Racial Bias in Police Officers' Discretionary Search Decisions and Associated Community
Mental Health Consequences: Evidence from Nashville, Tennessee

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CHAPTER 1

INTRODUCTION

In August of 2016, I was invited to a conference call to discuss a research project that a local

social justice organization—Gideon's Army—was planning. Gideon's Army had conducted

listening sessions with black community members asking about the issues that were most salient

in their lives. Aggressive policing was one of the top concerns that the community brought

forward. Leaders in the organization knew that they would likely be dismissed by police and city

leaders without strong evidence that a problem existed. They decided to tap into the knowledge-

base of the community to research policing in Nashville. A team member had already received

the Metro Nashville Police Department's (MNPD) traffic stop database for 2010-2015 and began

a cursory exploration of the contents. When the five years of data were combined, more than two

million stops were made over the period. As I listened on the conference call, I thought that I

could offer a useful statistical skillset for the group. Almost three months later, we released

Driving While Black: A Report On Racial Profiling In Metro Nashville Police Department

Traffic Stops (Gideon's Army 2016). The Nashville Scene, a local magazine, recently wrote that

the report "fundamentally changed the conversation about policing in the city" (Hale 2019).

In the report, we argued that MNPD made more traffic stops than other comparable cities

and that there were substantial racial disparities in traffic stops and searches (Gideon's Army

2016). Over the period of 2010-2015, MNPD made an average of 393,941 traffic stops annually.

The residential driving age population (16 and over) in Nashville was 529,259 according to

2010-2015 American Community Survey 5-year estimates (U.S. Census Bureau 2016). When

compared to the residential population, MNPD made 744 stops for every 1,000 driving age residents. In comparison, the National Institute of Justice found that 10.2% of respondents in the National Crime Victimization Survey had been stopped by police while driving in 2011 (Langton and Durose 2013). Similar-sized cities also made fewer traffics stops than Nashville. For instance, Charlotte-Mecklenburg, NC made 231 stops per 1,000 residents; Dallas, TX made 116 per 1,000 residents; Louisville, KY made 181 per 1,000 residents; and Raleigh, NC made 196 per 1,000 residents (Gideon's Army 2016). We concluded that MNPD conducts seven times the national average rate of traffic stops and nearly four times that of comparable cities. In terms of the racial distribution of traffic stops, the report found that annually "MNPD made enough stops to have stopped 112% of the black population" compared to about 70% of whites (Gideon's Army 2016:35). The *Driving While Black* report also investigated the racial distribution of police searches during traffic stops. The data showed that black residents were disproportionately searched during traffic stops compared to whites and when searched, black drivers were less likely to have contraband than whites. The findings suggested a lower standard of evidence being applied to initiate a search of black drivers.

In addition to the quantitative analysis of traffic stops in Nashville, the *Driving While Black* report included a qualitative analysis of 25 interviews with black community members. These interviews reflect how police decisions and demeanor can affect communities. Interviewers asked how black drivers felt when they were stopped. The report stated:

> When asked how interactions with officers made them feel, community members expressed feeling anxious, scared, angry, helpless, victimized, violated, traumatized, disrespected, dehumanized, and in many cases, confused as to why the officer stopped them in the first place. This fear, they shared with us, is informed by their past experiences with MNPD and by broader national social and political conditions, namely police killings of young black men (Gideon's Army 2016:76).

Since community members reported anxiety and concern about their interactions with police, they engaged in "safety strategies" related to police contact (Gideon's Army 2016). These included being aware of where documents are stored in their vehicle, attempting to stay calm when feeling unjustly targeted, awareness of movements and body position, and generally avoiding any contact with police or calling police when they may be useful. Stuart (2016) calls these behavioral adaptations a form of "cop wisdom." Communities that are highly policed become copwise and adapt their behavioral signals to avoid police contact. Stuart (2016:150) argues that "when policing is hypervigilant, residents reinterpret their physical and social environment not only in terms of associated risks of crime, but also in light of their perceived likelihood of unwanted police contact." Gideon's Army's (2016) research highlights that racial disparities in policing are occurring in Nashville and that there are consequences for the wellbeing of community members.

Following the release of the report, community attention was placed on how MNPD officers interact with community members. The reception from MNPD was chilly at best (Garrison 2017). The Police Chief, Steve Anderson, issued a letter to the Metro Council critiquing the report's methodology—in particular the use of the residential population as a benchmark to look for racial disparity. The Chief's critique did not discuss vehicle searches or the qualitative findings of the report. The residential population benchmarking critique is valid and a limitation of the report. A large body of academic research shows that the residential population is not an accurate reflection of how police prioritize specific neighborhoods and target specific people for heightened scrutiny (Alpert, Dunham, and Smith 2007; Baumgartner, Epp, and Shoub 2018; Epp, Maynard-Moody, and Haider-Markel 2014; Fridell 2004; Knox, Lowe, and Mummolo 2019; Natl. Acad. Sci. Eng. Med. 2018; Neil and Winship 2019; Ridgeway

and MacDonald 2010). Even though the limitation is well known, the use of residential population is common (for examples, see U.S. Department of Justice 2015, 2016). Methodological issues notwithstanding, the report tapped into the experiences of the community. One interviewee in the report said that, "I think it's foolish for us to think that we cannot become a Ferguson or a Baltimore. Yes, we can. Yes, we can. The right match has not been struck, that's all" (Gideon's Army 2016:18). Less than four months after the report was released, Jocques Clemmons—a black man who lived in a highly-policed neighborhood where the largest public housing complex in Nashville is located—was shot by an MNPD officer while running from a traffic stop and allegedly reaching for a gun that he had dropped. After this incident, The Policing Project at New York University was contracted by the city of Nashville to evaluate whether the practice of traffic stops was effective for reducing crime and if there would be negative consequences if police made changes to their strategy. They found that racial minorities were disproportionately stopped in all areas of Nashville and that the number of stops had no relationship to the number of serious crimes committed (Policing Project 2018). They did not, however, evaluate racial disparities in police searches.

This dissertation was sparked by my work on the *Driving While Black* report but takes a distinctly sociological approach to assess racial disparities, racial bias, and the consequences for community members. Each of the three papers (or dissertation chapters) presented below is engaged with ongoing theoretical and methodological debates in sociology, criminology, and police sciences. In addition to addressing ongoing scholarly discussions, these papers have implications for public policy in Nashville. The reminder of the introduction provides a broad overview of the sociology of policing and how it intersects with race. I briefly review the history of concepts and frameworks that inform the three substantive chapters of the dissertation.

SOCIOLOGICAL PERSPECTIVES ON RACE AND POLICING

The sociologist Egon Bittner (1970) argued that "the role of the police is to address all sorts of human problems when and insofar as their solutions do or may possibly require the use of force at the point of their occurrence" (44). In Bittner's analysis, the profession of policing is much more than controlling crime. Police officers are the social response to any situation where non-negotiable coercive force is desired or needed. "Calling the cops" is a request for intervention by individuals tasked with controlling others. Police do not necessarily need to exercise coercion when called, their authority to coerce is often sufficient for most situations. Bittner's theory of the police role is similar to Max Weber's conception of the state. Weber defined the state as, "a human community that (successfully) claims the monopoly on the use of legitimate physical force within a certain territory" (Gerth and Mills 1946; Terpstra 2011:4). If the state has the monopoly on physical force, the modern exercise of that force is through policing.

Where and how police exercise coercive force distributes the control of the state unequally across society. Scholars have argued since the 1980's that the United States has taken a punitive turn "in which state surveillance, regulation, and punishment have become more aggressive, intolerant, and prolific" (Stuart, Armenta, and Osborne 2015:237). A culture of control is embedded throughout American society (Garland 2001). One way the punitive turn toward control is put into practice is through police deployment strategies. Police focus their enforcement efforts in neighborhoods where crime is most likely to occur (Braga, Brunson, and Drakulich 2019; Braga and Weisburd 2010; Natl. Acad. Sci. Eng. Med. 2018). Neighborhoods where crime is common also tend to be areas where social disadvantages are concentrated (Sampson 2013; Sampson, Raudenbush, and Earls 1997). People living in disadvantaged areas

are disproportionately low-income and people of color and are therefore exposed to more police control that more affluent and white counterparts (Anderson 1999; Wilson 2012). Police have defended the overrepresentation of racial minorities in police stops by arguing that more crimes are committed by and against racial minorities than whites. Several decades of empirical research has shown that even though there are differences in the rate of crime perpetration and victimization, it does not fully explain the racial gap in police contact (Braga et al. 2019; Natl. Acad. Sci. Eng. Med. 2018). In fact, Weaver et al. (2019) argue that there has been a recent decoupling between crime behaviors and arrest, especially for blacks. Comparing the 1997 to the 1979 cohorts of the National Longitudinal Survey of Youth, the authors find that the more recent cohort had a much higher probability of arrest than the previous generation. The increase in arrest probability from the 1979 cohort to the 1997 cohort was primarily for those who reported no criminal offending and more pronounced among blacks than whites. Weaver et al. (2019:112) state that, "what transpired in the last half century was not only an expansion of the state's authority and citizens' increased contact with the state's punitive arm, it was a decoupling that transformed the historical relationship between criminality and exposure to arrest among Americans."

Police contact in neighborhoods is a key entry point to the criminal justice system. A vehicle or pedestrian stop that turns into a search often precedes an arrest. The most likely reason that a person is arrested in a vehicle stop is possession of a small amount of drugs (Baumgartner, Epp, et al. 2018). Misdemeanor arrests can lead to a proliferation of legal problems if a person is not able to pay bail, fines, and court fees (Alexander 2012). If a person is held pre-trial and cannot afford bail, they may lose their job, housing, and custody of children (Heaton, Mayson, and Stevenson 2017). Until recently, Tennessee had a policy of suspending drivers' licenses if

court fines were not paid. In July 2018, the license suspension policy was overturned in US federal court in part because it made paying fines more difficult and trapped poor people in a cycle of incarceration and legal debt. According to The Tennessean newspaper, from 2012 to 2018 over 250,000 Tennesseans had their drivers' licenses suspended for not paying court fees (Boucher 2018). Once a person has a criminal record—even only a misdemeanor offense—gaining employment is more difficult than it would be without a record (Pager 2003, 2008; Pager, Bonikowski, and Western 2009; Pager and Shepherd 2008; Uggen et al. 2014).

There are other ways that people become entangled with the criminal justice system. For youth in particular, schools are increasingly a site of legal sanctions and police presence—especially in urban schools (Anderson 2017; Jones 2009; Morris 2016; Rios 2011, 2017). Rios (2011) argues that schools have become part of a 'youth control complex' that in conjunction with other social institutions criminalize young people of color. School administrators dole out harsh punishments including suspensions and expulsions in order to control the behavior of students. In ride alongs with police officers in California, Rios (2017) saw police officers having both empathetic and supportive interactions as well as unnecessarily punitive interactions with youth suspected of being gang affiliated. Officers, especially white officers, misinterpreted cultural symbols as gang symbols and responded with punitive sanctions. Rios (2017) concludes that the harsh, adversarial interactions that youth have with school officials and law enforcement further push them away from success. Unfair treatment by authorities is a risk factor for incarceration and school dropout (Rios 2017:157).

In this dissertation, I investigate one specific practice that police use in marginalized neighborhoods: aggressive patrol (Herbert, Beckett, and Stuart 2018). Aggressive patrol is referred to by several names including "hot spot policing," "broken windows policing," "quality

of life policing," "order maintenance," and "zero-tolerance" (Natl. Acad. Sci. Eng. Med. 2018).

Each term has distinctions in intent and practices but all refer to increasing police scrutiny in

places showing visible signs of social disorder and increasing the certainty of apprehension when

crime occurs. Aggressive patrol is used to try to proactively uncover evidence of criminal

activity. If a police officer considers a vehicle or driver as suspicious, they can use a minor

violation or pretext to make a traffic stop (Epp et al. 2014). After the stop, the officer can

convince a driver to consent to a search or, if the officer asserts probable cause, coerce a search

of the vehicle. Aggressive patrol is thought to reduce crime through deterrence. When police

focus on a specific area with proactive, aggressive strategies, the probability that a crime is

investigated and a suspect is arrested increases. Others in the community also recognize that the

probability of apprehension is high and will therefore avoid criminal activity (Nagin 2013;

Nagin, Solow, and Lum 2015). In contrast to the deterrence argument, aggressive patrol can be

counterproductive. Herbert, Beckett, and Stuart (2018:1498) argue that "aggressive patrol

focused on the socially marginal will often increase the likelihood of notable class and race-

based disparities in both arrests and subsequent jail and prison terms." Large racial disparities

can reduce trust in the police and reduce the likelihood that community members will work with

police (Epp et al. 2014; Meares, Tyler, and Gardener 2015). Focusing on discretionary searches

during a traffic stop, this dissertation examines how racial disparities are produced and whether

search decisions are biased against blacks and Hispanics. The third paper shifts focus to whether

aggressive patrol practices in conjunction with unfair treatment by police are associated with

depressive symptoms and anxiety symptoms for residents of Nashville.

