cities differ in the degree of racial inequality in police use of force, there is a general pattern of racial inequality across localities (Goff et al 2016).

Prior Research on Police Stops and Use of Force

As the legal rulings regarding stop-and-frisk focused on its efficacy in finding weapons and preventing crime, so too has most of the research (see Meares 2014 for a review). However, the original case involved police using force against an individual (Terry) who had not yet performed a criminal act (he was preparing to commit armed robbery when stopped). Stuntz

(1998) argues that the Supreme Court and researchers mistakenly focus on the legitimacy of the search and not when police use force against individuals. Stuntz's critique remains apt today, particularly because foundational scholars conceptualize police capacity for use of force as the defining characteristic of police work (Bittner 1970).

Although deadly police encounters are rare compared to police use of force in general, public interest may have steered researchers toward the most severe form of force. In the broadest sense, research finds that communities with greater racial inequality have higher rates of lethal violence by police (Jacobs and O'Brien 1998, but for a recent exception, see Klinger et al 2016). Although recently, in part due to research showing that structural factors explain only a portion of police behavior and the rise in public awareness of specific incidents of police use of force, researchers shifted focus to police use of lethal force at the individual level.

These latest studies, which adapt data from the Bureau of Justice Statistics and/or crowdsourced data, show racial inequalities in who is killed by police (e.g. Guardian, mappingpoliceviolence.org). For example, one study finds that unarmed Black people are 3.5 times more likely to be shot by police than unarmed Whites (Ross 2015). Such research is useful for determining the scope of the issue, but conclusions are limited. For example, without a comparison group such as non-fatal encounters, scholars cannot identify how these fatal shootings differ from other police encounters. Moreover, as this data does not contain many details of the encounter, it is impossible to ascertain whether Black individuals are more likely to be shot because of racial bias or due to some other reason. Indeed, there are a variety of competing explanations for why racial disparities may exist other than racial bias. While data limitations have hampered empirical work, scholars have long been theorizing about why observed disparities in police use of force might occur, highlighting a series of behavioral,

contextual, and organizational factors (Engel and Calnon 2004; Friedrich 1980; Geller and Toch 1996; Smith 1986; Smith and Alpert 2007).

A recent study that adjusted for a range of these factors did not find racial disparities in police shootings in Houston, but did find disparities in police use of force in general (Fryer 2016). However, Fryer compared police shootings to police encounters involving arrests in which police could have been legally justified in shooting (e.g., a person resisting arrest) and research suggests that these arrests are racialized; officers are more likely to perceive people of color as verbally abusive or noncompliant than whites (Geller and Fagan 2010). As a result, Fryer's analytic strategy likely obscured any racial disparity in police shootings.

Unfortunately, data limitations such as those described above are not new, rather, studying police use of force has always been challenging. Because of this, most of the literature debates how to measure it and achieve representative estimates of use of force (see Garner et al 2002; Geller and Toch 1996). For instance, most early work relied on trained observers accompanying officers on their shifts and recording any use of force, which is susceptible to bias (e.g. Terrill and Mastrofski 2002). Similarly, other work relies on surveys of individuals in custody (Garner et al 1995; 2002). Additional research using surveys of the public or data collected by the police also lack enough information to rule out competing explanations (Engel and Calnon 2004; Goff et al 2016). Also, aside from crowdsourced studies, most research to date relies on data collected in the 1990s. Taken together, these limitations may explain why previous research on racial disparities in police use of force has historically been mixed (Goff et al 2016; Sun and Payne 2004; Terrell and Mastrofski 2002). The current study builds on previous work by (1) using contemporary data to assess disparities in police use of force, (2) using a

comparison group, and (3) adjusting for competing explanations that prior research has not

adequately considered, such as civilian behavior. We detail these explanations next.

Contextual Differences

A common rationale for racially unequal rates of police use of force is that Black

residents live in neighborhoods with higher poverty rates than White residents (Smith 1986).

Given that the risk of police violence is higher in disadvantaged neighborhoods (Terrill and

Reisig 2003), Black people may be more likely to experience police violence than White people

because of where they live. Here, structural factors should explain any racial disparities in police

use of force. In short, the combination of racial segregation and poverty concentration may

explain any racial inequality in police shootings (Massey and Denton 1993). These race and class

differences can also affect organizational strategies, such as whether or not to aggressively use

stop and frisk as a policing practice, which could lead to higher or lower use of force during

stops. Recent research finds that context did not explain the racial disparity, but rather,

moderated it. Consistent with racial threat theory, the racial disparity in police use of force is

greatest in segregated precincts (Levchak 2017).

Behavioral and Situational Differences

Racial disparities in crime rates are perhaps the default explanation for any observed

inequalities in policing (Goff et al 2016; MacDonald 2011). For example, if police shootings

occur at random during police interactions and Black individuals are three times more likely to

interact with police than White individuals because of a higher rate of involvement in violent

crime (Sampson and Lauritsen 1997), we would expect Black individuals to be three times as

likely to be shot as Whites. In this case, observed racial disparities in police shootings would be

due to differential involvement in crime. As evidence, recent work shows that violent crime rates

broken down by race decreases but does not eliminate the racial disparity in police use of force (Goff et al 2016).

Further, civilian behavior during the stop may also explain racial differences in police use of force. One way civilian behavior may influence this is whether the stop is productive or not. A productive stop is one that results in an arrest or finds a weapon or other contraband (i.e. drugs). Because civilians involved in criminal activity may resist the stop in the hopes of avoiding sanctions, productive stops may require police use of force more so than unproductive stops. In other words, racial differences in the stopped person's involvement in crime may explain any observed racial disparities. For instance, if Black people are more likely to be arrested during investigatory stops, then accounting for the stop outcome might explain disparities in police use of force. On the other hand, the "hit rate" for finding weapons or drugs during a stop is lower for Black than White civilians in NYC, thus, adjusting for the "success" of the stop could exacerbate any observed racial disparity in police use of force (Gelman et al 2007). Unfortunately, data limitations prevent researchers from ascertaining the sequencing of police locating criminal activity and police use of force; police might exert force after finding a weapon or, use force and then discover contraband.

Other scholars emphasize different forms of civilian behavior (Durna 2011; Friedrich 1980). This line of work suggests that any observed racial disparity in police use of force is due to the way Black civilians behave compared to White civilians during a police encounter. Put differently, some research finds that Black civilians are more hostile and noncompliant toward officers and such behaviors increase the likelihood of police use of force (Engel 2003; Garner et al 2002). Similarly, officers are more likely to use force when a civilian is suspected of a violent crime, and given racial disparities in violent crime, Black civilians may be more likely to be

suspected of such than White ones (Worden 1996). In this case, unlike "hit rates," police are more likely to report that Black civilians were suspected of violent crime or noncompliant when stopped, thus accounting for these behaviors may decrease any observed racial disparity. Moreover, because these behaviors are racialized—officers employ racialized "scripts" for these kinds of behaviors and as a result are more likely to perceive Black civilians as, for instance noncompliant —adjusting for these behaviors will produce conservative estimates of any police violence disparities (Geller and Fagan 2010; Muhammad 2010). Like with the outcome of the stop, ascertaining the timing of civilian behavior and police violence is difficult and a common civilian complaint is that police induce arrest as a post hoc justification for their use of force.

Discrimination Based Theories

In contrast to behavioral and contextual theories, others argue that any observed disparities in police use of force are the result of racial bias—that police perceive Black civilians differently than Whites. If after accounting for the theoretically and empirically important factors discussed above, we find racial disparities in police use of force, then racial bias may be present. Racial disparities in police use of force are produced at either the individual level or via spatial differences in policing practices. Because we adjust our analyses for the fact that policing strategies differ across neighborhoods and control for clustering at the precinct level, only individual (cop) bias remains (Tomaskovic-Devey, Mason, and Zingraff 2004; Warren et al 2006).

Officer bias can be explicit, implicit, or both. Often referred to as the "bad apples" argument, it is unlikely that enough officers are overtly biased to produce systematic patterns in police violence alone (Warren et al 2006). Yet recent scandals involving the exchange of racist texts and memes among police from areas ranging from San Francisco to Ferguson to Fort

Lauderdale suggest prejudice continues to thrive, and data on over 28,000 civilian complaints in Chicago show that a small percentage of officers are responsible for the majority of civilian complaints (Arthur 2015; Hernandez 2015; Robles 2015). Similarly, analyses of Florida traffic stop ticketing patterns indicate that approximately 25% of Florida highway patrol officers are biased against Black and Hispanic drivers (Goncalves and Mello 2017). Such explicitly biased policing may explain why Black residents consistently report more negative police encounters than Whites (Anderson 1990; Brunson 2007; Carr et al 2007; Weitzer and Tuch 2004) and some early work suggests that Black people are more likely to experience police use of force than White people (Worden 1996; Terrill and Mastrofski 2002).

Racial bias, however, need not be explicit for policing to lead to racially disparate experiences. Viewing the behavior of Black individuals as suspicious compared to similarly behaving White individuals is an example of implicit bias and may lead to more frequent violence against Black people than White people. That is, an officer need not be actively aware that their perceptions of civilians vary by race. Indeed, research suggests that implicit biases affect officer performance (Correll et al 2007; Greenwald and Krieger 2006; Plant and Peruche 2005). As stereotypes of Black individuals are often specifically about physical threats to personal safety (Quillian and Pager 2010), implicit bias may lead to unequal use of force. Implicit bias may also cause police to interpret behavior in racialized ways, as discussed above. Thus using police reports of civilian behavior to adjust for bias in police use of force may underestimate any racial discrimination. Yet even using officer reports of police use of force in a quasi-experiment, Legewie (2016) shows racial bias in New York City policing. Police violence increased against Black civilians after Black suspects fatally shot police officers, but no such increase occurred after White or Hispanic suspects fatally shot police.