DEFINING RACE IN THE CONTEXT OF POLICING

Research on race and policing often hinges on definitions of race and racism. In this dissertation, I use both a structural definition of race and racism as well as engage with research that aims to identify whether racial bias can be attributed to individual decisions. I use the term black rather than African American because black people in the United States are diverse in their geographic backgrounds but experience discrimination based on the color of their skin. I do not capitalize racial categories throughout this dissertation in accordance with the American Sociological Association's (2010) *Style Guide*. Following Omi and Winant (2015:110), I define *race* as "a concept that signifies and symbolizes social conflicts and interests by referring to different types of human bodies." Bodies themselves do not make race. Race is constructed through sociohistorical processes that give different types of bodies access to varying amounts of social power and material resources.

In addition to representing conflicts over power and resources, race is also a social identity. Racial meanings are produced by those in power as well as marginalized groups. From above, powerful groups and/or state institutions can impose meanings on subordinated groups. For instance, racial minorities are often criminalized by dominant groups which can lead to increased police scrutiny (Morris 2016; Rios 2007, 2011, 2017). Simultaneously, those meanings can be contested and countered by subordinated social groups. The process of extending racial meaning to previously unclassified identities, behaviors, and resources is called racialization (Omi and Winant 2015). Racialization is "enacted through meso-level organizations reinforcing, challenging, or altering racial meanings" (Ray 2019:30). Police agencies are organizations where racial meanings are enacted and reified. Bonilla-Silva (1997) argues that the embeddedness of racial categories at all levels of society—e.g. political, social, economic—is indicative of a

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racialized social system. *Racism* is the ideology that supports the racialized social system and "guides actions of racial actors in society" (Bonilla-Silva 1997:474). Racist ideology becomes "common sense" because it rationalizes inequality and racial stereotypes (Bonilla-Silva 1997, 2010; Omi and Winant 2015). Police practices are based on common sense assumptions about crime and, in turn, shape racial meaning in society and help produce the lived experience or race (Epp et al. 2014).

The structural definition of race and racism given above differs substantially from the definitions used by police and in many studies of policing. For police, racism is usually defined as individual animus toward a person based on their race (Baumgartner, Epp, et al. 2018; Epp et al. 2014; Glaser 2014; Gumbhir 2007; Natl. Acad. Sci. Eng. Med. 2018). Racism in this perspective happens on the individual level and is due to individual decisions. Race is framed as an individual characteristic or group membership. When written into police policy, racial bias is given an even more narrow definition. For example, the Metro Nashville Police Department's Manual defines biased based policing as "the selection of individuals for enforcement intervention based ***solely*** on a common trait of a group, such as race, ethnic origin, gender, socioeconomic status, sexual orientation, or age" [emphasis in original] (Metropolitan Nashville Police Department 2018:441). By this definition, racism or biased policing can only occur on an individual level and only if an officer intentionally (and demonstrably) targets a person based on race without any other pretext that can justify the action. Race can be used by officers in deciding to stop a vehicle or pedestrian but it can't be the *only* reason for the stop. Not only does this definition of racism absolve police of bias in most cases but it also ignores the ways that organizations can reproduce and perpetuate racial inequality.

DISSERTATION OVERVIEW

       In this dissertation, I examine racial disparities in discretionary vehicle searches by new police officers in Nashville, Tennessee and test whether police practices affect psychological wellbeing in the community. The first two papers evaluating racial disparity show how police disproportionately apply state power and control on people of color in Nashville. The third paper asks how that disproportionate application of coercive force is associated with distress for community members. I use both the structural and individual accounts of race and racism in this dissertation. The first paper (Chapter 2) examines racial disparities in discretionary searches for white, black, and non-black officers of color in the first three years of their careers. I test whether new officers' search trajectories—the rate of searching drivers over the first years in their career—are best explained by statistical discrimination theory, social conditioning theory, or bureaucratic promotion theory. The results are consistent with a structural understanding of race since racial disparities are persistent over time and officers are more likely to conduct searches when they are about to become eligible for a promotion. The second paper (Chapter 3) draws more explicitly from an individual model of race and racism. I engage with the research literature on testing for racial bias in police decisions in order to identify whether officers conduct discretionary searches with different standards of evidence for white, black, and Hispanic drivers (see Neil and Winship 2019 for an overview). I find clear evidence of racial bias. The analysis would not meet the policy definition of bias-based policing in the MNPD manual because I cannot show that officers made the decision to search *solely* based on race. Nevertheless, the findings should be concerning for police administrators and policy makers. The final paper (Chapter 4) tests whether proactive policing in conjunction with having previously experienced unfair treatment by police is associated with depressive and anxiety symptoms. Using the

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Nashville Stress and Health Survey, I find that black respondents have increased depressive symptoms if they have experienced unfair police treatment. The heightened risk of depressive symptomatology is more pronounced when living is a neighborhood where police make many misdemeanor arrests, self-initiated reports, and discretionary searches. I do not find a relationship of proactive policing or unfair treatment by police with anxiety symptoms. Together, these three papers provide a snapshot of how police practices differentially impact Nashville residents based on race and ethnicity. I address policy implications in the discussion of each chapter and the concluding chapter of the dissertation.

CHAPTER 2

RACIAL DISPARITIES IN POLICE OFFICERS' DISCRETIONARY SEARCH
TRAJECTORIES: STATISTICAL DISCRIMINATION, SOCIAL CONDITIONING, AND
BUREAUCRATIC PROMOTION INCENTIVES

ABSTRACT

Police officers tend to search black drivers more often than white drivers when they conduct a

traffic stop. Large disparities in search rates may delegitimize police and contribute to inequities

throughout the criminal justice system. Little is known about how individual officers develop

their search tendencies throughout their careers. Drawing on theories of statistical discrimination,

social conditioning theory, and bureaucratic promotion theory I examine the rate at which

officers who are white, black, and non-black people of color (POC) conduct discretionary

searches over the first three years of their careers. The results show that there is a large disparity

between search rates for black and white drivers from the beginning of officers' careers

consistent with statistical discrimination theory. Black police officers diverge from white and

non-black POC officers reducing their search rate after their first year on the force. When

officers become eligible for promotion in the third year, white and non-black POC officer

increase their search rate as suggested by bureaucratic promotion theory's proposition that

employees will increase productively while black officers do not. Together, these findings show

that racial disparities can be influenced by organizational structure as well as the biases that are

established early in their career.

INTRODUCTION

Recent criminal justice reform efforts have encouraged the public to focus on racial disparities in the criminal justice system. Most research shows that black people are more likely than whites to be stopped, searched, and arrested by police (Alexander 2012). Once in the court system, blacks are more likely than whites to be convicted of a crime and receive harsher sentences for equal crimes compared to whites (Cole 1999; Patterson 2015; Walker, Spohn, and DeLone 2012). The result is a system of racialized mass incarceration where, in 2018, 2.3 million people in the United States were in jails, prisons, or other detention facilities and an additional 4.5 million are under community supervision, probation or parole (Bobo and Thompson 2010; Prison Policy Initiative 2019). Black Americans are subject to correctional control disproportionately compared to their representation in the population. In 2016, blacks were 28 percent of the probation population and 38 percent of parolees while comprising 13 percent of the general population (Kaeble 2018; Patterson and Wildeman 2015). The observed racial disparities are no accident but the result of state and federal policies that disproportionately target and harm black communities (Alexander 2012; Bobo and Thompson 2006; Tonry 2011).

Loïc Wacquant (2001) argues that the expansion of the carceral state through policing, probation, and parole following the Civil Rights Movement and accelerated by the War on Drugs has led to a "solidification of the centuries-old association of blackness with criminality and devious violence" (117). Sociologists show that the concentration of imprisonment and correctional control in poor, black communities is now one of the primary driving forces of race-based social stratification (Beckett and Western 2001; Massey 2007; National Research Council 2014; Pettit and Western 2004; Western 2002, 2006). Racial disparities in criminal justice contact often begin early in life with schools increasingly working with police and intense

suspicion and criminalization of young people of color creating a school to prison pipeline (Jones 2009; Rios 2011, 2017). After police contact occurs and a citation or arrest is made, the formal criminal justice process begins. The most common way a person comes in contact with a police officer is during a traffic stop (Davis, Whyde, and Langton 2018; Langton and Durose 2013). When a traffic stop leads to a search, police officers are making a judgment about who is suspicious (Epp et al. 2014). In aggregate, search decisions are a filter that leads to the criminal justice system. If racial disparities are abundant, they are one of the first steps in producing the overrepresentation seen throughout courts and corrections.

Modern urban police forces are large bureaucratic organizations that enforce the legal code. Police officers are *street-level bureaucrats* that make decisions about how the law is implemented on a case-by-case basis (Lipsky 1971). Each small decision about when to conduct a traffic stop or a discretionary search can have large implications for the driver. If the driver is found with drugs or an illegal weapon, they will face consequences from courts including fines, probation, and/or imprisonment. Often overlooked are situations where a driver is searched but has nothing illegal in his or her possession. In this case, the driver must sit on the curb while a state bureaucrat rifles through their personal belongings. To the driver, this may feel somewhere between an annoyance and an injustice, entirely based on the police officer's judgment that the driver is not the be trusted. The driver's perception of the search on the annoyance-injustice spectrum is likely influenced by their subject position. If the driver sees their treatment as equitably distributed and carried out in a professional manner, the search is likely an annoyance. If, however, the driver knows that others who share an identity, notably race, are disproportionately subject to police searches, feelings of injustice are a likely response. This is a problem beyond the issue of procedural fairness itself. When police officers' decisions are

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perceived as biased by the community, the overall legitimacy of the police force is tarnished (Meares et al. 2015).

Ideally, new police officers are trained to exercise their legal authority in fair and unbiased ways. In practice, decades of racial profiling research suggests that race contributes to officers' enforcement decisions (Baumgartner, Epp, et al. 2018; Epp et al. 2014; Glaser 2014; Tonry 2011). Implicit and explicit racial bias can influence an officer's evaluation of facts and circumstances leading to higher rates of searches on people of color (Glaser 2014). Black men in particular are often seen as suspicious and singled out for searches (Davis 2017; Eberhardt 2019; Rios 2007, 2011). Studies investigating racial disparities in search decisions tend to show that black drivers are more likely to be searched than white drivers after a traffic stop (Baumgartner, Epp, et al. 2018; Epp et al. 2014; Higgins, Vito, and Grossi 2012; Rojek, Rosenfeld, and Decker 2012). Some research also indicates that white officers are more likely than black officers to conduct searches but there are mixed findings across different jurisdictions with several studies finding few, if any, differences between white and black officers (Close and Mason 2007; Klahm and Tillyer 2015; Rojek et al. 2012; Tillyer 2014; Tillyer and Klahm 2011; Tillyer, Klahm, and Engel 2012).

This study investigates how racial disparities in discretionary searches are produced within police organizations. Officers self-select into the profession but are trained uniformly in their police academy how to enforce laws in the jurisdiction while respecting the rights of community members. Following training, officers are socialized into the police organization and have experiences in the field that likely shape how they make decisions to conduct searches. If the first years on the force are formative and help set career trajectories, the quality of policing occurring in these years requires greater attention from researchers. Using data from Nashville,

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TN, I examine how often officers who are white, black, and non-black people of color (POC) decide to conduct discretionary searches during their first three years on the police force. My theoretical approach is shaped by theories of racial discrimination and by bureaucratic promotion theory.

Theories of racial discrimination–specifically social conditioning theory (Smith and Alpert 2007) and statistical discrimination theory (Pager and Karafin 2009)–suggest alternate trajectories of search behavior over time. Social conditioning theory suggests that stressful negative experiences with racial minority suspects accumulate and lead to increasing racial disparities over time, especially for white officers (Klahm and Tillyer 2015; Smith and Alpert 2007). Statistical discrimination, in contrast, would predict that a racial disparity between black and white drivers would begin large and remain stable over time. In addition to processes of racial discrimination, racial disparities are produced within a racialized organizational structure that incentivizes certain behaviors (Ray 2019). Ray (2019) proposes that organizations, including police agencies, should be understood as embedded within a larger racial social structure that patterns the internal practices of the organization along racial lines. Officers across racial groups may exercise their agency in different ways—i.e. changing their discretionary search rates—in response to organizational norms of career advancement. Bureaucratic promotion theory argues that once eligible for a promotion, officers will adjust their performance metrics by conducting more searches in hopes they will receive a promotion (Halaby 1978; Jacobs 1981; Lutfey and Mortimer 2006). When examined through the lens of racialized organizations, there will likely be differences between officers by race in how they respond to organizational incentives initiating higher numbers of searches, especially on black drivers who have less social power (Rojek et al. 2012).

This paper makes several contributions to the research literature. First, I examine discretionary search decisions as a longitudinal process that develops over time. As a career trajectory, discretionary search rates show how individual officers change over time and whether specific career points are related to officers' decisions to conduct searches. Second, by using a longitudinal model I test whether racial disparities increase over time—consistent with social conditioning theory (Smith and Alpert 2007)—or whether racial disparities exist at the beginning of the career and persist over time—a proposition of statistical discrimination theory (Pager and Karafin 2009). Third, I apply an organizational perspective which shows how officers may adjust their policing practices in response to the bureaucratic promotion system used by the police force. Finally, this paper has implications for studies of officer race on racial profiling research. The results show that black officers conduct discretionary searches at a similar rate to their white peers when they are compared cross-sectionally. When the temporal nature of the data is modeled, black officers diverge from their white peers by conducting fewer discretionary searches.

BACKGROUND

Police officers are given wide latitude to make decisions about conducting searches during a traffic stop (Friedman 2017). Police officers conduct discretionary searches in response to their suspicion that they will find evidence of a crime (i.e. drugs or illegal weapons). Officers are trained to observe behavioral and situational cues from the driver or passengers in order to establish specific and articulable facts and circumstances that justify conducting a search. For instance, if a driver is seen trying to hide something from the officer or the vehicle smells of marijuana, the officer can allege that they have probable cause to search the vehicle. If an officer

does not have enough evidence to establish probable cause but still desires to search the vehicle, they may ask the driver for consent to conduct a search. Both are examples of discretionary searches. Armenta (2017) found that officers in Nashville are taught to "push the stop" by taking additional steps to investigate the driver and vehicle if they felt suspicion or had a hunch. She found that racial and ethnic stereotypes led to determinations of suspiciousness. She writes that during her ride-alongs, "officers voiced suspicions about young Latino men that hinged on whether they believed Latino men were workers or possible gang members" (Armenta 2017:68). Ethnicity was being used as a proxy for suspicion. Researchers argue that these stereotypes come from through repeated exposure to racial minorities in criminal or deviant situations or from prior assumptions about racial or ethnic groups as a whole (Alpert, Dunham, and Stroshine 2014; Knowles, Persico, and Todd 2001; Pager and Karafin 2009; Smith and Alpert 2007). Another possibility is that weak justifications to search drivers are based on organizational incentives to show productivity. In the remainder of this review, I will review previous research related to discretionary search decisions specifically focusing on officer race, officer experience, and driver race. Then, I will develop hypotheses based on social conditioning theory (Smith and Alpert 2007), statistical discrimination theory (Knowles et al. 2001; Pager and Karafin 2009; Schwab 1986), and bureaucratic promotion theory (Halaby 1978; Jacobs 1981) which suggest alternate hypotheses related to search decisions over time. I review these theories and test whether they fit the observed patterns over time.

Probability of a Discretionary Search

The probability that an officer will decide to search a vehicle during a traffic stop is used in many studies to show whether a racial disparity exists between black and white drivers. Black

drivers, in particular, are usually found to be searched at a higher rate than white drivers when stopped by police officers (Ariel and Tankebe 2016; Baumgartner et al. 2017; Baumgartner, Epp, et al. 2018; Epp et al. 2014; Glaser 2014; Rojek et al. 2012; Tillyer et al. 2012). While this method is useful for describing and testing explanatory reasons for a racial disparity, it does not show whether any specific stop or officer was affected by bias (Fridell 2004; Knowles et al. 2001; Ridgeway 2008). Even if all searches meet the legal requirements for constitutionality, large racial disparities are often considered unfair by community members (Meares et al. 2015). Tests for racial disparity are useful to illustrate the underlying social processes leading to the observed data. Examining differences in officers by race and experience helps determine the processes leading to discretionary searches.

Officer race-driver race

Following urban uprisings in the 1960's, The National Advisory Commission on Civil Disorders (The Kerner Commission) recommended hiring more racial minority officers to increase police legitimacy and decrease police abuses of black civilians (Gillham and Marx 2018; National Advisory Commission on Civil Disorders 1968). In 1987, only 14.6 percent of local police officers were racial or ethnic minorities; by 2013, 27.3 percent of officers were a racial or ethnic minority (Reaves 2015). More specifically, black officers comprised 12 percent of officers in 2013. Similarly, President Obama's 2015 Task Force on 21st Century Policing echoed the Kerner Commission's recommendation of increasing officer diversity (President's Task Force on 21st Century Policing 2015). Whether racial minority officers differ from white officers in their decisions as police officers has been a topic of substantial debate. Black officers often report experiencing racism in the workplace from their white peers and identify situations

where white officers have abused their power with racial minority suspects (Bolton and Feagin 2004). In terms of decisions to search vehicles during traffic stops, there has been mixed evidence across studies.

Rojek, Rosenfeld, and Decker (2012) analyzed the probability of a search for different officer race/driver race combinations in St. Louis, Missouri. Taking a conflict theory approach, they argue that the power differential between officer and driver within the racial social structure will predict the likelihood of a search. They found that the most likely officer race/driver race combination leading to a search is white officers stopping black drivers followed by white officers stopping white drivers, black officers stopping black drivers, and the least likely to lead to a search is black officers stopping white drivers. They interpret these findings as support for their theory that white officers have status as both a police officer and a white person so they will use their relative power against lower status individuals more frequently. Similarly, Close and Mason (2007) analyzed data from Florida Highway Patrol from 2000 to 2002 and found that black officers were 15 percent of the force but conducted only four percent of the searches. White officers comprised 73 percent of the force and conducted 88 percent of searches. Other studies have found contradictory or mixed findings related to officer and driver race combinations. Tillyer, Klahm, and Engel (2012) found that white officers were 2.9 times more likely to conduct a discretionary search than non-white officers. In their data from Cleveland, Ohio, they did not find an increased risk of being searched for black or Hispanic drivers overall but did find that young black men specifically are at higher risk of a search. Officer race did not moderate this relationship indicating that white officers are not more likely to search young black men than non-white officers. Instead, they found that the increased discretionary search risk was predominantly driven by officer assignment rather than officer race. Officers assigned to traffic

detail were more likely than non-traffic officers to search young black men. They attribute these results to the fact that traffic officers are less likely to have ongoing contacts in specific geographic areas and therefore may rely on stereotypes more than officers who become familiar with the neighborhoods they patrol. Similarly, Klahm and Tillyer (2015) use 2009 data from a large, urban Southwestern city and find no differences in the probability of searches for black drivers compared to white drivers or in black officers compared to white officers. These contradictory findings on the relationship between officer race/driver race show that more nuanced work is needed to examine the social contexts that are related to racial disparities in discretionary searches.

Officer experience

Klahm and Tillyer (2015) argue that professional experiences as a police officer are more likely to predict discretionary search rates than officer race. The authors contend that the majority of previous research has primarily treated experiences as a count of the number of years an officer has been on the force without measuring previous police activity. Drawing on Smith and Alpert's (2007) social conditioning model, they hypothesize that officers with greater exposure to racial minorities and young suspects in the past will search more often than those with less exposure. Klahm and Tillyer (2015) split their observation year (2009) into six-month segments and hypothesized that officers who stopped more racial minorities, searched more drivers, and that those who found more evidence in searches during the first half of the year would conduct more searches in the second half of the year. The findings support for the hypotheses and Klahm and Tillyer (2015) argue that, "officers gain experience during searches that influences their decision making in the future" (356). Officers who conducted more searches

and found more evidence continued to conduct searches at higher rates in the second half of the year. It is not clear from this study how officer experience prior to the beginning of a calendar year affect discretionary search activity. If police officers gain experience throughout their careers that influences their discretionary search behavior, officers' first years on the police force should receive greater scrutiny.

Social Conditioning Theory

Smith and Alpert's (2007) theory of social conditioning is often used to explain why racial disparities are so persistent in police outcomes. They argue that due to historical and structural forces, police officers often work in racially segregated communities that have persistent problems with violent crime. Officers do not intend to discriminate but they are exposed to stressful situations—often with racial minority suspects—that prime their cognitive schema to be suspicious of people of color. Psychologists often refer to this priming as implicit bias (Eberhardt 2019; Glaser 2014). In this model, officers are receiving a biased sample of negative experiences with racial minorities. Officers develop an *illusory correlation* of race with criminality through direct exposure to racial minority suspects. If an illusory correlation is applied to routine encounters with the public—like traffic stops—they are more likely to treat a person in biased ways. With more time on the force, the likelihood of having negative experiences and developing biased cognitive schema increases. Smith and Alpert (2007) do not develop a temporal aspect of their theoretical model. Since social conditioning is framed as a process, temporality is implicitly assumed. The longer officers are potentially exposed to negative social encounters with racial minorities, the more likely they are to show biases in their decisions. When framed as an average effect on officers' decisions, if social conditioning is driving a racial disparity the discretionary

search rate for black drivers would likely increase relative to the rate of discretionary searches of white drivers. Hypothesis 1 tests whether social conditioning theory is supported:

Hypothesis 1: Evidence will support social conditioning theory if the discretionary search rate for black drivers increases relative to the discretionary search rate for white drivers over time.

Statistical Discrimination

The main mechanism of bias proposed by Smith and Alpert is a cognitive model that is acquired over time. Research suggests that there is both a temporal process as well as baseline levels of *statistical discrimination* that lead to racial disparities in hiring decisions. Statistical discrimination occurs when presumed group-level attributes are applied to an individual (Pager and Karafin 2009; Schwab 1986). Pager and Karafin (2009) propose a model in which employers bring their prior beliefs about black employees to their hiring decisions which then will either be confirmed or denied once working with black employees. They argue that the process of racial discrimination is due to both previous knowledge or beliefs and a process of updating beliefs using new information. In the case of discretionary searches during a traffic stop, police officers have prior knowledge and beliefs about race and crime. In the police academy, officers are trained on general crime statistics and the racial composition of the population of crime suspects. Officers are then likely to generalize from these statistics to other interactions with the public. For instance, homicide suspects and victims are often disproportionately racial minorities. If the racial composition of homicide suspects leads an officer to search more black drivers than white drivers instead of the specific context of each stop, that officer would be practicing statistical discrimination. Beliefs about blacks and crime can be confirmed or disputed as officers gain more experience. Social conditioning theory suggests the process of confirmation is through negative interactions with racial minority suspects. From a longitudinal perspective, the initial

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racial disparity between decisions to search black and white drivers is most likely due to previously held knowledge or information gained from training. If social conditioning were also taking place and updating prior beliefs, over time the disparity between black and white drivers would grow. If social conditioning was not occurring and statistical discrimination was the only source of racial bias, the disparity would remain equal over time. Hypothesis 2 tests whether statistical discrimination theory is supported:

Hypothesis 2: Evidence will support statistical discrimination theory if the discretionary search rate for black drivers is consistently greater than the discretionary search rate for white drivers over time.

Bureaucratic Promotion Incentives

Police officers not only manage their interactions with the public but are also employees within a bureaucratic organization. Organizational social psychologists argue that workers' desire to show productivity is an orientation toward future promotion (Lutfey and Mortimer 2006). Weber argues that in a rationalized bureaucracy, "each individual worker is mathematically measured, each man becomes a little cog in the machine and, aware of this, his one preoccupation is whether he can become a bigger cog" (Weber quoted in Mayer 1956:126–27). Organizational theorists argue that promotion within a bureaucracy is determined by both fixed and discretionary criteria (Halaby 1978). Fixed criteria are the institutional requirements placed on advancement. For instance, a union contract may govern who is eligible for a promotion or there may be requirements about years of service prior to eligibility. Discretionary criteria are applied by evaluating performance. Jacobs (1981) argues that promotion in police agencies requires longer periods of observation at each level of the organization to avoid controversy, and those who are most productive (without being involved in a controversy) will be promoted. Police researchers have observed that *productivity* is often emphasized by

supervisors over more holistic measures of quality policing (Armenta 2017; Moskos 2008).

Moskos (2008) conducted an ethnographic study of Baltimore police by working as an officer in the field for one year. His supervisors emphasized arrests and required officers to make at least two arrests per month, otherwise they would have to write a report justifying their lack of arrests. Giving quotas for stops or arrests to officers is illegal but departments can have "performance goals" which give recommended numbers that officers should aim to achieve.

Since officers have no control over fixed promotion requirements, they are likely to adjust their performance outcomes—including discretionary searches—to show supervisors they deserve promotion. If there is a time requirement before promotion, the year prior to eligibility is when officers are most likely to boost their numbers. If promotion incentives contribute to search activity, there should be a curvilinear pattern for search probability over time with a pronounced rise in the year of eligibility. Hypothesis 3 tests whether bureaucratic promotion theory is supported:

Hypothesis 3: Evidence will support bureaucratic promotion theory if the discretionary search rate increases in police officers' third year on the force.