Despite elevated public discourse on racial bias, particularly implicit bias, as well as continued national debate concerning the credibility of Black Lives Matter (BLM) and the subsequent counter groups All Lives Matter and Blue Lives Matter, few contemporary studies systematically examine whether police violence varies by race, net of other key factors that influence racial inequalities. Because police may perceive Black civilians as more dangerous than White civilians, our first hypothesis is:

> H1. Black individuals are more likely to be subjected to force, and specifically potential lethal force, during a police interaction than White individuals net of relevant factors including neighborhood characteristics, crime rates, civilian behavior, and the stop outcome.

While many of the civilian deaths that have sparked national conversation were during stops in which the individual had done nothing wrong, others were after police reported feeling afraid or had begun the process of arresting the individual. For example, Eric Garner was placed in a chokehold for illegally selling individual cigarettes and Tamir Rice was confronted by police who had been told he had a gun. As a result, public discourse has focused on whether the individual's behavior precipitated police violence, and that, in line with prior research on stop outcomes, once individual behavior is accounted for, any racial disparities should disappear. In spite of this, scholarship consistently finds that Black people receive harsher treatments than White people throughout the criminal justice system (Morenoff 2005; Ousey and Lee 2008; Steffensmeier et al 1998). Given this research and that officers interpret Black civilian behavior differently than White behavior, officer reactions may be amplified when Black individuals are violating the law (Geller and Fagan 2010). Therefore rather than explaining any racial disparity, discrimination theories suggest that Black individuals may be even more likely to experience force than Whites when they are suspected of breaking the law.

Specifically, a Black civilian violating the law may trigger stereotypes of the athletic and aggressive Black man or the criminal "Black brute" for officers (Miller 1998). For example, Darren Wilson described Michael Brown as "Hulk Hogan like" to justify his use of deadly force and Betty Shelby's defense for shooting Terence Crutcher was her fear that he was heading toward his car to get a gun. Further, research shows that such stereotypes persist; Black people are perceived as more aggressive and physically formidable than White people (Holbrook et al 2016; Wilson, Hugenberg, and Rule 2017). Stereotypes of Black people as more dangerous than White people, lead us to hypothesize that police will perceive any evidence of criminal activity as more threatening when stopping Black civilians than White ones. Thus, our second hypothesis is:

> H2. Any observed racial disparity in police use of force will be larger during stops when contraband is found or the stop resulted in an arrest, net of neighborhood characteristics, crime rates, and civilian behavior.

BLM activists, however, not only articulate accusations of broad racial inequality in police use of force, they also make more intersectional claims about how and why that inequality emerges. In particular, BLM protestors argue that police use of force is especially harmful for Black youth and that a fear of police is learned very early in Black communities. Although spurred by the death of 18 year old Michael Brown, the BLM movement first emerged after 17 year old Treyvon Martin's death in 2012. The centrality of age in this conflict is further illustrated in the viral videos of police violence against teens such as the viral video of a McKinney, TX police officer kneeling on the back of a 14 year old Black child in a bikini at a pool party or the surveillance video of the shooting of 12-year old Tamir Rice in a Cleveland park.

Extant research provides some support for this argument. Black students are more likely than White students to be suspended or expelled for otherwise equivalent disciplinary reasons in schools (Gregory and Weinstein 2008; Welch and Payne 2010). This may, in part, be explained by racialized views of youth, as Black boys are seen as older than their peers in photographs (Goff et al 2014) and Americans prefer harsher punishments for juvenile behaviors when the perpetrator is Black instead of White (Pickett and Chiricos 2012; Rattan et al 2012). While rarely a focus of research on police use of force, early work suggests that age influences police use of force (Reiss 1968; Terrill and Mastrofski 2002). Indeed, recent scholarship calls for policing research to focus explicitly on kids, as legal socialization and legitimacy attitudes develop early in life (Tyler and Trinkner 2017). Taken together, if police have biases against Black youth—for example, the officers who killed Tamir Rice claimed he looked older than his age—then the magnitude of the relationship between age and police use of force should be greater for Black youth than White youth. If police systematically share those perceptions of Black youth as older and more worthy of punishment than White youth, this will lead to police using more force against Black youth than White peers. Thus, our third hypothesis, is:

> H3. Any observed racial disparity in experiencing police force will be greatest for stops of teenagers and will decline with age.

Proactive Policing and Reforms in New York City

As a policing policy, stop-and-frisk dates back to *Terry v. Ohio (1968)*, the Supreme Court case in which police were given the ability to detain and frisk an individual for whom they had "reasonable suspicion" has been, is, or will be engaged in a criminal activity and may be armed and "presently dangerous." In the late 1990s, the NYPD began employing this proactive

strategy in response to an unprecedented crime wave. At its peak, from 2006-2012, the NYPD instigated over half a million stops every year, or one stop per minute for six years.

As a result of hundreds of citizens, primarily people of color, being stopped daily and low and unequal rates of finding illegal weapons during those stops, a federal 2013 ruling found that New York's aggressive use of stop-and-frisk was racially discriminatory. Earlier in 2013, NYPD also voluntarily shifted away from stop and frisk as a policing tactic. Overall, stops in the city dropped from averaging over half a million stops a year to under 50,000 in 2014. In addition to dramatically reducing the number of stops and increasing awareness surrounding racial disparities in stops, the NYPD also revised its training to promote more civil and less confrontational behavior during stops. This provides a unique opportunity to test whether or not organizational policy changes can reduce any observed racial disparities in police use of force.

On the one hand, decreasing stop and frisk and revising officer training may reduce any observed disparities. For instance, research on the "driving while Black" phenomenon shows that racial disparities in traffic stops dropped after states passed laws prohibiting the use of racial profiling (Tomaskovic-Devey and Warren 2009). Similarly, Fyfe (1982) found that police use of lethal force decreased after administrative policies were enacted in the 1970s.

Meanwhile other work suggests that reforms cannot change unconscious bias by individual actors without significant de-escalation/racial bias training (Correll et al 2002). Although the NYPD did implement new training protocol specifically concerning stops, this training did not address racial bias. Instead, it focused on non-confrontational techniques. Indeed, accusations of racial bias by the NYPD have continued since the training tactics change. For example, Eric Garner's death came after the policy change and was caused by a chokehold that violated NYPD policies.

In sum, while the NYPD dramatically reduced the use of investigatory stops and revised its training, this does not necessarily imply that racial disparities in use of force declined as a result. In light of the NYPD's changes and existing work showing that police organizational reform can reduce observed racial disparities, our fourth hypothesis is:

> H4. In the wake of *Floyd v. City of New York,* NYPD's reduction in stops, and changes in officer training, any observed racial inequality in police use of force decreased beginning in 2013.

Analytic Strategy

We employ a series of strategies to test our four hypotheses concerning the relationships between race, civilian behavior, age, and police use of force and whether reforms have impacted any observed disparities. To assess hypothesis 1 that observed racial disparities are not explained by contextual or behavioral explanations, we first estimate the likelihood of experiencing police violence during New York Police Department investigative stops while adjusting for those explanations.[1] Since racial tensions often center on whether the victim was involved in criminal activity at the time and racial stereotypes may be especially pertinent in these circumstances, we next divide our sample into two groups to test hypothesis 2: (1) productive stops, during which officers arrested the civilian and/or seized a weapon or other contraband, and (2) stops that concluded without arrest or seizures. This directly tests whether or not behavioral differences— specifically, post hoc identifications of criminal behavior—explain or amplify any observed racial disparities. Further, examining disparities in analyses restricted to stops in which police *did not* report any criminal activity avoids any potential sequencing issues between civilian behavior and police use of force.

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[1] We do not assess mediation in our analyses because there is no agreed upon method for comparing nested logistic regression models (see Mood 2010 for a detailed explanation).

Next we report marginal effects to test our age hypothesis that Black youth are more likely to experience police violence than White youth (hypothesis 3). Then, to test whether recent organizational changes to investigatory stops reduced inequalities in police use of force (hypothesis 4), we estimate separate pre reform models (2007-2012) and post reform models (2013-2014). As our data are from police self-reports and any justifications for the use of force is reported only after force was used, our estimates of inequalities in police violence are conservative and should be viewed as a baseline.

Data

The New York Police Department (NYPD) began collecting data on stops more than twenty years ago; however, it was not until the class action lawsuit settlement of *Daniels et al. v. City of New York* in 1999 that the department agreed to make the data publicly available. NYPD officers are trained to fill out a form (a UF-250) for any civilian interaction in which an officer has "reasonable suspicion" that a person is involved in criminal activity, regardless of the outcome of that stop. We analyze all stops of Black or White civilians recorded between 2007 and 2014 with valid information, producing a sample of over 2 million stops.[2] UF-250s include a variety of details about the stop such as the location, use of force, and the behaviors and characteristics of the stopped individual.[3] To incorporate police precinct and census data, we geocode recorded addresses and merge them with publicly available maps of New York City's 77 precincts and census tracts created as part of a WNYC (NYC public radio) project on the location of low level marijuana arrests. We then include census level demographics from the

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[2]Less than 2% of stops had any missing data.
[3]Of the 2 million stops reported, an unknown number are of individuals who are stopped more than once. The NYPD data does not include any way of identifying the stopped individual, so we cannot test whether or not experiencing multiple stops makes individuals more or less likely to experience force during stops.

2010 census and the 2008-2012 American Community Survey (ACS) 5-year sample. Table 1 shows descriptive statistics for all variables included in the analysis.

Our dependent variables include two measures of police use of force. Consistent with prior research (Legewie 2016; Terrill and Mastrofski 2002), we first examine whether or not a stop includes *any* use of force, which includes a range of physical force from "hands on suspect" to "pointing firearm at suspect" (1=any force). Roughly 1/5th of all stops include some form of physical force, most commonly placing hands on suspect, handcuffing them, or putting the suspect against the wall/car. Although this is a standard measure and the NYPD specifically defines these actions as force, the process of arresting a civilian may, by definition, include force, which complicates temporal ordering (see Kaminski, Engle, Rojek, Smith, and Alpert 2015). We address this in two ways. First, as described above, we split the sample by whether or not the stop was productive or not (i.e. resulted in arrest/found contraband). If we find similar racial disparities in stops during which police *did not find* any criminal activity or materials (before or after using force) *and* in stops during which police *do find* such evidence, this would demonstrate that arrests are not driving racial disparities in use of force. We also examine a much narrower form of force--- drawing and/or pointing a service weapon--- which is not a part of arrest protocol.

As police officers are trained only to pull their firearm if they are prepared to shoot an individual and firearms represent the only lethal force option on the UF-250 form, we also model a subset of our first dependent variable in which an officer pulls their firearm and/or points the firearm at a suspect as a separate outcome (1=gun drawn or pointed). This potentially lethal form of force represents 0.5% of all recorded stops and roughly 90% of the time in which an officer

uses any available weapon listed on the UF-250 form (gun, pepper spray, baton).[4,5] As with any

force, we also split the sample by the stop outcome when estimating disparities in potential lethal

force.

Our focal independent variables include indicators for race and age. In our data, police

used force in approximately 22.3% of stops involving a Black individual compared to 16.4% of

stops with Whites. Importantly, because our sample includes all stops reported, this disparity

(and all of our results) is *net of the substantial racial inequality in the likelihood of being stopped*

by police (Chauhan et al 2015; Epp et al 2014). To facilitate understanding of the age-use of

force dynamic, we divide age into nine categories ranging from ages 10-14—there are more than

36,000 stops of Black youth aged 10-14 in our sample alone—to age 50 plus, which serves as the

reference group. This allows us to capture any non-linear associations between age, race and

police use of force and focus on teenage experiences (hypothesis 3).[6] Overall, more Black

teenagers experienced force during a stop than Whites as a whole in our sample. We also adjust

for gender as more than 90% of stops were of men (male=1) and height, which is measured in

inches.[7]

To estimate inequalities in police violence, we incorporate an extensive set of controls

including civilian behavior, stop characteristics, crime rates, policing strategies, and

neighborhood characteristics. A key independent variable is the outcome of the stop—

specifically whether the stop was successful in (1) finding a weapon (which could explain the

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[4] During the time period under study, NYC did not provide patrol officers with Tasers.
[5] The results from ordered logistic analyses of all types of police use of force were generally consistent with our strategy of modeling force and guns separately, but we keep them separate because using ordered logistic obscures some differences. Because of its rarity, we do not model non-gun police weapon use, but the results from sensitivity analyses predicting any weapon use do not differ from models focused on guns only (available upon request).
[6] All age categories contain large enough cell sizes with one exception: only 18 White youth aged 10-14 had guns drawn on them during a stop compared to 188 Black youth in those circumstances.
[7] We exclude indicators of body mass index (BMI) from our models because they were not meaningful in preliminary analyses (results available upon request).

police use of force during the stop), (2) finding other contraband (primarily drugs), or (3)

resulted in an arrest (Garner et al 1995). These categories are not mutually exclusive; for

instance, a person might be arrested because police find contraband during a stop. In later

models, we split the sample by the outcome of the stop. We include three measures of civilian

behavior during the stop: officer reports that the stopped individual (1) made verbal threats, (2)

refused to comply with orders, and (3) was suspected of a violent crime (Smith 1986; Terrill and

Mastrofski 2002; Worden 1996). Like with the stop outcome, these measures are reported after

the stop concludes. We also adjust for three additional stop characteristics that prior research

suggests are related to police use of force (Grogger and Ridgeway 2006; Levchak 2017): the

length of time the officer observed the civilian before making the stop (0-60 minutes), whether or

not the stop occurred at night (1=yes), and the stop duration (0-60 minutes).[8]

Beyond individual or stop characteristics, we adjust for precinct level felony and

misdemeanor arrest rates, because the NYPD often modifies policing strategies based on local

crime rates. For example, areas that experienced crime spikes saw an increase in police officers

as part of the NYPD's COMPSTAT program (i.e. hot spot policing). We use current year

precinct arrest rates as NYPD policing was responsive, generally, to contemporary crime (2-

week periods) and not to crime rates in prior years.[9]

Additionally, we include indicators of precinct stop rates, as previous research on racial

inequalities in stop rates found that precincts varied in their stop rates, but not necessarily in the

racial inequalities in who is stopped (Gelman et al 2007). To do so, we identified precincts in

which the stop rate was more than one standard deviation higher than the average precinct as

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[8] To determine whether a stop occurred at night, we used daily sunrise and sunset times for NYC from 2007-2014 from the U.S. Naval Observatory (n.d.) and adjusted for daylight savings time.
[9] Sensitivity analyses using a lagged measure of arrest rates were substantively similar (available upon request).

"high-stop" areas (n=9) and precincts with at least .7 standard deviation fewer stops as "low-stop" precincts (n=10; none reached the one SD cut-off in that direction). Since the use of investigative stops varies over time, we also include indicators for year in our analyses (results not shown, available upon request).

Drawing on the neighborhood effects literature and building on existing use of force research, we also adjust for a variety of neighborhood characteristics including measures of population, population density, racial composition of the area, male median age, poverty, education, vacancy, and unemployment (Levchak 2017; Smith and Holmes 2014).

Results

First, we estimate the likelihood of stops involving any police use of force as well as potential lethal force across our entire sample population using logistic regression with robust standard errors to adjust for clustering by precinct.[10] The results, which appear in Table 2, show that Black civilians have 27% higher odds of experiencing force during a stop than White civilians and 28% higher odds of officers drawing their guns (OR= 1.27 and 1.28 respectively). Importantly, these findings are net of alternative explanations including civilian behavior, the success of the stop, local crime rates, and neighborhood context. This supports hypothesis 1 that Black individuals are more likely to experience force, including potential lethal force, at the hands of police than White individuals.

Additionally, the results in Table 2 provide preliminary support for the notion that younger civilians are more likely to experience both any force and potential lethal force than

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[10] As prior research shows that precinct differences account for 11% of variation in police use of force, but did not substantially affect the size of observed racial disparities, multilevel modeling is unnecessary for our purposes (Levchak 2017).

older civilians. The results also indicate that demographic characteristics beyond race and age are associated with police violence. Gender, in particular has a strong relationship with police use of force; men have 64% higher odds of experiencing force than women (OR=1.64). However, model 2 shows that men are no more likely than women to have guns drawn on them during stops. Because officers are trained to draw their weapons when they are prepared to shoot and kill, the results suggest that stereotypes regarding traditional femininity that may protect women from, and during, police encounters, disappear when police perceive a heightened threat.

Turning to police justifications for force, the results also show that civilian behavior and context matter. The odds of police using force are more than twice as high for stops of civilians suspected of a violent crime (OR =2.39) and nearly quintuple for police pulling their guns (OR=4.94). Civilian noncompliance with orders is also strongly associated with both police using force and drawing a gun. Stops during which civilians verbally threatened officers also have higher odds of officers using force including drawing a gun, although to a lesser extent than the other reported behaviors.

Not surprisingly, the outcome of the stop is also strongly associated with usage of force. Stops that end in arrest are associated with an increase in the odds of police using force by 217% (OR=3.17) and the odds that police draw their weapons by 200% (OR=3.00). Understandably, stops in which police find weapons are more likely to involve the use of force and finding a weapon is strongly related to police drawing their service weapons. Contraband, in comparison, has a weaker association with the odds of police using force and was not related to police drawing their weapons.

The results also indicate that local context is inconsistently related to police use of force. In particular, precinct stop rates are not associated with police use of force with the exception of

stops in high stop rate precincts and potential lethal force; such stops are less likely to involve police drawing their guns. It may be that extensive practice of officers performing stops and civilians being stopped de-escalates the risk of potential lethal force in high stop precincts. Alternatively, the aggressive use of investigatory stops may primarily increase the number of low-risk stops, reducing the overall likelihood of police drawing their weapons. Stops in precincts with higher rates of misdemeanor arrests, on the other hand, are more likely to include force; for every 10 additional misdemeanor arrests in a precinct, the odds of a stop including force increases by 2% (OR=1.002).