Officer Race/Ethnicity

Even though racial minority officers receive the same training as other officers, they bring life experiences that may protect them from developing racist stereotypes (Bolton and Feagin 2004; Thompson 2003). The police academy has a standardized curriculum that teaches the skills required to be a police officer as well as the philosophy of the department. Departments are increasingly teaching new officers community oriented policing and problem solving skills to reduce unnecessary use of force and bias (Bradford and Pynes 1999). Teaching community oriented and problem solving skills in the academy may not make as large of an impact as

intended. In a longitudinal study of 14 successive training academies in Phoenix, a community policing and problem solving curriculum made recruits feel more positive toward community-focused strategies but over the first year of field training the positive attitudinal changes dissipated (Haarr 2001). Haarr (2001) suggests that the on-the-job socialization as well as the prior beliefs officers bring to the profession are more influential than the standardized curriculum offered to new recruits. If racial stereotypes are common for white officers, new recruits—especially white recruits—may be socialized toward believing them.

Black officers may be less likely to adopt the dominant racial ideology of the organization than white officers. In a study of black officers conducted in the late 1990's in the American South, Bolton and Feagin (2004) found that black officers commonly reported that their own experiences growing up in segregated neighborhoods informed their choices as officers. The officers said that they understood why police were not trusted. One officer said, "blacks from my generation had to run from police. They were beaten up badly. Some were killed, shot and they just had bad experiences. So when I did become a cop, I can see them [parents] telling their kids to stay away from cops…I can understand why" (Bolton and Feagin 2004:51–52). The black officers in the study also reported that they heard their white peers using racist language, use excessive force against black community members, and have mistrust for black officers by framing them as taking the side of black communities over police (Bolton and Feagin 2004). Black officers in several studies have reported exclusion from "old-boy" networks that are useful for mentorship and promotion (Bolton and Feagin 2004; Thompson 2003).

Research on racial attitudes of white and black officers show that white officers tend to hold more racially biased opinions of black people than the white population at large. LeCount (2017) uses nationally representative data from the General Social Survey to test whether white

law enforcement officers differ from other whites and whether black law enforcement officers differ from other blacks. White officers are more likely than other whites to deny that there is an educational disadvantage for blacks and to believe that blacks are not disadvantaged by discrimination. White police officers are nine times more likely than non-law enforcement whites to believe blacks are more violent than whites. White officers are more likely to have higher racial resentment, to deny discrimination of blacks, believe that whites are discriminated against, and endorse stereotypes of black criminality than whites in the general population. Black law enforcement officers did not differ from the black population on any of the 12 measures of racial beliefs in the General Social Survey. While LeCount's (2017) study does not show a causal relationship between having negative on-the-job experiences with black people and holding racial stereotypes, the findings indicate that white officers are more likely to hold racially biased views than whites who are not in law enforcement.

Black police officers bring their lifetime of racial socialization as a background to the training they receive as police officers. It is likely that white officers may differ from officers of color in how they make decisions to search drivers over time. Non-black officers of color may also experience a protective effect against racial disparities in vehicle search decisions. The three hypotheses above may vary by officer race. With officers of color more likely to have lifelong experiences of racial discrimination and more social experience with people of color, negative experiences with black suspects may be less likely to form biases. I test this proposition in hypothesis 1a:

Hypothesis 1a: White officers will increase the discretionary search rate for black drivers relative to the discretionary search rate for white drivers to a greater extent than black or non-black officer of color over time.

Antonovics and Knight (2009) argue that if statistical discrimination is the only form of discrimination occurring in vehicle search decisions there should be no differences in search rate by officer race. They argue that black and white police officers would use the same statistical evidence to make decisions. Hypothesis 2a tests this proposition:

Hypothesis 2a: Black and non-black officers of color will have a lower racial disparity in discretionary searches between black and white drivers.

Finally, the possibility of promotion may be less of an incentive to conduct more searches for black and non-black officers of color than for whites. White officers may be included in cliques that are likely to endorse aggressive strategies against black drivers and have fewer life experiences that show them the consequences of aggressive policing. Hypothesis 3a tests whether officers of color act differently in promotion years:

Hypothesis 3a: Black and non-black officers of color will not increase their discretionary search rate in their third year on the force to the same extent as white officers.

Figure 1: Predicted Discretionary Search Trajectories

Predicted Trajectories

Figure 1 shows predicted trajectories for bureaucratic promotion theory, social

conditioning theory, and statistical discrimination theory consistent with the hypotheses above. If

social conditioning theory is the only process of discrimination occurring, early in the career

there would be small disparities between black and white drivers but the disparity would increase

linearly as more officers have negative encounters with racial minority suspects. If statistical

discrimination is the only process at work, there would be an initial disparity between black and

white drivers that would remain consistent over time. Finally, if the prospect of a promotion

increases search rates, the trajectory over time would be unchanged from year one to year two

but increase in the third year. I also test for differences in trajectories by officer race because

officers of color and white officers are likely to diverge. White officers are likely more

susceptible to developing racial stereotypes as suggested by social conditioning theory and

therefore conducting more discretionary searches over time than black or non-black officers of

color. Racial minority officers may also be less likely than whites to raise their search

productivity—particularly for black drivers—when they become eligible for a promotion

because they are more likely to have family and friends who have experienced bias from police.

The Nashville Context

When an officer joins Metro Nashville Police Department (MNPD), they attend the police

academy and spend their first three years on the force as patrol officers. The academy teaches

recruits the policies of the department and what will be expected of them as officers including

how to conduct legal and unbiased searches. They receive their first assignment in one of eight

precincts as a patrol officer on one of three shifts. The eight precincts in Nashville differ substantially from one another. Central Precinct encompasses downtown Nashville and many of the tourist areas of the city. In contrast, North Precinct is a large and heterogeneous area. The precinct includes the historically black neighborhood of North Nashville where two historically black universities—Fisk University and Tennessee State University—are located. The zip code for North Nashville has the highest incarceration rate in the nation for black men born in the 1980's (Looney and Turner 2018). North Precinct extends to the Northernmost part of the county which is rural and lightly populated. Each precinct has unique challenges that lead to specific policing strategies. Patrol officers learn the strategies and norms of their assigned precinct. After three years in Patrol, officers can then be reassigned to other units (e.g. Narcotics, Investigations, Homicide, Domestic Violence, Flex). Officers aiming to be promoted to Flex—a unit dedicated to proactive policing in high-crime areas—or other proactive units often increase the number of traffic stops and searches they conduct to prove to their supervisor that they would be a good candidate (Armenta 2017).

Patrol detail is both a training ground and a rite of passage into the police department. Each Patrol unit is supervised by a sergeant and the officers work together closely to respond to emerging community needs. The on-the-job experience gained while assigned to a Patrol unit aims to hone police skills but is also a source of socialization into departmental culture. Officers leave the academy trained in departmental policy but learn how policy is practiced once in the field. While assigned to Patrol, officers learn about the city they are patrolling and problems specific to neighborhoods. Officers spend their days working from their vehicle, responding to emergency and non-emergency calls for service, assisting other officers when needing backup, making traffic stops, issuing citations, making arrests, and completing paperwork. Officers'

productivity, including number of arrests, traffic stops, and searches, contributes to their career advancement. Armenta (2017:61–62) found in her 2012 ethnography of MNPD's South Precinct that officers were encouraged to conduct proactive traffic stops because, "the more productive officers received better evaluations and were more likely to have their preferences accommodated when they requested new shifts, assignments, and promotions." She also reported that an officer credited receiving his preferred days off to his productivity and the unit had a sense of competition for conducting the most stops. Similarly, Fox 17 News Nashville reported that a 2015 email from a lieutenant to his precinct, "ask[ed] officers to increase physical arrests and to take a zero-tolerance approach." The email gave recommended performance goals of 2 arrests and 11 traffic stops a week for patrol officers (Quinones 2015). Armenta (2017) also found resistance to the competition with some more experienced officers lamenting the dragnet approach because it required no skill.

Focus groups of MNPD officers conducted in 2001 and 2002 split by race and gender showed stark differences in how white and black officers understood racial profiling (B. N. Williams, Peters, and Speer 2003). The focus groups with white men and white women both had a common theme that denied the existence of racial profiling or that it was a problem. One white officer said, "I like to think we profile conduct. We don't profile people. If that conduct involves descriptions of people or statistics of who's doing what and where, well then so be it" (14). In contrast, the focus groups with black men and black women both acknowledged that racial profiling was common and had happened to them when not in uniform. A black male officer also pointed to productivity statistics as important. He said, "there was a big deal about the stats, and I was watching all the other boys making them stats, but they were making them illegal stats. No probable cause, but there was mighty trumped up charges just to say, 'Hey Sarge, I've got this

paperwork over here'" (21). White and black officers bring different life experiences with them to the profession and clearly diverge with one another about the impact of police on black communities.

Recently, Nashville activists have criticized the discretionary search trends of MNPD officers. Gideon's Army (2016), a non-profit organization in Nashville, published a report analyzing traffic stops and vehicle searches conducted by MNPD between 2010 and 2015. The report argued that MNPD searched black drivers based on probable cause at a rate 3.4 times higher than white drivers in 2015 but were 15% less likely to find any evidence of a crime. Similarly, black drivers were 2.3 times more likely to be searched based on consent in 2015 and officers only found evidence in 11% of consent-based searches of black drivers. The report authors conducted logistic regression models to estimate the odds of a search or finding evidence but did not include theoretically relevant controls for driver demographics, officer demographics, location, or type of stop. The Gideon's Army report sparked community conversations on policing in Nashville that are ongoing.

METHODOLOGY

Data

Data for this paper come from MNPD administrative records received through open records requests. I use two databases for the analysis beginning January 1st, 2010 and ending December 31st, 2017. First, a database of all traffic stops conducted in the jurisdiction. At every traffic stop, officers are required to fill out a form (Form 252) about the stop. They enter information about the demographics of the driver, the reason for the stop, whether they conducted a search, the legal justification for the search, and the outcome of the stop

(i.e. warning, ticket, misdemeanor citation, arrest). The second source of data is employee demographics and assignments. The department keeps records of all officers' assignments and transfers. They also collect demographic information on the officer including gender, age, and race. I match the traffic stop data and the employment data by employee identification number and date.

The final sample includes 419 officers that joined MNPD January 1, 2010 and after then completed three full years on the force by the end of 2017. Since officers join the force in staggered cohorts, I calculate years on the force in relation to the first assignment after the training academy. A number of stops are excluded from the sample for several reasons. Drivers who were not identified as non-Hispanic black or non-Hispanic white are excluded from the analysis. The officers in the sample conducted 43,109 stops of non-black, non-white drivers. Drivers under the age of 14 were also excluded, a total of 102 cases. Gender was missing in 24 also excluded cases. Searches conducted for non-discretionary reasons are excluded as well. These include searches conducted because the driver had an outstanding warrant (N=530). When a driver has an arrest warrant, the officer is required by policy to make an arrest and search the vehicle. Additionally, searches conducted incident to arrest (N=2,303) and inventory searches (N=191) are excluded because they are non-discretionary. The final sample includes 462,768 traffic stops.

Measures

The dependent variable is whether a discretionary search was conducted after a traffic stop. On the 252 Form, officers select whether a search was conducted (yes or no) and if they checked "yes," they select the legal justification for the search. The officer can select multiple

justifications for a search. For instance, many searches (N=1,770) are indicated as both probable cause and consent, both discretionary reasons for a search. Legally, if the officer has probable cause then consent is not needed; however, many officers will ask for consent from the driver rather than making the stop more confrontational than needed. Since multiple justifications are given for searches, deciding on the specific justification becomes subject to additional error. Following previous research, I exclude searches where a non-discretionary justification (warrant, incident to arrest, or inventory) is given and include all other searches as discretionary.

Independent variables are drawn from stop-level characteristics, officer characteristics, and the geographic region of the city. At the stop-level, the driver's race is coded as a binary variable for black drivers with whites as the reference. Gender indicates female. Driver's age is centered at age 25 to assist with interpretation of interaction effects. The reason for the stop given by the officer is included as a set of binary variables. Officers can select whether the stop was made due to a moving violation (reference group), an investigatory stop, a vehicle equipment violation, illegal parking, regulatory violation, no seatbelt, or due to safety. At the officer-level, officer race/ethnicity is measured from the employee demographics as non-Hispanic white, non-Hispanic black, and all other officers (referred to as non-black POC). White officers are the reference group. Officer gender is a binary variable comparing female to male officers. Officer age is measured in years and mean centered. To adjust for geographic differences, the precinct in which the stop occurred is included. Controlling for precinct adjusts for different crime rates, neighborhood differences, and institutional priorities in each of the eight precincts in Nashville. Central precinct (Downtown Nashville) is the reference group.