At the census tract level, context continues to matter for some factors more than others. Though the magnitude of these associations may seem small, these covariates vary from 0-100. Thus a 10% increase in percent Black or Latino residents is associated with a 4.2% increase in the odds of police drawing their gun. This is consistent with prior research (Levchak 2017; Smith and Holmes 2014), but there is no relationship with use of any force. In contrast, neighborhood poverty is associated with lower odds of police drawing their guns. However, the vacancy rate is associated with higher rates of police use of force, which demonstrates that the neighborhood context beyond the racial demographics of the area is associated with police use force. In sum, and in line with previous research and hypothesis 1, although the context of the stop is associated with the likelihood of police using force during a stop, a substantial racial disparity persists net of measures of neighborhood and precinct context.[11]

Civilian Behavior and Police Use of Force

To more rigorously test the claim that racial differences in criminal behavior may explain racial disparities in police use of force, examine variation in stop type, and assess the robustness

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[11] As contextual effects are not the focus of this piece, we do not show these results for the remaining analyses but they are available on request.

of our findings, we next split our sample by whether or not the stop was a "hit" in finding an arrestable offense, weapon, or other contraband. This tests hypothesis 2 that the racial disparity in the use of force will grow when police uncover criminal activity. Table 3 reports these results. Model 1 shows the results for whether police used any force in stops that *did not* result in an arrest or weapon or other contraband found. As over 90% of stops in our data fit this criterion, it is not surprising that these results are nearly identical to those in Table 2.

Still, it is striking that when police do not report any criminal behavior by stopped civilians, Black individuals experience 29% higher odds of experiencing force than White individuals. Turning to gun use in model 2, the results are again consistent with those in Table 2, albeit the magnitude of the race relationship is slightly smaller (OR=1.20 compared to 1.28 in Table 2). Nonetheless, together these results clearly demonstrate that the racial disparity persists even when individuals are not arrested nor found with contraband. Concerning age, the results show that, like with Table 2, young civilians are more likely to experience any police violence than older persons when no laws are broken, but this does not extend to potential lethal force. However, we caution that such comparisons may be biased by residual heterogeneity between models and not due to substantive differences (Mood 2010). Thus, we graph marginal effects to show the substantive association between race, age, the outcome of the stop, and police use of force shortly.

Before showing the marginal effects, we turn to models 3 and 4 which restrict the sample to stops resulting in arrest or seizure of weapons or other contraband. These are relatively rare— only 145,807 of the 2,085,775 stops were considered productive by this measure. Nevertheless, there is evidence supporting hypothesis 2. Although the racial disparity is smaller for any force when police arrest individuals or find contraband and/or weapons compared to when they are

innocent (model 3 to 1), the disparity grows monumentally for potential lethal force from 20% to 60% higher odds (model 2 to 4). As further evidence that the race of the civilian is directly related to potential lethal force and not a proxy for behavioral differences, the odds ratios for civilian behavior decrease. Most dramatically, being suspected of a violent crime is far less predictive of having a gun drawn for "successful" stops, dropping from 5.57 to 3.61 between models 2 and 4.

Table 3 also shows that the magnitude of the age association decreased for any force between innocent and productive stops but increased considerably across models for stops where police pull their guns. That is, age appears more consequential for potential lethal force when police uncover criminal activity. Regarding gender, men are more likely to experience force regardless of the stop outcome, except for potential lethal force when police find no criminal activity. In this case, men are actually less likely to experience potential lethal force than women. This may be due to how police record stops; each individual stopped gets their own UF-250 report. In the data, women are more likely to be stopped in the company of others and it may be that the behavior of these other people affects how police treat the whole group (Stuart and Benezra 2017). In sum, the results in Table 3 reveal that although race matters across stop outcomes, race is an especially powerful predictor of potential lethal force when police uncover criminal behavior, which supports hypothesis 2. The age associations are less consistent but like with race, are strongest for police drawing their guns during productive stops.

Methodologists, however, caution that comparisons across samples may be invalid for logistic regression coefficients (Long 2009; Mood 2010). Additionally, we have yet to examine how the intersection of race and age influences police violence. Comparing the marginal effect of a variable of interest across samples is a more robust method for testing differences across

samples, which we do in Figures 1 and 2. Specifically, based off the models in Table 3, these figures display the marginal effect of race at every age in our sample by whether the stop was productive or not, testing both hypotheses 2 and 3.

The results in Figure 1 show support for the BLM claim that race is associated with police use of force even after considering alternative explanations such as civilian behavior, criminal involvement, and contextual factors (hypothesis 1). Counter to hypothesis 2 that the racial disparity in use of force should be larger during stops that result in arrest or the seizure of contraband or weapons, the marginal effect of race does not differ by whether or not the stop was productive. For both productive and non-productive stops, Black civilians are more than three percentage points more likely to be subjected to force during a stop than White civilians. In other words, the racial disparity in use of force is not related to racial differences in the "hit rate" of stops—in fact, Black civilians are less likely to be arrested or be found with contraband or weapons when stopped than whites. Overall, this marginal effect indicates that more instances of force against Black civilians are unexplained by contextual or behavioral differences than instances of force against White civilians.

Additionally, there are no age differences for either stop outcome. That is, Figure 1 does not support hypothesis 3; young Black civilians are no more likely to experience police violence than White youth. Instead, Black civilians are more likely to experience police use of force than Whites regardless of their age. Next we turn to the marginal effect results for police use of potential lethal force.

Figure 2 shows the marginal effect of race on police drawing and/or pointing their guns at the stopped individual. Here we find strong evidence of hypothesis 2 that the racial disparity in police escalation of force is greater for productive stops. In other words, and consistent with

research on other criminal justice outcomes such as arrests and sentencing (Ousey and Lee 2008; Steffensmeier et al 1998), Black civilians are treated more harshly than otherwise similar White civilians when doing something wrong. Where the marginal effect is below 0.1 percentage points for stops in which the civilian was not arrested and no contraband nor weapons were seized, it is greater than 0.4 percentage points at every age for stops that resulted in arrests and/or seizures. These differences are statistically significant. In short, Black civilians are more likely to experience potential lethal force when no criminal behavior is uncovered and the likelihood increases at least four fold when officers locate criminal activity.

Further, although age is not related to the marginal effect of race for stops where no criminal behavior is found, age is strongly associated with the marginal effect of race for stops that do result in arrest or seizures. Teens between the ages of 15 and 19 experienced the largest racial disparity of 0.82 percentage points which falls to 0.43 for stops of Black civilians over the age of 50. Thus, the age relationship is more nuanced than our original hypothesis. The racial disparity in police use of force is blind to age *except* when police arrest or seize contraband from young Black individuals and is limited to police drawing their firearms.

Though the magnitude of these marginal effects may seem small, this is at least in part because this sample is comprised of investigatory stops that did not rise to the level of probable cause, hence there are relatively few instances of police drawing or pointing their guns. Yet the marginal effect of race is not only significantly different from zero at all ages for both categories of stops, but substantively meaningful because of the absolute number of stops performed by police. To demonstrate, we calculate a counterfactual: how many fewer stops of Black civilians would include force if Black civilians were treated the same as White civilians at the hands of police?

To calculate our counterfactual, we multiply the number of stops of Black civilians in each age category in our data by the marginal effect for each age category. If Black civilians were treated identically to Whites, we estimate that 61,207 fewer stops of Black civilians (95% CI +/-22,793) would have included force and 1,814 fewer stops of Black civilians (95% CI +/-533) would have involved police gun use. In comparison, fewer than 50,000 total White civilians were subjected to police force during a stop during our observation period and fewer than 1,200 had guns drawn on them. Put differently, there would have been 21 (+/-7.8) fewer uses of force on Black civilians per day and 4.4 (+/- 1.3) fewer guns drawn on Black civilians per week over our eight year observation period.

Organizational Reforms and Police Use of Force

The results discussed above show that during investigatory stops, almost two dozen additional black civilians were subject to police violence every day and more than four had guns drawn on them, compared to White civilians' likelihoods of experiencing force during a stop. Yet those numbers are for our entire observation period, 2007-2014, and NYPD implemented reforms which reduced the number of stops from over half a million every year before 2013 to just over 50,000 in 2014. Although the reforms also included trainings designed to promote professionalism during stops and reduce the reliance on physical force, these trainings were not specifically geared toward reducing the racial disparity in police use of force. Therefore, while the frequency of stops declined, it remains unknown if the racial disparity in police violence also decreased thanks to those organizational reforms.

Table 4 presents the results testing our hypothesis that organizational strategies reduce racial disparities in officer use of force. All covariates are included but not shown—full tables are available upon request. Here we compare logistic regressions before and after NYPD

substantially reduced its use of stop and frisk policing from over 1,800 stops per day to 130 stops per day on average. In short, we find mixed evidence that organizational reforms reduced disparities in police use of force. On the one hand, models 1 and 2 in Table 4 show that Black civilians had 26% higher odds of experiencing any force during a stop compared to Whites before reform and 37% higher odds afterward. This increase is not statistically significant when we examine the difference in the marginal effect of race pre and post reform, but the results clearly suggest that the racial disparity *did not decrease* after organizational reform as hypothesized. The pattern of results concerning age is similar to race; age inequalities persist after reforms and the magnitude for the majority of the age associations increased somewhat post reforms.

On the other hand, the results for potential lethal use of force, which appear in models 3 and 4 in Table 4, provide preliminary evidence of progress in racial inequality. Before the practice was ruled unconstitutional and before police training changed, Black civilians had 29% higher odds of having police draw or point their firearms at them compared to White civilians. After these changes, Black civilians are no longer more likely to experience potential lethal force than White individuals. Similar to our results for any force, the change in the marginal effect of race between pre and post reform is not significantly different. However, this might be due to sample size as only 870 stops of Black civilians included potential lethal force post reform compared to 136 stops of Whites post reform.

While the racial disparity decreased, the overall rate of police gun use increased from 0.4% of stops pre reform to 0.7% of stops after reform. This increase is a logical result of a reform that reduced the rate of stops, as individuals aroused greater suspicion from police to precipitate the stop after reforms (though we did not see the same association for any use of

force, that may be due to training reforms to de-escalate confrontation during stops). In other words, because innocent civilians were less likely to be stopped after reform, the gun rate increased.

Turning to the age results in models 3 and 4, we see that stops of individuals aged 20-44 were more likely to include potential lethal force than individuals aged fifty and older from 2007-2012. As with race, these associations no longer exist post reforms, but the decrease is not statistically significant and this may be due to sample size. Taken together, the results in Table 4 reveal that both age and racial inequalities appear to have decreased some post reforms, but this only applies to the most serious form of force (drawing a firearm) and the change is not statistically significant.

Despite these mixed findings, our data indicate that these reforms fundamentally altered police use of force through the dramatic drop in the number of stops in which police used force. Further, approximately 22.3% of stops before 2013 included force compared to 18.4% of stops after 2013. Because Black people were disproportionately stopped, Black people benefitted from the reforms more so than White people. Indeed, we estimate that every year after reform, 51,017 Black and 6,410 fewer White civilians were subjected to police violence because of those reforms. Taken together, the overall effect of court mandated and NYPD initiated reforms is substantially fewer instances of racially disparate uses of force or guns being drawn during a post reform year than in a typical pre-reform year, even though the marginal effect of race did not significantly change in our models.

Discussion

One hundred years ago, NAACP protests against lynching, police misconduct, and legalized violence against Black Americans demanded social change. In the 1960s, rumors of police misconduct were behind many of the riots and rebellions in cities across the country. Most recently, the deaths of Black citizens during encounters with police returned police brutality and racial inequality to national attention and the growth of the Black Live Matter movement.

However, as a part of the criminal justice system, policing has not been the focus of social science research as much as the study of inequality via mass incarceration (Wakefield and Uggen 2010). Yet, policing inequalities are at the root of legal cynicism that helps perpetuate a cycle of violence and distrust of government in communities (Carr, Napolitano, and Keating 2007; Desmond, Papachristos and Kirk 2016; Tyler, Fagan and Geller 2014). For example, after Chicago police shot and killed her son and neighbor, Janet Cooksey was not only angry at the police, but also at her son's father because she thought he should have called her instead of 911. In her words, "[police] are supposed to serve and protect us and yet they take the lives" (Coates 2015). Similarly, Betty Jones' (the neighbor who was shot) brother already doubted any official investigation's legitimacy, saying "we all know how that will turn out." Strikingly, he made this statement just days before a grand jury decided not to indict Cleveland police officers for Tamir Rice's death on the recommendation of the county prosecutor.

To date, however, there have been few systematic analyses of whether or not there is racial inequality in police use of force today. Moreover, no research exists to our knowledge on how the productivity of a police stop, or age, is associated with the racial disparity in police use of force. Using NYPD's UF-250 forms, precinct, and census data, we find that Black Lives Matters claims are largely borne out by the data, even after controlling for the outcome of the stop, other civilian behavior, and neighborhood and precinct context. Specifically, police treat

Black individuals more harshly than Whites (hypothesis 1). Additionally, the racial disparity in police drawing their weapons is higher for stops that resulted in arrest and/or seizure of contraband or weapons, suggesting that police perceive Black individuals engaging in criminal behavior as more threatening than White individuals in similar circumstances (hypothesis 2). Yet this is limited to potential lethal force; whether a stop was productive or not had no effect on the racial disparity in police use of force more broadly. Further, the racial disparity in gun use during productive stops was greatest for Black youth and young adults—when young Black civilians are found in violation of the law during stops, they are more likely to experience potentially lethal force than young White civilians as well as older Black and White civilians (hypothesis 3). There were no age inequities by race among stops that did not include or uncover any illicit behavior.

In sum, Black individuals are not only more likely to be stopped by police, they are also more likely to be subjected to police use of force during that interaction, and more likely to be seen as threatening to officers, resulting in a greater rate of police drawing their weapons. This finding is notable for its consistency across our models: Black civilians who were found to be engaging in criminal behavior were more likely to be subjected to force, as were Black civilians who were not engaging in such behavior. That was true across all age groups and true before and after organizational reform (the only exception is potential lethal force post-reform, though that is driven by a small sample of whites who experienced that form of violence after 2013). Those findings are not only in the same direction, but the magnitude of the racial disparity is consistent (with the exception that Black youth who were arrested or found with contraband were more likely to experience potential lethal force).

Although the marginal effects appear small in magnitude, across the more than 1.5 million stops of Black civilians during the eight year time period, these racial disparities resulted

in approximately 61,000 more cases of police force against Black civilians and 1,800 more cases of police drawing their weapons against Black civilians than would have occurred if Black civilians were treated identically to Whites. Those numbers are greater than the total number of Whites who were subjected to force or weapons being drawn on them in our sample.

Concerning inequalities more broadly, our findings indicate that police perceptions of race are a powerful form of inequality in police violence, over and above age. Although the youthfulness of Black civilians subjected to police violence has been highlighted by the media and Black Lives Matter advocates, our analyses show that age is only a factor in the likelihood of experiencing potential lethal force and even then, race continues to trump age. That is, police treat consistently treat civilians differently by skin tone more so than age.

Our findings also show the potential benefits but also the limitations of organizational reform efforts to reduce racial disparities. Unfortunately, reforms to the regularity of stop-and-frisk and training did not significantly reduce the racial disparity in the likelihood of experiencing police violence as hypothesis 4 had predicted, nor inequities in age. This is consistent with research arguing that in-depth training on racial bias is necessary to reduce disparities, which studies have shown reduces police implicit bias (Correll et al 2002; Correll et al 2007; Greenwald and Krieger 2006; Plant and Peruche 2005). Yet our findings also reveal that reforms have been beneficial; when the NYPD reduced the use of stop-and-frisk and instituted changes in training, approximately 57,000 fewer stops, the majority of which targeted Black people, included force by police annually.

This study moves our understanding of inequalities in criminal justice forward, but our results do come with limitations. First, our data come from New York City, a global city with a highly visible and aggressive stop-and-frisk policy. However, other research using multicity

samples found similar patterns, indicating that our findings are not exceptions to the general pattern of police use of force (Goff et al 2016). Additionally, so as to have a proper comparison group of otherwise similar interactions, these results are only of investigative stops and not, for example, exhaustive of the types of death that sparked the contemporary social movement, specifically when police are called to a scene (e.g. Tamir Rice, Laquan McDonald) or as part of a traffic stop (e.g., Walter Scott, Philandro Castile). Nonetheless, the results do show racial inequity in how police respond to reasonable suspicion and provide evidence that a person's race, age, and behavior are associated with differential risks of police violence. These findings are in line with laboratory research that young Black civilians are seen as physically larger and more threatening (Wilson, Hugenberg, and Rule 2017).

At the same time, our analyses cannot determine the time ordering of civilian behavior and police use of force, such as whether the arrest or seizures are what lead to heightened sense of risk by police or are instead post hoc justifications for force. Thus examining the timing of police use of force and civilian behavior is a fruitful avenue for future research. Additionally, while we focused on race and age in this paper, our results suggest that gender is also key to understanding police-civilian dynamics. Thus future research should explore how police perceptions of gender affect this racialized disparity, especially in light of the Say Her Name movement. Finally, although we adjust for a wide variety of competing explanations and relevant factors, our methods cannot prove discriminatory practices by the NYPD (see Legewie 2016 for quasi-experimental evidence of discriminatory patterns by NYPD). This is another important direction for future research.

In addition to testing racial disparities in policing using other methods and data that could more directly test for bias, future research should explore the consequences of experiencing

police violence. Across the country, police killed roughly 1,000 people in 2015, sparking nationwide protests and costing cities millions in settlements (Elinson and Frosch 2015; Kindy, Fisher, Tate, and Jenkins 2015). Nonetheless, the greatest result of police violence may be an unwillingness to see or treat the police as agents of justice and safety but instead as potential threats to one's health and well-being (Desmond, Papachristos, and Kirk 2016; Tyler, Fagan, and Geller 2014). Importantly, our analyses indicate that ending stop-and-frisk lowered the rate of police interactions, but not necessarily the racial inequality in the use of force during those police interactions. Future research should explore how to reduce the disparities in experiencing police violence that exist above and beyond the disparities in being stopped.

Perhaps not surprisingly, recent Pew surveys show a large racial gap in trust in the police and hope for future improvement in police-community relations (Drake 2015). Black Lives Matter articulates specific reasons for that gap in police trust around police violence against Black people, specifically teens. Research indicates that the experience of a police interaction is critical to understanding civilian satisfaction with police (Skogan 2005; Weitzer and Tuch 2005), but had not measured how unequal those police interactions are. That experience is racially unequal even when adjusting for the outcomes of a stop; contact with police is fundamentally different for Black and White residents. That difference in initial contact may be an underappreciated source of inequality in criminal justice outcomes and subsequent inequalities, including mental health, employment, and education (Geller et al 2014; Harknett 2015). Although the majority of police interactions for individuals of all races do not involve violence, the perception that police violence disproportionately targets Black civilians has greatly harmed police-community relations. Unfortunately, that perception is reality.

References

Anderson, Elijah. 1990. *Streetwise: Race, Class, and Change in an Urban Community*. Chicago: Chicago University Press.