Analytic Strategy

The analysis proceeds in several steps. First, descriptive statistics are calculated for all variables. Descriptives are reported split by officer race. The most common statistical test for differences between nominal variables is a Chi-Square test. The Chi-Square test and ANOVA test, however, are sensitive to sample size. The sample size of traffic stops (N=462,768) is large enough that all tests will show differences to be statistically significant even if they are not actually substantive. I report both the significance from the Chi-Square test or ANOVA as well as Cramer's V for two categorical variables and eta-squared for the ANOVA test. Cramer's V, commonly denoted as ϕ_c, measures the effect size of a correlation between two discrete variables. The interpretation of Cramer's V is context dependent but generally effect sizes with two degrees of freedom are considered negligible when less than .07 (Sun, Pan, and Wang 2010). Eta-squared (η^2) is the amount of variance explained in a continuous variable by the grouping variable.

The second step of the analysis is fitting a latent growth curve model to estimate officers' search trajectories over their first three years on the force. In a multilevel modeling framework, there are many model specifications that could be used to fit the model. A standard 2-level growth curve model expects one observation measured at each time period for each level-2 unit (i.e. the officer) (Snijders 2011). In this case, there are many traffic stops in each time period. One strategy to simplify this case would be to aggregate traffic stops for each time period. An aggregated model would not be able to estimate the effect of driver demographics on vehicle search probabilities. To address this limitation, I fit the model trajectory with a 3-level growth curve model. At level-1, observations are individual traffic stops. At level-2, an interaction term

between time and officer gives three groupings per officer associated with each time point. Finally, level three is the officer. I calculate the Intraclass Correlation Coefficient (ICC) based on Wu, Crespi, and Wong (2012) as implemented in the *sjstats* package in R (Lüdecke 2018).

I test for the best fitting trajectory without other covariates in the model but the same pattern is found when fit with a full model. To fit the trajectory, I estimate a series of models introducing time and time^2 sequentially and then, finding that the curvilinear trajectory is the best fit, test whether time and time^2 should be included as random slopes at level-3 (Curran, Obeidat, and Losardo 2010; Snijders 2011). I compare the log likelihood, Bayesian Information Criterion (BIC), and Akaike Information Criterion (AIC) to establish which model provides the best fit of the data. BIC is the most conservative estimate of model fit because it favors parsimony by penalizing additional parameters. I also conduct an ANOVA deviance test comparing model fit.

Piecewise growth models

The third step of analysis is estimating the main effects models and probing for between-officer variability. Following the recommendation of Hernández-Lloreda, Colmenares, and Martínez-Arias (2004), after fitting a quadratic model I estimate two separate slopes for time. The first gives the trajectory between times one and two. The second shows the trajectory between times two and three. Fitting a piecewise model assists with interpretation of random effects since polynomial terms are often challenging to interpret (Curran et al. 2010; Hernández-Lloreda et al. 2004; Snijders 2011). Another advantage of the piecewise model is that it can be estimated as a 2-level model since the period one slope variance and the period two slope variance account for all variability of time that would otherwise be modeled at level-2 in the 3-level model. When estimated as a 3-level piecewise model, the level-2 variance is zero and the

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model is identical to the 2-level model. The 3-level curvilinear model discussed in the previous section and the 2-level piecewise model are functionally equivalent and only differ in interpretation of the time slopes. Estimating the model as 2-level is more parsimonious and reduces the likelihood of estimation errors or non-convergence. Findings are substantively identical across various model specifications.

After estimating the model with all covariates and random time period slopes, I probe whether driver race should be included as a random effect. The random slope for driver race is interpreted as between-officer propensity for searching black drivers. Including driver race as a random effect is the best fitting model. Finally, I use the random intercept, random time period slopes, and random driver race model to estimate fixed effect interactions among time, officer race, and driver race. I estimate two-way interactions between each combination of variables and a three-way interaction among the three key variables. All models are fit using the glmer() function from the *lme4* package in R (Bates et al. 2015).

Equations and variance matrices for the final piecewise growth model including random intercepts, random slopes, and random driver race effects (Table 3, Model 2) are shown below:

Level-1 Equation (stop level):

$$\log\left(\frac{\pi_{ij}}{1-\pi_{ij}}\right) = \beta_{0j} + \beta_{1j}time1_{ij} + \beta_{2j}time2_{ij} + \beta_{3j}blackdriver_{ij} + \varepsilon_{ij} \tag{1}$$

Level-2 Equations (time X officer level):

$$\beta_{0j} = \gamma_{00} + u_{0j}$$

$$\beta_{1j} = \gamma_{10}^{time1} + u_{1j} \tag{2}$$

$$\beta_{2j} = \gamma_{20}^{time2} + u_{2j}$$

$$\beta_{3j} = \gamma_{20}^{blackdriver} + u_{3j}$$

with variances,

$$\varepsilon_{ij} \sim N(0, \sigma_\varepsilon^2)$$

$$\begin{bmatrix} u_{0j} \\ u_{1j} \\ u_{2j} \\ u_{3j} \end{bmatrix} \sim N \left(\begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} \tau_{00} & & & \\ \tau_{01} & \tau_{11} & & \\ \tau_{02} & \tau_{12} & \tau_{22} & \\ \tau_{03} & \tau_{13} & \tau_{23} & \tau_{33} \end{bmatrix} \right) \qquad (3)$$

RESULTS

Descriptives

Stop-level (level 1) and officer-level (level 2) descriptive statistics are shown in Table 1. A total of 346 white officers (82.6% of total) are included in the population of officers completing three years on the force between 2010 and 2017. A total of 34 (8.5%) black officers and 39 (9.3%) non-black POC officers are included in the population. All Chi-Square tests on level 1 variables are significant due to the large sample size; Cramer's V is a measure of association that is not sensitive to sample size. The effect sizes on all level 1 comparisons are small which shows that the differences between white, black, and non-black POC officers shown by the Chi-Square tests are not substantive. White officers made 387,328 traffic stops which led to 11,274 discretionary searches (2.9% of stops), black officers made 30,954 traffic stops leading to 551 discretionary searches (1.8% of stops), and non-black POC officers made 44,486 traffic stops leading to 1,311 discretionary searches (2.9% of stops). When stopping black drivers, white and non-black POC officers searched 4.3% and 4.2% of the black drivers they stopped, respectively, while black officers searched 2.6%. White and non-black POC officers searched 1.8% and 1.9% of the white drivers they stopped, respectively, while black officers searched 0.9%.

Black and non-black officers of color were more likely to be women with 18% of officers in both groups being female. Only 7% of white officers are female. A Chi-Square test shows that this difference is significant ($\chi^2 = 8.85$, *df*=2, *p*<.05) and Cramer's V shows a small to moderate

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Table 1: Descriptive Statistics for All Years

	White		Black		Non-Black POC		Sig. Diff[a]	Effect Size[b]
N-Officers	346		34		39			
N-Stops	387,328		30,954		44,486			
	Mean/ N	(SD)/Prop	Mean/ N	(SD)/Prop	Mean/ N	(SD)/Prop		
Stop-level (level-1) N=462,768								
Searches	11,274	.029	551	.018	1,311	.029	***	.017
Black Drivers Stopped	173,977	.449	15,526	.502	19,707	.443	***	.027
Black Drivers Searched	7,531	.043	405	.026	836	.042	***	.022
White Drivers Stopped	213,352	.551	15,428	.498	24,779	.557	***	.027
White Drivers Searched	3,743	.018	146	.009	475	.019	***	.016
Women Stopped	159,905	.413	13,294	.429	18,306	.412	***	.009
Women Searched	2,519	.016	99	.007	283	.015	***	.017
Driver Age	36.92	(14.13)	37.35	(14.50)	37.06	(14.16)	***	.000
Moving Violation Stops	148,663	.384	11,568	.374	17,072	.384	***	.005
Investigative Stops	4,844	.013	348	.011	565	.013	***	.003
Vehicle Equipment Stops	137,725	.356	8,964	.290	15,503	.348	***	.034
Parked Vehicle Stops	555	.001	36	.001	23	.001	***	.008
Regulation Stops	44,185	.114	4,272	.138	4,274	.096	***	.026
Seatbelt Stops	5,826	.015	1,008	.033	1,216	.027	***	.042
Safety Stop	43,944	.113	4,679	.151	5,739	.129	***	.031
Officer-level (Level-3) N=419								
Officer Age	27.64	(5.22)	28.59	(6.93)	27.36	(3.18)		.003
Proportion Women Officers	.07	-	.18	-	.18		*	.15

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

[a] Significance levels report *p*-value from Chi-Square test for nominal variables and ANOVA test for continuous variables

[b] Effect size reports Cramer's V for all difference tests between nominal variables and eta-squared for nominal-continuous comparisons because they are robust to large sample size.

effect size of .15. Officers across racial/ethnic groups did not differ significantly by age. On average, white officers were 27.64 years old (*sd*=5.33), black officers were 28.59 years old (*sd*=6.93), and non-black POC officers were 27.36 years old (*sd*=3.18).

Fitting Trajectory Shape

The first step of the analysis is to establish the shape of the growth trend over time. Table 2 shows the null model and sequentially adds fixed effects for time and time^2 testing for linear or non-linear growth. Model 1 shows the null model which has a level-2 ICC of .16 and the level-3 ICC of .18, which is acceptable for estimating a 3-level model. Model 2 incorporates time as a linear fixed effect. Model 3 adds the time^2 to the model. Both the linear and quadratic fixed effects in Models 2 and 3 are significant. The log likelihood, AIC and BIC are smaller in Model

Table 2: Evaluating Model Fit and Growth Form Over Time Using Three-Level Multilevel Model Predicting a Discretionary Search During Traffic Stop for Officers in First Three Years

	(1)		(2)		(3)		(4)	
	b	*(se)*	*b*	*(se)*	*b*	*(se)*	*b*	*(se)*
Time			.28***	(.04)	-.33*	(.13)	-.37**	(.12)
Time^2					.29***	(.06)	.28***	(.05)
Constant	-4.29***	(.06)	-4.60***	(.07)	-4.46***	(.08)	-4.37***	(.07)
Random effects; Level 2 (N= 1,257)								
Level-2 Intercept SD	.91		.84		.82		.51	
Random effects; Level 3 (N=419)								
Level-3 Intercept SD	.96		.99		.99		.95	
Time SD							1.15	
Time-Intercept Corr.							-.27	
Time^2 SD							.24	
Time^2-Intercept Corr.							.17	
Time^2 –Time Corr.							-.99	
Observations (Level 1)	462,768		462,768		462,768		462,768	
Log Likelihood	-51,566.98		-51,533.45		-51,524.86		-51,464.00	
Akaike Inf. Crit.	103,140.00		103,074.90		103,059.70		102,948.00	
Bayesian Inf. Crit.	103,173.10		103,119.10		103,114.90		103,058.50	
Residual DF	465,480		465,479		465,478		465,473	

Note: *p<.05, **p<.01, ***p<0.001

3 than Model 2 indicating that a curvilinear model better fits the data. An ANOVA test comparing model fit showed that Model 3 fit the data more accurately than the linear trajectory model (χ^2 =17.17, df=1, p<.001). Model 4 tests whether time and time^2 should be included as random effects. The log likelihood, AIC, and BIC are lower in Model 4 compared to Model 3 suggesting that the curvilinear trajectory varies between officers. The ANOVA test supports Model 4 as an improved fit over Model 3 (χ^2 =121.71, df=5, p<.001). The best fitting trajectory for discretionary search rate over time is a quadratic growth model with random effects for time and time^2.

Main Effects

Piecewise growth models including all covariates are shown in Table 3. Model 1 includes random intercepts and random slopes for time period 1 and time period 2. The fixed effect portion of Model 1 shows that the average officer does not change the rate that they search between their first and second year on the force (b=-.10, se=.07, p=.19). From the second to third year on the force, the average officer increases their rate of searching drivers (b=.42, se=.05, p<.001). The odds ratio for the second time period is 1.52 showing that searches increased 52% between the second and third years. This result supports the hypothesized increase in searches due to a promotion incentive (Hypothesis 3). Black officers (b=-.25, se=.20, p=.21) and non-black POC officers (b=.01, se=.18, p=.95) do not differ from their white peers in how often they conduct discretionary searches. Female officers also do not differ from their male peers and officer age is not associated with discretionary searches.