Arthur, Rob. 2015. How to Predict Bad Cops in Chicago. Fivethirtyeight. Available at: https://fivethirtyeight.com/features/how-to-predict-which-chicago-cops-will-commit-misconduct/ [Accessed 19 Jun. 2017].

Bittner, Egon. 1970. The Functions of the Police in Modern Society. Washington, DC: US. Government Printing Office. Accessed on September 28, 2016: https://www.ncjrs.gov/pdffiles1/Digitization/147822NCJRS.pdf.

Brunson, Rod K. 2007. "'Police Don't Like Black People': African American Young Men's Accumulated Police Experiences." *Criminology & Public Policy* 6:71-102.

Carr, Patrick, Laura Napolitano, and Jessica Keating. 2007. "We Never Call the Cops and Here is Why: A Qualitative Examination of Legal Cynicism in Three Neighborhoods." *Criminology* 45:445-80.

Chauhan, Preeti, Todd Warner, Adam Fera, Ervin Balazon, Olive Lu, and Megan Welsh. 2015. "Tracking Enforcement Rates in New York City, 2003-2014." New York City: John Jay College of Criminal Justice.

Coates, Ta-Nehisi. 2015. "The Paranoid Style of American Policing" *The Atlantic*. Retrieved Jan 4, 2016, http://www.theatlantic.com/politics/archive/2015/12/illegitimacy-and-american-policing/422094.

Correll, Joshua, Bernadette Park, Charles M. Judd, and Bernd Wittenbrink. 2002. "The police officer's dilemma: Using ethnicity to disambiguate potentially threatening individuals." *Journal of Personality and Social Psychology* 83:1314-1329.

Correll, Joshua, Bernadette Park, Charles M. Judd, Bernd Wittenbrink, Melody S. Sadler, Tracie Keesee. 2007. "Across the Thin Blue Line: Police Officers and Racial Bias in the Decision to Shoot." *Journal of Personality and Social Psychology* 92:1006-1023.

Desmond, Matthew, Andrew V. Papachristos, and David S. Kirk. 2016. "Police Violence and Citizen Reporting in the Black Community." *American Sociological Review* 81:857-876.

Drake, Bruce. 2015. "Divide Between Blacks and Whites on Police Runs Deep" *Pew Research Center Fact Tank*. Retrieved Jan 4, 2016, (http://www.pewresearch.org/fact-tank/2015/04/28/Blacks-Whites-police/)

Durna, Tuncay. 2011. "Situational Determinants of Police Use of Force: Who the Suspect Is vs. What the Suspect Does." Technical Report. Geneva Center for the Democratic Control of Armed Forces, Geneva.

Elinson, Zusha and Dan Frosch. 2015. Cost of Police-Misconduct Cases Soars in Big U.S. Cities. Wall
 Street Journal. Accessed July 2017. https://www.wsj.com/articles/cost-of-police-misconduct-cases-soars-in-big-u-s-cities-1437013834.

Engel, Robin Shepard. 2003. "Explaining Suspects' Resistance and Disrespect toward Police."
 Journal of Criminal Justice 31:475-492.

Engel, Robin Shepard and Jennifer M. Calnon. 2004. "Examining the Influences of Drivers'
 Characteristics During Traffic Stops with Police: Results from a National Survey."
 Justice Quarterly 21:49-90.

Epp, Charles R., Steven Maynard-Moody, Donald P. Haider-Markel. 2014. *Pulled Over: How
 Police Stops Define Race and Citizenship.* Chicago: University of Chicago Press.

Fyfe, James, J. 1982. Blind Justice: Police Shootings in Memphis. *Journal of Criminal Law and
 Criminology* 73:702-722.

Friedrich, Robert J. 1980. "Police Use of Force: Individuals, Situations, and Organizations."
 ANNALS of the American Academy of Political and Social Science 452:82-97.

Fryer Jr., Roland G. 2016. An Empirical Analysis of Racial Differences in Police Use of Force.
 Working Paper: http://www.nber.org/papers/w22399.pdf.

Garner, Joel H., Thomas Schade, John Hepburn, and John Buchanan. 1995. Measuring the
 Continuum of Force Used by and Against the Police. *Criminal Justice Review* 20:146-168.

Garner, Joel H., Christopher D. Maxwell, Cedrick G. Heraux. 2002. "Characteristics Associated
 with the Prevalence and Severity of Force Used by the Police. *Justice Quarterly* 19:705-46.

Geller Amanda and Jeffrey Fagan. 2010. Pot as pretext: marijuana, race, and the new disorder in
 New York City street policing. *Journal of Empirical Legal Studies* 7:591–633.

Geller, Amanda, Jeffrey Fagan, Tom Tyler, and Bruce G. Link. 2014. Aggressive Policing and
 the Mental Health of Young Urban Men. American Journal of Public Health 104(12):2321-27.

Geller, William A., and Hans Toch. 1996. Understanding and Controlling Police Abuse of Force.
 Pp. 292-328 in Police Violence: Understanding and Controlling Police Abuse of Force,
 edited by William A. Geller and Hans Toch. New Haven, Conn.: Yale University Press.

Gelman, Andrew, Jeffrey Fagan, and Alex Kiss. 2007. Analysis of the New York City Police Department "Stop-and-Frisk" Policy in the Context of Claims of Racial Bias. *Journal of the American Statistical Association* 102: 813-823.

Goff, Phillip Atiba, Matthew Christian Jackson, Brooke Allison Lewis Di Leone, Carmen Marie Culotta, and Natalie Ann DiTomasso. 2014. The Essence of Innocence: Consequences of Dehumanizing Black Children. *Journal of Personality and Social Psychology* 106:526-45.

Goff, Phillip Atiba, Tracey Lloyd, Amanda Geller, Steven Raphael, and Jack Glaser. 2016. "The Science of Justice: Race, Arrest and Police Use of Force". Center for Policing Equity. Accessed January 20, 2016. http://policingequity.org/wp-content/uploads/2016/07/CPE_SoJ_Race-Arrests-UoF_2016-07-08-1130.pdf.

Goncalves, Felipe and Steven Mello. 2017. A Few Bad Apples? Racial Bias in Policing . *Industrial Relations Section Working Paper #608.*

Greenwald, Anthony G. and Linda Hamilton Krieger. 2006. Implicit Bias: Scientific Foundations. *California Law Review* 94945–67.

Gregory, Anne and Rhona S. Weinstein. 2008. "The Discipline Gap and African Americans: Defiance or Cooperation in the High School Classroom." Journal of School Psychology 46:455–75.

Grogger, Jeffrey and Greg Ridgeway. 2006. "Testing for Racial Profiling in Traffic Stops From Behind a Veil of Darkness." *Journal of the American Statistical Association* 101:878–887.

Guardian, n.d. "The Counted: People Killed by Police in the U.S." Accessed July 12, 2016 https://www.theguardian.com/us-news/series/counted-us-police-killings.

Harknett, Kristen. 2015. "Did Stop, Question, and Frisk Policing Affect the Mental Health of New York City Residents?" Presented September 14, at the Population Studies Center Colloquium, University of Pennsylvania.

Hernandez, Rigoberto. 2015. "Here are the Racist Emails Ferguson Officials Passed Around." Accessed September 2016. http://www.npr.org/sections/codeswitch/2015/03/04/390725377/here-are-the-racist-emails-ferguson-officials-passed-around.

Holbrook, Colin, Daniel M.T. Fessler, and Carols David Navarrete. 2016. "Looming Large in Others' Eyes: Racial Stereotypes Illuminate Dual Adaptations for Representing Threat Versus Prestige as Physical Size." *Evolution and Human Behavior* 37:67-78.

Hyland, Shelley, Lynn Langton, and Elizabeth Davis. 2015. Police Use of Nonfatal Force, 2002–11. Bureau of Justice Statistics: Special Report. Accessed December 30, 2015 http://www.bjs.gov/content/pub/pdf/punf0211.pdf.

Jacobs, David and Robert M. O'Brien. 1998. "The Determinants of Deadly Force: A Structural Analysis of Police Violence." *American Journal of Sociology* 103:837-62.

Kindy, Kimberly, Marc Fisher, Julie Tate, and Jennifer Jenkins. "A Year of Reckoning: Police Fatally Shoot Nearly 1,000." *Washingtonpost.com.* Retrieved January 4, 2016 (http://www.washingtonpost.com/sf/investigative/2015/12/26/a-year-of-reckoning-police-fatally-shoot-nearly-1000/)

Klinger, David, Richard Rosenfeld, Daniel Isom, Michael Deckard. 2016. "Race, Crime, and the Micro-Ecology of Deadly Force." *Criminology & Public Policy* 15:193–222.

Legewie, Joscha. 2016. Racial Profiling and Use of Force in Police Stops: How Local Events Trigger Periods of Increased Discrimination. *American Journal of Sociology*.

Levchak, Philip. 2017. Do Precinct Characteristics Influence Stop-and-Frisk in New York City? A Multi-Level Analysis of Post-Stop Outcomes. *Justice Quarterly* 34:377-406

Long, J. Scott. "Group Comparisons in Logit and Probit Using Predicted Probabilities." Working Paper, Accessed June 26, 2017. http://www.indiana.edu/~jslsoc/files_research/groupdif/groupwithprobabilities/groups-with-prob-2009-06-25.pdf

MacDonald, Heather. 2011. "The Myth of Racial Profiling." *City* 11:14-27.

mappingpoliceviolence.org. n.d." The Police Violence Report." Accessed June 20, 2016 http://mappingpoliceviolence.org/reports/.