Black drivers are more likely to be searched than white drivers (b=.76, se=.02, p<.001). The odds ratio of black drivers being searched compared to white drivers is 2.14 which indicates

Table 3: Piecewise Growth Curve Models Predicting a Discretionary Search During Traffic Stop for Officers in First Three Years (N=462,768)

	(1)		(2)	
	b	*(se)*	*b*	*(se)*
Time Period 1	-.10	(.07)	-.09	(.07)
Time Period 2	.42***	(.05)	.41***	(.05)
Black Officer (Ref=White Officer)	-.25	(.20)	-.25	(.20)
Non-Black Officer of Color	.01	(.18)	-.005	(.18)
Officer Age (Mean centered)	.01	(.01)	.01	(.01)
Female Officer (Ref=Male)	-.11	(.19)	-.14	(.19)
Black Driver (Ref=White Driver)	.76***	(.02)	.89***	(.03)
Female Driver (Ref=Male Driver)	-1.06***	(.02)	-1.06***	(.02)
Driver Age (Centered at Age=25)	-.04***	(.001)	-.04***	(.001)
Investigatory Stop (Ref=Moving Violation)	1.50***	(.05)	1.50***	(.05)
Vehicle Equipment Violation	-.15***	(.02)	-.15***	(.02)
Parked Stop	-.20	(.26)	-.20	(.26)
Regulatory Stop	-.01	(.03)	-.01	(.03)
Seatbelt Stop	.13*	(.06)	.12*	(.06)
Safety Stop	-.07	(.04)	-.07	(.04)
East Precinct (Ref=Central)	.15*	(.07)	.14*	(.07)
Hermitage Precinct	.05	(.07)	.02	(.07)
Madison Precinct	.38***	(.08)	.36***	(.08)
Midtown Hills Precinct	-.01	(.07)	-.02	(.07)
North Precinct	.25***	(.07)	.24***	(.07)
Other/Unlabeled Precinct	.005	(.06)	-.01	(.06)
South Precinct	.001	(.07)	-.01	(.07)
West Precinct	.07	(.07)	.05	(.07)
Constant	-4.08***	(.09)	-4.14***	(.09)
Random effects; Level 2 (N=419)				
Level-2 Intercept SD (τ_{00})	1.06		1.15	
Time Period 1 SD(τ_{11})	1.11		1.10	
Time Period 1 -Intercept Corr. (τ_{01})	-.45		-.41	
Time Period 2 SD (τ_{22})	.81		.80	
Time Period 2 -Intercept Corr. (τ_{02})	-.18		-.13	
Time Period 2 –Time Period 1 Corr. (τ_{12})	.18		.18	
Black SD (τ_{33})			.44	
Black-Intercept Corr. (τ_{03})			-.38	
Black- Time Period 1 Corr. (τ_{13})			-.07	
Black- Time Period 2 Corr. (τ_{23})			-.16	
Log Likelihood	-47,499.72		-47,382.27	
Akaike Inf. Crit.	95,059.43		94,832.53	
Bayesian Inf. Crit.	95,390.78		95,208.06	

Note: *p<.05, **p<.01, ***p<0.001

that the odds of a black driver being searched are more than twice as large as the odds that a white driver is searched when stopped by police. The predicted probability that a black driver is searched when all other variables are the reference category is 3.5% while the predicted probability of a white driver being searched is 1.7%. Women are less likely than men to be searched (b=-1.06, se=.02, p<.001) and older drivers are less likely to be searched than younger drivers (b=-.04, se=.001, p<.001). Compared to stops made for moving violations, investigatory stops (b=1.50, se=.05, p<.001) which are made based on a suspect or vehicle description are more likely to result in a search and stops initiated because the driver was allegedly not wearing a seatbelt were more likely to lead to a discretionary search (b=.13, se=.06, p<.05). Stops made for vehicle equipment violations (b=-.15, se=.02, p<.001) are less likely to result in a search than moving violations. There is also geographic variability in search probabilities with a higher likelihood of discretionary searches in East Precinct (b=.15, se=.07, p<.01), Madison Precinct (b=.38, se=.08, p<.001), and North Precinct (b=.25, se=.07, p<.001) compared to Central Precinct.

Random effects in Table 3, Model 1 show that there is considerable variation among officers over time. The random intercept standard deviation (τ_{00}) is the amount of variability in the first year after the academy. A standard deviation of 1.06 means that between officers there is a great amount of variation with some officers searching at a rate higher than the norm. The time period 1 random slope ($\tau_{11} = 1.11$) and the time period 2 random slope ($\tau_{22} = .81$) show the standard deviation of slope trajectories over time. The second time period is less variable than the first period but still has substantial variability in between officer slopes. The Time Period 1-Intercept Correlation ($\tau_{01} = .45$) is negative indicating that officers are tending toward more convergence in the second year compared to their first. The Time Period 2-Intercept Covariance

($\tau_{02} = -.18$) is also negative indicating convergence from year two to year three. Finally, the

Time Period 2-Time Period 1 correlation ($\tau_{12} = .18$) indicates that officers' change from year

one to two and their change from years 2 to three are moderately correlated.

Driver race random effects

Model 2 in Table 3 tests whether including a random slope for driver race improves the

model fit. When driver race is added as a random effect, the model is a better fit with lower log

likelihood, AIC and BIC. The fixed effect for the log odds of a black driver being searched

increases from .76 in model 1 to .89 in model 2. The odds ratio increases from 2.14 to 2.43. The

standard deviation of driver race random slope ($\tau_{33} = .44$) shows that officers vary in how they

decide to conduct searches. Figure 2 plots conditional modes for each officer. Conditional modes

are the difference between the population-average response given the fixed-effect values and the

response predicted for a specific officer (Bates et al. 2015). The population average is graphed at

the value of one in Figure 2 and deviations from the population are shown as box plots. The box

plots show that there is more variance among white officers than black or non-black officers of

color. Most officers fall close to the average effect but several officers are above average in

searching black drivers. A few officers search at rates lower than their peers as well. Since

including a random slope for driver race improves model fit, I estimate subsequent interaction

models with a random slope for driver race.

Figure 2: Conditional Modes of Officers Showing Between-Officer Variability in Probability of Searching a Black Driver
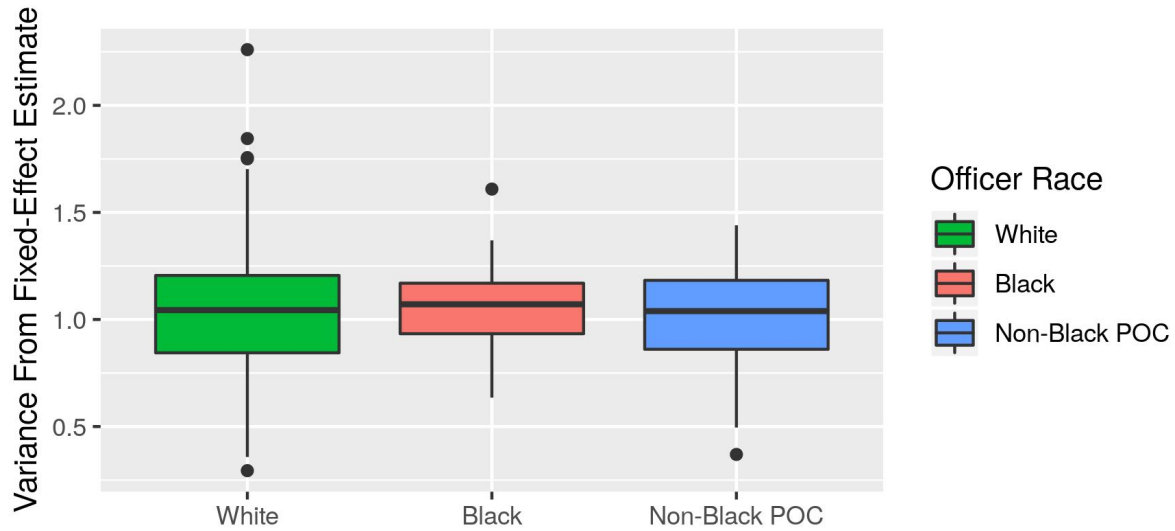
Interaction Effects

Fixed Effects Interactions are shown in Table 4. All models include random intercepts, random time period slopes, and a random driver race slope. Model 1 estimates the interaction effect of officer race with time periods 1 and 2. The interaction terms between black officers and time period one (*b*=-.50, *se*=.28, *p*=.07) and black officer and time period two (*b*=-.41, *se*=.21, *p*=.05) approach statistical significance. When estimated separately, both reach statistical significance at the *p*<.05 level. The predicted slope over time by officer race is graphed in Figure 3. In the first year after academy, the average black officer searches black drivers at a similar rate as white officers but reduces their search rate compared to white officers in their second year on the force. In the second period, black officers remain stable while white officers and non-black

Table 4: Interaction Effects of Officer Race, Officer Gender, Race of Driver, and Time Predicting a Search (N=462,768)

	(1)		(2)		(3)		(4)	
	b	*(se)*	*b*	*(se)*	*b*	*(se)*	*b*	*(se)*
Time Period 1	-.03	(.08)	-.17*	(.09)	-.09	(.07)	-.11	(.09)
Time Period 2	.44***	(.06)	.52***	(.06)	.41***	(.05)	.51***	(.06)

	M1		M2		M3		M4	
Black Officer (Ref=White Officer)	.12	(.25)	-.25	(.20)	-.25	(.23)	.10	(.31)
Non-Black Officer of Color	.13	(.23)	-.004	(.18)	.07	(.20)	.10	(.27)
Black Driver (Ref=White Driver)	.89***	(.03)	.86***	(.07)	.90***	(.04)	.85***	(.08)
Time Period 1 X Black Officer	-.50†	(.28)					-.41	(.34)
Time Period 1 X Non-Black Officer of Color	-.26	(.25)					-.35	(.30)
Time Period 2 X Black Officer	-.41†	(.21)					-.59*	(.28)
Time Period 2 X Non-Black Officer of Color	.09	(.18)					.42*	(.21)
Time Period 1 X Black Driver			.12	(.08)			.11	(.08)
Time Period 2 X Black Driver			-.16***	(.05)			-.11*	(.05)
Black Officer X Black Driver					-.01	(.15)	.02	(.26)
Non-Black Officer of Color X Black Driver					-.09	(.12)	.07	(.23)
Time Period 1 X Black Officer X Black Driver							-.13	(.30)
Time Period 1 X Non-Black Officer of Color X Black Driver							.14	(.25)
Time Period 2 X Black Officer X Black Driver							.26	(.25)
Time Period 2 X Non-Black Officer of Color X Black Driver							-.50**	(.16)
Constant	-4.18***	(.10)	-4.12***	(.10)	-4.15***	(.10)	-4.16***	(.11)
Random effects; Level-2 (N=419)								
Level-2 Intercept SD (τ_{00})	1.15		1.15		1.15		1.15	
Time Period 1 SD (τ_{11})	1.09		1.11		1.10		1.09	
Time Period 1 -Intercept Corr. (τ_{01})	-.40		-.40		-.41		-.40	
Time Period 2 SD (τ_{22})	.79		.80		.80		.80	
Time Period 2 -Intercept Corr. (τ_{02})	-.12		-.15		-.13		-.13	
Time Period 2 –Time Period 1 Corr. (τ_{12})	.16		.18		.18		.16	
Black SD (τ_{33})	.44		.43		.43		.43	
Black-Intercept Corr. (τ_{03})	-.38		-.38		-.38		-.40	
Black- Time Period 1 Corr. (τ_{13})	-.08		-.10		-.08		-.08	
Black- Time Period 2 Corr. (τ_{23})	-.15		-.09		-.15		-.10	
Log Likelihood	-47,377.47		-47,376.86		-47,381.95		-47,365.64	
Akaike Inf. Crit.	94,830.93		94,825.71		94,835.90		94,823.27	
Bayesian Inf. Crit.	95,250.64		95,223.33		95,233.52		95,331.34	

Note: †$p<.10$, *$p<.05$, **$p<.01$, ***$p<0.001$

officers of color increase their search rate in their third year. This interaction supports the

hypothesis that black officers are less likely to raise their search rate when they are eligible for a

promotion compared to white or non-black officers of color (Hypothesis 3a).