Massey, Douglas S. and Nancy Denton. 1993. *American Apartheid: Segregation and the Making of the Underclass*. Cambridge: Harvard University Press.

Meares, Tracey L. 2014. "The Law and Social Science of Stop and Frisk." *Annual Review of Law and Social Science* 10:335-52.

Miller, Patrick B. 1998. "The anatomy of scientific racism: Racialist responses to Black athletic achievement." *Journal of Sport History* 25:119-51.

Mood, Carina. 2010. "Logistic Regression: Why We Cannot Do What We Think We Can Do, and What We Can Do About It." *European Sociological Review* 26:67-82.

Morenoff, Jeffrey D. 2005. "Racial and Ethnic Disparities in Crime and Delinquency in the US." In *Ethnicity and Causal Mechanisms*, ed. M Tienda, M Rutter, pp. 139–73. New York: Cambridge Univ. Press.

Muhammad, Khalil Gibran. 2010. *The Condemnation of Blackness: Race, Crime, and the Making of Modern Urban America*. Cambridge, MA: Harvard University Press.

Ousey, Graham C. and Matthew R. Lee. 2008. "Racial Disparity in Formal Social Control: An Investigation of Alternative Explanations of Arrest Rate Inequality." *Journal of Research in Crime and Delinquency* 45:322–55.

Pickett, Justin T. and Ted Chiricos. 2012. Controlling Other People's Children: Racialized Views of Delinquency and Whites' Punitive Attitudes toward Juvenile Offenders. *Criminology* 50:673-710.

Plant, E. Ashby and B. Michelle Peruche. 2005. "*The Consequences of Race for Police Officers' Responses to Criminal Suspects*." Psychological Science 16:180–83.

Quillian, Lincoln and Devah Pager. 2010. "Estimating Risk: Stereotype Amplification and the Perceived Risk of Criminal Victimization." *Social Psychology Quarterly* 73:79–104.

Rattan, Aneeta, Cynthia S. Levine, Carol S. Dweck, and Jennifer L. Eberhardt. 2012. Race and the Fragility of the Legal Distinction between Juveniles and Adults. *PLoS ONE* 7:1-5.

Reiss, Albert, J., Jr. 1968. Police Brutality—Answers to Key Questions. *Trans-Action* 5:10-19.

Robles, Frances. 2015. Racist Police Emails Put Florida Cases in Doubt. Accessed September 2016. https://www.nytimes.com/2015/05/16/us/miami-prosecutor-reviews-cases-of-police-officers-who-sent-racist-emails.html

Ross, Cody. 2015. A Multi-Level Bayesian Analysis of Racial Bias in Police Shootings at the County-Level in the United States, 2011-14. *PLOS One* 10(11): doi:10.1371/journal.pone.0141854.

Sampson, Robert J., and Janet L. Lauritsen. 1997. "Racial and ethnic disparities in crime and criminal justice in the United States." *Crime and Justice* 21:311-374.

Skogan, Wesley. 2005. "Citizen Satisfaction with Police Encounters." *Police Quarterly* 8(3): 298-321.

Smith, Douglas A. 1986. "The Neighborhood Context of Police Behavior." Pp. 313–41 in Crime and Justice: A Review of Research, vol. 8, edited by A. J. Reiss Jr. and M. Tonry. Chicago: University of Chicago Press.

Smith, Michael R. and Geoffrey P. Alpert. 2007. "Explaining Police Bias: A Theory of Social Conditioning and Illusory Correlation." *Criminal Justice and Behavior* 34:1262-83.

Smith, Brad W. 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.

Stuntz, William J. 1998. Terry's Impossibility. *St. John's Law Review* 72:1213–30.

Steffensmeier, Darrell, Jeffery Ulmer, and John Kramer. 1998. "The Interaction of Race, Gender, and Age in Criminal Sentencing: The Punishment Cost of Being Young, Black, and Male." 36 Criminology 36:763-98.

Stuart, Forrest and Ava Benezra. 2017. Criminalized Masculinities: How Policing Shapes the Construction of Gender and Sexuality in Poor Black Communities. *Social Problems* 65(2):174-90.

Sun, Ivan Y. and Brian K. Payne. 2004. "Racial Differences in Resolving Conflicts: A Comparison Between Black and White Police Officers." *Crime and Delinquency* 50:516-41.

Terrill, William and Stephen D. Mastrofski. 2002. Situational and Officer-based Determinants of Police Coercion. *Justice Quarterly* 19(2):215-48.

Terrill, William and Michael Reisig. 2003. Neighborhood Context and Police Use of Force. *Journal of Research in Crime and Delinquency* 40(3):291-321.

Tomaskovic-Devey, Donald, Marcinda Mason, and Matthew Zingraff. 2004. Looking for the Driving While Black Phenomena: Conceptualizing Racial Bias Processes and Their Associated Distributions. *Police Quarterly* 7(1):3-29.

Tomaskovic-Devey, Donald and Patricia Warren. 2009. "Explaining and Eliminating Racial Profiling." *Contexts* 8(2):34-9.

Tyler, Tom, Jeffrey Fagan, and Amanda Geller. 2014. "Street Stops and Police Legitimacy: Teachable Moments in Young Urban Men's Legal Socialization." *Journal of Empirical Legal Studies* 11(4):751-85.

Tyler, Tom R. and Rick Trinkner. 2017. *Why Children Follow the Rules*. New York: Oxford.

United States Naval Observatory. N.D. "Sun or Moon Rise/Set Table for One Year." Accessed July 10, 2016. http://aa.usno.navy.mil/data/docs/RS_OneYear.php.

Wakefield, Sara, and Christopher Uggen. 2010. Incarceration and Stratification. *Annual Review of Sociology* 36:387-406.

Warren, Patricia, Donald, Tomaskovic-Devey, William Smith, Matthew Zingraff, and Marcinda Mason. 2006. Driving while Black bias Processes and Racial Disparity in Police Stops. *Criminology* 44:709-738.

Welch, Kelly and Allison Payne. 2010. Racial Threat and Punitive School Discipline. *Social Problems* 57:25-48.

Weitzer, Ronald and Stephen Tuch. 2004. Race and perceptions of Police Misconduct. *Social Problems* 51:305–25.

Weitzer, Ronald and Steven Tuch. 2005. Racially Biased Policing: Determinants of Citizen Perceptions. *Social Forces* 83(3):1009-30.

Wilson, John Paul, Kurt Hugenberg, and Nicholas O. Rule. 2017. Racial Bias in Judgments of Physical Size and Formidability: From Size to Threat." *Interpersonal Relations and Group Processes* 117(1):59-80.

Worden, Robert, E. 1996. The Causes of Police Brutality: Theory and Evidence on Police Use ofForce. In W.A. Geller and H. Toch (Eds.), Police Violence (pp. 23-51). New Haven: Yale University Press.

Cases:
Daniels et al. v. City of New York (1999)
Floyd v. City of New York, No. 08 Civ. 1034 (S.D.N.Y. 2013)
Terry v. Ohio, 392 U.S. 1 (1968)

Table 1. Descriptive Statistics of Investigatory Stops

	Mean	SD
DEPENDENT VARIABLES		
Any force by police (1=yes)	21.41%	
Gun drawn/pointed by police (1=yes)	0.45%	
INDIVIDUAL CHARACTERISTICS		
Black	85.03%	
White	14.97%	
Age		
50+ (ref)	7.53%	
10-14	2.03%	
15-19	25.04%	
20-24	23.31%	
25-29	14.82%	
30-34	9.38%	
35-39	6.38%	
40-44	6.08%	
45-49	5.43%	
Male (1=yes)	92.70%	
Height (inches)	69.1	3.23
CIVILIAN BEHAVIOR		
Violent crime suspected	12.27%	
Citizen was noncompliant with orders	9.56%	
Citizen made verbal threats	0.63%	
STOP OUTCOME		
Arrest made	6.23%	
Weapon found	1.11%	
Contraband found	1.92%	
STOP CHARACTERISTICS		
Length of time officer observed prior to stop	2.45	3.53
Night stop	60.68%	
Stop duration	5.33	4.29
PRECINCT CHARACTERISTICS		
Low stop precinct	5.56%	
High stop precinct	35.16%	
Felony arrest rate	1493.03	736.08
Misdemeanor arrest rate	3338.94	1912.83
CENSUS TRACT CHARACTERISTICS		
Total population	4525.85	2201.58
Population density	58013.44	35381.20
Percent Black/Hispanic	72.68%	
Male median age	30.94	7.16
Poverty rate	26.30%	
Percent adults w/o HS degree	22.24%	
Percent adults w/ HS degree	28.73%	
Percent adults w/ associates degree	23.30%	
Percent adults w/ bachelor's degree and up (ref)	25.73%	
Vacancy rate	9.13%	
Unemployment rate	11.61%	
2007 (ref)	13.09%	
2008	14.73%	
2009	16.30%	
2010	16.26%	
2011	18.25%	
2012	14.88%	
2013	5.54%	
2014	0.95%	
N	2,085,775	

Table 2. Odds Ratios of Types of Force Used During Stop

	Force Used		Gun Drawn	
	OR	SE	OR	SE
Individual Characteristics				
Race				
White (ref)	---		---	
Black	1.27***	.06	1.28***	.08
Age				
50+ (ref)	---		---	
10-14	1.46***	.09	1.13	.14
15-19	1.52***	.06	1.09	.08
20-24	1.46***	.04	1.20**	.08
25-29	1.39***	.03	1.15*	.08
30-34	1.32***	.03	1.20**	.08
35-39	1.23***	.02	1.17**	.07
40-44	1.17***	.02	1.21**	.08
45-49	1.11***	.02	.97	.06
Male (1=yes)	1.64***	.05	.95	.05
Height (inches)	1.01***	.00	1.03***	.00
Civilian Behavior				
Violent crime suspected	2.39***	.12	4.94***	.20
Citizen was noncompliant with orders	2.57***	.14	2.92***	.12
Citizen made verbal threats	1.68***	.11	1.64***	.16
Stop Outcome				
Arrest made	3.17***	.15	3.00***	.14
Weapon found	2.05***	.09	3.06***	.17
Contraband found	1.51***	.05	1.06	.07
Stop characteristics				
Length of time officer observed prior to stop	1.00	.00	.97***	.01
Night stop	1.10**	.03	1.13**	.05
Stop duration	1.04***	.00	1.06***	.00
Precinct Characteristics				
Low stop precinct	.80	.14	1.03	.10
High stop precinct	.78	.15	.75***	.06
Felony arrest rate	1.00	.00	1.00	.00
Misdemeanor arrest rate	1.00*	.00	1.00	.00
Census Tract Characteristics				
Total population	1.00	.00	1.00	.00
Population density	1.00	.00	1.00	.00
Percent Black/Hispanic	1.00	.00	1.00*	.00
Male median age	1.01*	.01	1.00	.00
Poverty rate	.99	.00	.99*	.00

Percent adults w/o HS degree	1.01	.00	1.00	.00
Percent adults w/ HS degree	.99*	.00	.99**	.00
Percent adults w/ associates degree	1.01*	.00	1.00	.00
Vacancy rate	1.01*	.01	1.01**	.00
Unemployment rate	1.00	.01	1.00	.00
2007 (ref)	---		---	
2008	1.00	.05	.83***	.04
2009	.94	.09	.68***	.04
2010	.79*	.08	.67***	.04
2011	.75**	.07	.66***	.05
2012	.59***	.05	.70***	.04
2013	.63***	.06	.86*	.06
2014	.75*	.10	1.36**	.13
Constant	.01***	.00	.00***	.00
N	2,085,775		2,085,775	

Notes:

*p<.05, **p<.01, ***p<.001

Table 3. Odds Ratios of Types of Force Used During Stop by Stop Outcome

	Stop did not result in arrest, contraband or weapon found				Stop resulted in an arrest, or contraband or a weapon was found			
	Model 1 Force Used		Model 2 Gun Drawn		Model 3 Force Used		Model 4 Gun Drawn	
	OR	SE	OR	SE	OR	SE	OR	SE
Individual Characteristics								
Race								
White (ref)	---		---		---		---	
Black	1.29***	.07	1.20*	.09	1.14**	.05	1.60***	.17
Age								
50+ (ref)	---		---		---		---	
10-14	1.50***	.10	.94	.13	1.24***	.08	1.90***	.30
15-19	1.57***	.06	.87	.07	1.24***	.04	2.01***	.21
20-24	1.50***	.04	1.03	.08	1.16***	.04	1.88***	.22
25-29	1.43***	.04	1.00	.07	1.14***	.04	1.75***	.20
30-34	1.36***	.03	1.09	.08	1.10**	.04	1.55***	.18
35-39	1.26***	.02	1.06	.07	1.06	.03	1.60***	.18
40-44	1.19***	.03	1.13	.09	1.04	.04	1.51***	.18
45-49	1.12***	.02	.90	.07	1.00	.03	1.27	.19
Male (1=yes)	1.80***	.06	.77***	.05	1.10***	.02	1.65***	.18
Height (inches)	1.01***	.00	1.03***	.01	1.01***	.00	1.02*	.01
Civilian Behavior								
Violent crime suspected	2.48***	.14	5.57***	.28	1.62***	.07	3.61***	.22
Citizen was noncompliant with orders	2.69***	.16	2.94***	.14	1.66***	.05	2.74***	.15
Citizen made verbal threats	1.69***	.11	1.82***	.21	1.58***	.17	1.35**	.16
Constant	.01***	.00	.00***	.00	.10***	.03	.00***	.00
N	1,939,968		1,939,968		145,807		145,807	

Notes:

*p<.05, **p<.01, ***p<.001, Standard errors adjusted for clustering at the precinct level

Controls not shown include length of time observed prior to stop, stop duration, low stop precinct, high stop precinct, felony arrest rate, misdemeanor arrest rate, census tract population, population density, % Black/Hispanic, male median age, poverty rate, education level, vacancy rate, unemployment rate, and year

Table 4. Odds Ratios of Any Force During Stop Pre vs. Post Reform

	Any Force Pre Reform (2007-2012)		Any Force Post Reform (2013-2014)		Gun Drawn Pre Reform (2007-2012)		Gun Drawn Post Reform (2013-2014)	
	OR	SE	OR	SE	OR	SE	OR	SE
Individual Characteristics								
White (ref)	---		---		---		---	
Black	1.26***	.06	1.37***	.08	1.29***	.09	1.19	.15
Age								
50+ (ref)	---		---		---		---	
10-14	1.46***	.09	1.51***	.14	1.19	.16	.72	.18
15-19	1.53***	.06	1.43***	.08	1.11	.09	.94	.11
20-24	1.46***	.04	1.36***	.08	1.24**	.09	.93	.11
25-29	1.39***	.03	1.37***	.06	1.18*	.09	.92	.12
30-34	1.32***	.03	1.39***	.07	1.22**	.10	1.00	.14
35-39	1.22***	.02	1.33***	.06	1.16*	.08	1.23	.20
40-44	1.17***	.02	1.21***	.06	1.21*	.09	1.18	.25
45-49	1.11***	.02	1.12**	.04	.99	.07	.82	.16
Male (1=yes)	1.67***	.05	1.30***	.07	.97	.06	.79	.12
Height (inches)	1.01***	.00	1.02***	.00	1.03***	.00	1.03*	.01
Civilian Behavior								
Violent crime suspected	2.44***	.14	1.92***	.12	5.01***	.22	4.34***	.33
Citizen was noncompliant with orders	2.57***	.15	2.51***	.15	2.89***	.12	3.06***	.35
Citizen made verbal threats	1.68***	.12	1.69***	.19	1.70***	.17	1.17	.28
Stop Outcome								
Arrest made	3.17***	.15	3.12***	.26	3.19***	.16	1.71***	.24
Contraband found	1.50***	.06	1.59***	.09	1.06	.08	1.00	.18
Weapon found	2.09***	.09	1.75***	.12	3.07***	.19	3.13***	.53
Constant	.01***	.00	.02***	.01	.00***	.00	.00***	.00
N	1,950,453		135,322		1,950,453		135,322	

Notes:

*p<.05, **p<.01, ***p<.001

Standard errors adjusted for clustering at the precinct level

Controls not shown include length of time observed prior to stop, night stop, stop duration, low stop precinct, high stop precinct, felony arrest rate, misdemeanor arrest rate, census tract population, population density, % Black/Hispanic, male median age, poverty rate, education level, vacancy rate, unemployment rate, and year

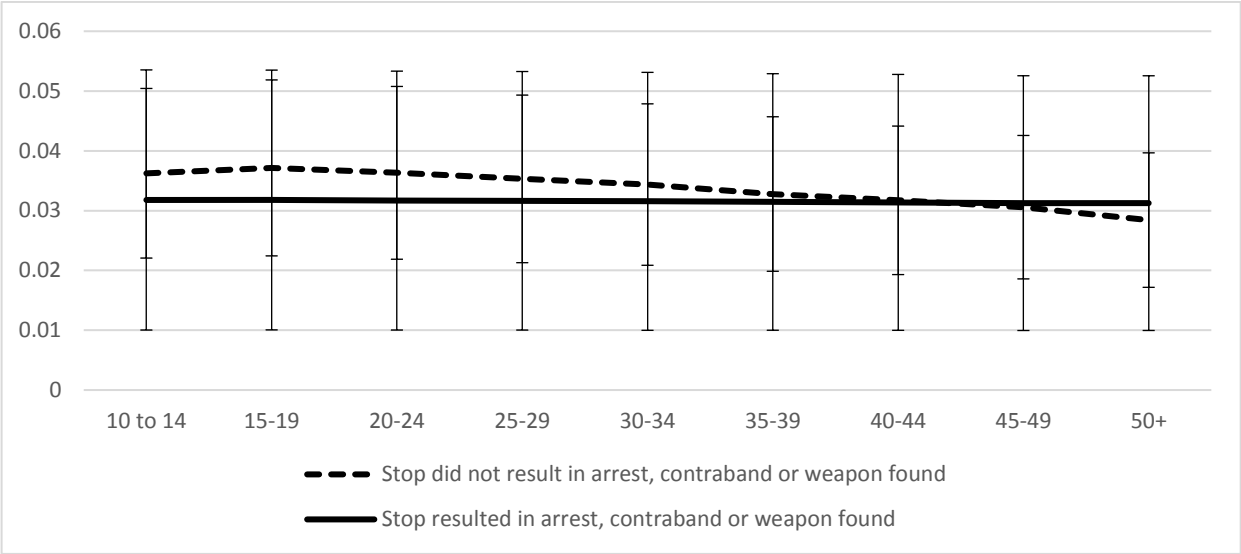**Figure 1. Marginal Effect of Race on the Use of Force by Age and Stop Outcomes**

Figure 2. Marginal Effect of Race on Police Drawing a Gun by Age and Stop Outcomes