Figure 3: Percent of Drivers Searched Over Time by Officer Race
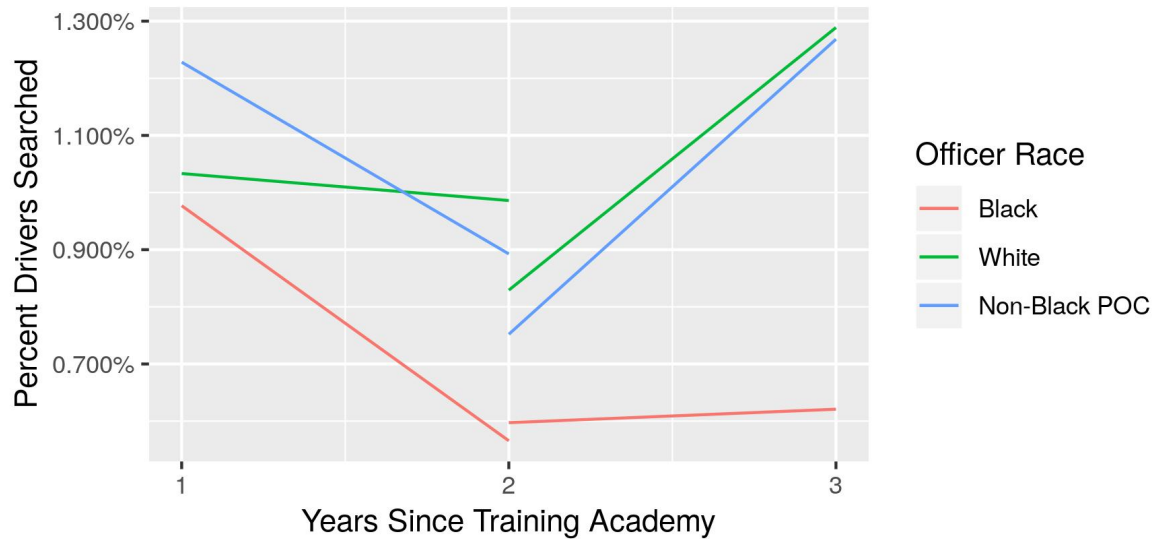
Model 2 interacts time period with driver race and is graphed in Figure 4. In the first time period, black drivers are searched more often than white drivers but the slope from year one to year two remains stable. This pattern supports the hypothesis that statistical discrimination may underlie decisions to conduct discretionary searches because there is a consistent gap from the beginning of the officers' time on the force (Hypothesis 2). In time period 2, the search rate of both white and black drivers increases but the increase is more pronounced for black drivers than white drivers. The rise for both groups supports bureaucratic promotions and the excess increase for black drivers compared to whites supports social conditioning theory. Model 3 does not find

Figure 4: Percent of Black and White Drivers Searched Over Time

Figure 5: Percent of Drivers Searched Over Time by Officer Race and Driver Race

significant effects of officer race interacted with driver race. Finally, the three-way interaction in

Model 4 finds a significant effect for non-black POC officers searching black drivers in time 2.

The interaction is plotted in Figure 5. The three-way interaction shows whether the trajectories of

officers by race differ between black and white drivers. The results indicate that white officers increase their rate of searching black drivers more than non-black officers of color from the second to third year. While both increase their rate of searching black drivers, the rise is more pronounced for white officers.

DISCUSSION

This paper investigates racial disparities in discretionary searches during traffic stops for new police officers in Nashville, Tennessee. Previous research suggests that there are differences in discretionary searches between white officers and non-white officers (Klahm and Tillyer 2015; Rojek et al. 2012; Tillyer 2014; Tillyer and Engel 2013; Tillyer et al. 2012). By estimating piecewise growth curve models, this paper investigates average within-officer change over time as well as between-officer variability in deciding to search black and white drivers over the first three years as a police officer. Social conditioning theory suggests that experiences with racial minority community members while on the force are likely to increase racial disparity over time, especially for white officers (Smith and Alpert 2007). Statistical discrimination theory would suggest that previous biases would lead to a disparity in the first year on the force. A small disparity in the beginning of a career and a positive linear trajectory, would provide support for social conditioning theory. Discrimination theories are supplemented with bureaucratic promotion theory, which argues that officers have routinized career trajectories that are shaped by the rules of the bureaucracy as well as standardized measures of performance (Baron, Davis-Blake, and Bielby 1986; Halaby 1978; Lipsky 1971). Since searches during traffic stops and arrests are incentivized as performance goals in the bureaucratic system, in anticipation of a

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potential promotion officers are likely to increase productivity. A curvilinear trajectory in discretionary search activity with an increase in the third year would support this theory. The growth trajectory shows a curvilinear shape that is stable between years one and two on the force but rises substantially between years two and three. The trajectory shows the average officer effect over time. This result supports the proposition that the incentives from the organization affect how officers prioritize searches in their policing activity. There is also substantial heterogeneity between officers. The random effects suggest that the most divergence between officers occurs in their first year out of the police academy and diminishes slightly each year. Future research should more closely examine the variety of trajectories that an officer may take in the first years of their career. This analysis also does not assess whether the increased rate of searches actually leads to a higher probability of promotion. Additional research is needed to examine how performance metrics shape career advancement.

The main effects models showed no differences in discretionary search patterns by officer race but the interaction models showed that black officers reduce their search rate relative to their white peers when examined over time. In the first year after the police academy, all officers conducted searches at similar rates. In the third year as an officer, white and non-black officers of color increased their search rates while black officers did not. Black officers may be less likely to increase their productivity in response to institutional incentives compared to white officers. Black officers have most likely experienced racism in their own lives and may have a better understanding of how aggressive policing can lead to resentment from community members (Bolton and Feagin 2004; LeCount 2017). Black officers may resist a "numbers driven" mentality that could lead to promotion within the law enforcement ranks.

Black drivers are searched at twice the rate of white drivers even after controlling for

officer characteristics, the reason for the stop, the geographic location, driver age, driver gender, and accounting for unobserved officer-level variability. The persistence of the disparity shows that increased suspicion is placed on black drivers when officers conduct traffic stops. When officers exit the police academy, all racial groups of officers conduct searches of black drivers at about double the rate of white drivers. Antonovics and Knight (2009) argued that statistical discrimination was most likely if there were few officer-race differences in searches because they would all be applying the same set of biased facts. It is likely that statistical discrimination is a factor in producing the racial disparity between white and black drivers. Since black officers decline in their rate of searching black drivers, they may be resisting the commonplace association between violent crime rates and discretionary searches. The rate of increase for black drivers in the third year post-academy is greater than for white drivers. Social conditioning may be part of why the rate increases more for black drivers but the relative stability of the disparity shows that officers are instilled from the academy to approach black community members with higher suspicion, an example of statistical discrimination. In public statements about racial disparities, MNPD officials point to higher rates of serious violent crime to justify the higher rate of searches and arrests (Reicher 2016). According to the Federal Bureau of Investigation's National Incident Based Reporting System (2017), in 2017 7,682 violent crime incidents (homicide, rape, robbery, and aggravated assault) were known to MNPD. Of the 9,794 suspects in these crimes, 6,193 (63%) were black. Traffic stops and discretionary searches rarely find evidence of serious crime. Instead, they are most likely to find small amounts of drugs (Baumgartner, Epp, et al. 2018). Applying one statistic to justify higher suspicion of everyone in a group is statistical discrimination.

There are several limitations to this analysis. One criticism of analyzing the probability of

conducting a search is that the population of drivers who are stopped is not a random sample of drivers (Baumgartner, Epp, et al. 2018; Fridell 2004; Neil and Winship 2019; Ridgeway and MacDonald 2010; Simoiu, Corbett-Davies, and Goel 2017). The sample of stopped drivers was taken from an unknown population of drivers that could vary based on the amount that they drive, access to vehicles, neighborhoods where they drive, and rule violating behavior. This limitation is commonly referred to as the "benchmarking problem" or "denominator problem" since the population of drivers at risk of being stopped is unknown. Once stopped the population of drivers at risk of a search is known but it is conditional on the unknown probability of the initial stop. Assuming that all stopped drivers have an equal probability of being searched is an unreasonable assumption. Controlling for stop reasons and the precinct in which the stop was made helps adjust for different search probabilities following a stop but the results may still reflect systematic differences in who was stopped. This method also does not directly test whether different thresholds of suspicion are applied to drivers of different races, only the proportion of drivers who were searched after they were pulled over (Neil and Winship 2019; Simoiu et al. 2017). Even with these limitations, this paper makes an important contribution to the literature on proactive policing by showing that officers have different longitudinal trajectories in how often they decide to search drivers.

CONCLUSION

The decision to conduct a search at a traffic stop is influenced by not only the specifics of the officer-driver encounter but also the organizational policies that govern career trajectories. Bureaucracies operate with explicit rules on upward mobility and officers distinguish themselves based on quantifiable productivity measures. While socially conditioned bias may influence

some officers, there are broader trends of statistical discrimination and increasing the proportion of drivers being searched when becoming eligible for a promotion. Whether increasing productivity actually leads to a higher probability of promotion is an important area for future research. Administrators should be aware of how performance metrics translate into the community. Encouraging officers to conduct more searches or make more arrests is more likely to lower the suspicion applied to the suspect than it is to increase the number of suspicious people the officer stops. The findings also suggest that officer training should be evaluated and emphasis should be placed on avoiding assumptions about an individual based on group-level data. Statistical discrimination often feels rational but leads to an unfair application of the law in practice. As the bureaucrats that make street-level decisions about the law, police officers must balance community needs, administrative priorities, and their own career paths. Police reform requires focus on the many ways that police outcomes are shaped, including the organizational structure itself and the ways that officers are trained.

CHAPTER 3

ARE DISCRETIONARY VEHICLE SEARCHES RACIALLY BIASED?: APPLYING THE HIT RATE AND THRESHOLD TEST TO NEW POLICE OFFICERS IN NASHVILLE, TENNESSEE

ABSTRACT

Whether and to what extent police officers discriminate against black and Hispanic drivers in their decisions to conduct discretionary vehicle searches is a challenging but important question for scholars and policy makers. Two primary tests are used to evaluate whether discrimination is occurring: the hit rate test and the threshold test. The hit rate test examines whether contraband is found at different rates on groups of drivers. If one group has a lower hit rate, the test indicates discrimination. The hit rate test is limited by the problem of infra-marginality—the possibility that distinguishing guilty from innocent drivers is easier for some groups than others—limiting its validity. The threshold test (Simoiu et al. 2017) aims to overcome infra-marginality by computationally inferring the suspicion threshold at which a search is initiated. This paper applies the hit rate test and the threshold test to rookie police officers over the first three years of their career in Nashville, Tennessee. Results from the hit rate test and threshold test are relatively consistent and indicate discrimination against black and Hispanic drivers. Over the first three years of an officer's career, the hit rate and threshold for searches based on probable cause remains consistent yet racially disparate. When other forms of discretionary searches are included—i.e. consent-based searches—officers have a higher hit rate over time and raise their suspicion threshold increases for searching white drivers but not blacks and Hispanics. Together, the results show that police officers treat blacks and Hispanics differently than whites when deciding to conduct a search.

INTRODUCTION

People of color in the United States are more likely than whites to have contact with police and

regularly report unfair treatment or discrimination from police officers (Beckett 2016; Davis et

al. 2018; Dottolo and Stewart 2008; Engel 2005; Glaser 2014; Stewart et al. 2009). Community

members often cite baseless suspicion leading to a police action as an injustice (McLean and

Worden 2017). Traffic stops–especially those based on pre-textual reasons (i.e. making a stop for

a traffic code technicality to investigate the driver for a suspected crime)–can often seem

unjustified and the driver may feel discriminated against (Baumgartner, Epp, et al. 2018; Epp et

al. 2014; McLean and Worden 2017). When traffic stops result in a search, drivers are more

likely to feel that the officer behaved inappropriately (Davis et al. 2018; Langton and Durose

2013). This is especially true if the justification seems flimsy or unjustified. Numerous media

(Balko 2018), government (President's Task Force on 21st Century Policing 2015; U.S.

Department of Justice 2015, 2016), non-profit (American Civil Liberties Union Foundation of

Massachusetts 2014; Gideon's Army 2016), and academic (Baumgartner, Epp, et al. 2018;

Dottolo and Stewart 2008; Epp et al. 2014; Harris 1999; Warren et al. 2006) sources show that

blacks and Hispanics in the United States feel as though they experience heightened scrutiny

from police, an experience of "driving while black or brown."

While many individuals report discrimination from police, scholars have sought to

develop tests to determine whether and to what extent discrimination is occurring in police

decisions. Rather than adjudicate single cases of discrimination, tests for racial bias seek to

determine whether police are systematically discriminating against individuals using

administrative data of police activity. Researchers also seek to separate discriminatory treatment

from other non-discriminatory mechanisms that produce racial disparities in police contact (Neil

and Winship 2019; Ridgeway and MacDonald 2010). For instance, disparities in individual officers' outcomes may occur because they are assigned to specific geographic areas (Neil and Winship 2019). Other potentially confounding factors are the unit assignment and job experience of police officers. Tillyer, Klahm, and Engel (2012) found that officers assigned to conduct primarily traffic stops were more likely to have racial search disparities than officers assigned to patrol more specific areas. Additionally, Tillyer and Klahm (2011) found that officers assigned to conduct traffic enforcement were less likely to find contraband when conducting a discretionary search as compared to officers who were assigned to patrolling specific areas. When assigned to specific areas, officers can develop first-hand knowledge of the issues within the community they patrol. The amount of time on the force and assignment history may also influence how often an officer decides to conduct searches or their accuracy in finding contraband (Klahm and Tillyer 2015). To account for these differences, this study focuses on new officers who are developing their policing skills who are all assigned to Patrol units.

This study builds on previous research by investigating racial bias in police searches focusing on new officers assigned to Metro Nashville Police Department's (MNPD) Patrol Division over the first three years of their career. All new officers in Nashville, Tennessee must be a patrol officer for three years before they are eligible for reassignment to another division. All officers, therefore, are in an equivalent position and their trajectories can be examined longitudinally. I conduct two analyses to make inferences about whether black, Hispanic, and white drivers are treated differently in decisions to conduct vehicle searches at traffic stops. First, I test whether officers find contraband at different rates when deciding to search a driver. Finding contraband at lower rates for one group during stops is interpreted as discriminatory because officers are applying different evidentiary standards to different groups (Knowles et al. 2001;

U.S. Department of Justice 2016). Using conditional logistic regression models with fixed effects for officers I examine whether officers improve their ability to find evidence over time and whether that change is equal for searches of white, black, and Hispanic drivers. I examine searches based on probable cause as well as discretionary searches more broadly. Second, I conduct a threshold test to examine whether decisions to conduct searches are due to differential suspicion or due to differential probabilities of drivers carrying contraband by race, a problem referred to as infra-marginality (Ayres 2002; Engel 2008; Engel and Tillyer 2008; Pierson, Corbett-Davies, and Goel 2017; Simoiu et al. 2017). While each test has limitations, together they help infer whether police officers decide to conduct searches of drivers equitably by race or ethnicity. There are two primary contributions of this paper to the research literature. First, I apply the hit rate test and threshold test to new officers in a longitudinal framework that shows how decision making changes over time. Understanding racial bias as a temporal process clarifies when bias is most likely and when interventions might be needed. Second, I focus the analysis on officers which shows how individual officers may be culpable for racial disparities or whether racially disparate treatment is a normative process in the department among patrol officers.

BACKGROUND

Decisions to conduct a search during a traffic stop have come under close scrutiny from researchers examining racial bias in police decisions. During a traffic stop, searches can be conducted for either discretionary or non-discretionary reasons. Non-discretionary reasons include

serving a warrant of a driver, searching a driver incident to arrest, and inventory searches[1]. In these cases, officers are required to search the vehicle. Since these searches do not require an estimation of the probability that a driver has contraband, discrimination is unlikely (Tillyer and Klahm 2011). In contrast, *discretionary searches* can be conducted based on probable cause, consent of the driver, or reasonable suspicion of weapons possession. Probable cause is the strictest standard that can be applied and it requires specific and articulable evidence that finding contraband is likely (Goldberg 2013; Ortman 2016). A common reason given to establish probable cause is the smell of marijuana which indicates that there is likely marijuana in the vehicle. Consent searches do not require any suspicion and can be conducted any time that an officer asks a driver for consent to search and the driver gives consent. Finally, if an officer has reasonable suspicion to believe that there is a weapon in the car, he or she may conduct a protective search of areas were a weapon could be hidden. Since probable cause searches involve the strictest standard, this study tests for racial disparities in probable cause search outcomes specifically as well as discretionary search outcomes more generally.

The decision to conduct a search is based on a variety of situational and contextual factors including behavioral cues, location, and the driver's criminal record. Officers are trained to "look past the stop" to look for cues that suggest criminal activity (Armenta 2017). If an officer sees signs of criminal behavior, they determine whether the evidence meets the probable cause standard to conduct a coerced vehicle search. If the evidence does not meet the probable cause standard, they decide whether they will ask the driver for consent to search the vehicle. If the

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[1] Warrant searches occur when the driver has an outstanding warrant for arrest. Searches incident to arrest are those that are conducted after arresting a driver. The most common reason is for driving under the influence (DUI). If a driver fails a roadside sobriety test, the officer arrests the driver and subsequently searches the vehicle. Inventory searches are conducted when impounding a vehicle. Searches incident to arrest and inventory searches overlap in their legal justification (Wallentine 2017).

same cues used to judge suspiciousness vary based on race, the officer would be racially profiling and discriminating against the driver. Two tests of discrimination have been proposed to examine whether drivers are facing discrimination, the hit rate test and the threshold test.

Hit Rates

Hit rates measure the rate at which officers find evidence of a crime when conducting a search. Measuring the outcome from a decision helps determine whether individuals are treated fairly throughout the process. Adapted from a test for discrimination in loan decisions (Becker 1957), outcome tests are used in relation to policing, banking, housing, and other areas where outcomes may differ based on race. Assessing hit rates has been a common way to examine whether bias is present in decisions to conduct a search. The US Department of Justice (2016:53) in their investigation of the Baltimore Police Department said that, "the best measure of racial patterns in searches is a comparison of the rates at which officers find contraband during searches, or 'hit rates.'" If officers are less likely to find contraband on one racial group of searched drivers, as was the case in the DOJ's Baltimore investigation, that group is being discriminated against and searched with a lower standard of evidence.

Knowles, Persico, and Todd (2001) formalized an economic version of the model that assumes an equilibrium is reached between officers deciding to conduct searches and drivers carrying contraband. They argue that, on the one hand, officers decide to conduct searches based on the efficiency of finding contraband and that not finding evidence is a cost to be avoided. On the other hand, drivers respond to the probability of being caught with contraband and will adjust their behavior accordingly. Given these conditions, an equilibrium will develop based on rational actors maximizing personal efficiency. Once an equilibrium is reached, if one racial group is

found with evidence less often, they would be experiencing discrimination. Knowles, Persico, and Todd (2001) did not find evidence of discrimination in their analysis of Maryland State Police from 1995 through 1999. Subsequent research reevaluating the model has argued that the strong assumptions about behavior of officers and drivers do not match the circumstances in which searches are conducted (Antonovics and Knight 2009; Ayres 2002; Close and Mason 2007; Engel 2008; Engel and Tillyer 2008; Persico and Todd 2008). Small changes in the assumptions, for instance whether drivers in a racial group modify their contraband carrying behavior in response to race-specific search rates, can lead to large changes in the interpretation of whether discrimination exists (Engel 2008; Engel and Tillyer 2008).

Limitations of the hit rate test

Even though the DOJ has stated that hit-rates are good evidence of whether discrimination is occurring, a simple comparison of hit-rates by race may overestimate or underestimate bias because police priorities and deployment are often not considered (Ayres 2002; Engel 2008; Engel and Tillyer 2008; Neil and Winship 2019; Simoiu et al. 2017). Neil and Winship (2019) review several problems stemming from omitted variables that can influence outcome tests. For instance, if police are more likely to make stops in areas with high crime and those areas also have higher proportions of racial minorities, even without racial discrimination the search rate and hit rates could show racial disparities. Similarly, if police focus on specific offenses (i.e. gun possession) or specific types of offenders (i.e. gang members) they may be treating all people they contact with the trait equally but the racial distribution of the trait in society could lead analysts to declaring racial bias when none exists. These factors are often unobserved in administrative data but are important for estimating whether hit-rates differ by race due to discrimination.

Another limitation of the hit rate test is the *infra-marginality problem* (Ayres 2002; Engel 2008; Engel and Tillyer 2008; Simoiu et al. 2017). Imagine the hypothetical scenario borrowed from Simoiu et al. (2017) where there are two types of white drivers and two types of black drivers. White drivers either have a 1% chance of carrying contraband or a 75% chance of carrying contraband. Black drivers either have a 1% or a 50% chance of carrying contraband. If officers search all drivers that have a 10% chance of contraband or higher, searches of whites will have a 75% hit rate whereas searches of blacks will result in a lower hit rate of 50%. The decision to conduct searches can use the same criteria but different probabilities of contraband possession could lead to unequal hit rates. This is an example of infra-marginality. To test for discrimination, we are concerned with the marginal cases when a person goes from being not suspicious enough to search to an officer deciding to conduct a search. Hit rates pool all searches regardless of whether the case is marginal or clear-cut. Of course, the probability of a driver in the population of all traffic stops possessing contraband is not a bimodal distribution. Officers will observe drivers on a spectrum of probabilities from 0 to 1. If a population has a larger variance (i.e. more people near the ends of the spectrum), it is easier to distinguish guilty from innocent individuals. This leads to fewer unnecessary searches and a higher hit rate than in a low-variance population where determining guilt is more difficult.

Threshold Test

Simoiu et al. (2017) develop a test for search thresholds in response to the problems of infra-marginality and omitted variable bias in hit-rates. The threshold test assumes a model of decision making where an officer who has made a traffic stop uses all of the available contextual and behavioral information to estimate a probability, (p_i), that the driver has contraband in the vehicle.

Taken together, these probabilities create a distribution of suspiciousness signals referred to as a signal distribution. Each officer is likely to have a threshold (t_o) that, when exceeded by their estimated probability of contraband possession for each stop (p_i), they will conduct a search of the driver ($p_i > t_0 \Rightarrow search$). The threshold test assumes thresholds are race-specific and fixed for each officer. If there is no bias, the threshold for each racial group should be equal. If the threshold for black drivers is lower than the threshold for white drivers ($t_b < t_w$), black drivers are being discriminated against.

The signal distribution and the thresholds are not observed and must be inferred from the data. To do this, a hierarchal Bayesian latent variable model estimates the unobserved signal distribution and search thresholds for each racial group within the primary hierarchical unit of analysis, in this case officers. The model is described in detail by Simoiu and colleagues (2017) and will be discussed briefly here. For each stop (i), there are four observed quantities: the driver's race (r), the hierarchical unit of analysis which in this paper is the officer's ID number (o), whether the stop resulted in a search ($S_i \in \{0, 1\}$), and whether contraband was found during the stop ($H_i \in \{0, 1\}$). The probability of finding evidence during any given stop (p_i) is modeled as a random draw from a race- and officer-specific signal distribution. The inferred signal distribution is produced through both observed and unobserved processes therefore it accounts for omitted variable problems present in other forms of analysis. With the observed quantities and inferred signal distribution, the threshold can be calculated based on two assumptions. First, the search rate is the area under the signal distribution that is above the threshold for initiating a search. Second, the hit rate is the mean of the distribution conditional on being above the search threshold.

The signal distribution is parameterized as a beta distribution with a mean ϕ_{ro} and a total

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count parameter λ_{ro}. ϕ_{ro} represents the overall probability that a driver of race r stopped by officer o will have contraband. λ_{ro} represents the heterogeneity across drivers of race r stopped by officer o. Each officer has a threshold for searching each race of driver denoted as t_{ro}. If $t_{ro} > p$, the officer will conduct a search. For each stop, i, whether a search occurs, S_i, and whether contraband is found, H_i, is generated through a stochastic process in three steps:

1. Given the driver's race, r_i, and the hierarchal unit of analysis, o_i, the officer observes a signal $p_i \sim beta(\phi_{r_i o_i}, \lambda_{r_i o_i})$, where $\phi_{r_i o_i}$ and $\lambda_{r_i o_i}$ are defined as:

$$\phi_{ro} = logit^{-1}(\phi_r + \phi_o)$$

    and

$$\lambda_{ro} = exp(\lambda_r + \lambda_o)$$

2. A search is conducted ($S_i = 1$) only if $p_i \geq t_{r_i o_i}$

3. If $S_i = 1$, then $H_i \sim Bernoulli(p_i)$; otherwise $H_i = 0$.

The stochastic process is parameterized with $\{\phi_r\}, \{\lambda_r\}, \{\phi_o\}, \{\lambda_o\}$, and $\{t_{ro}\}$. Weakly informative priors are placed on all parameters. Finally, the posterior distribution of the parameters is estimated with Hamiltonian Monte Carlo sampling implemented in Stan (Carpenter et al. 2017) through the Rstan interface (Stan Development Team 2018). I sampled four Markov chains in parallel and judged convergence by potential scale reduction factors (Gelman and Rubin 1992) for all parameters being below 1.05 ($\hat{R} < 1.05$) and visual inspection of the chains.

Previous research implementing the threshold test has focused primarily on comparing police departments within states. Simoiu et. al's (2017) initial publication of the threshold test implemented it with the 100 departments in the state of North Carolina that made the most traffic stops. They conducted a comparison of search rates and hit rates with the threshold test. All searches, including non-discretionary searches (i.e. warrant, incident to arrest), were included in

their analysis. Across the state, they found black and Hispanic drivers were searched more often than whites or Asians were, officers were less likely to find contraband on black or Hispanic drivers than on whites or Asians, and a lower threshold was applied to Black and Hispanic drivers than to white or Asian drivers. While the pooled results of the three tests across the state were consistent, they found that the hit-rate and threshold findings showed contradictory results in Raleigh. The hit rate test suggested discrimination against whites but the threshold suggested discrimination against blacks. Baumgartner, Christiani, et al. (2018) also conducted a threshold test on data from departments in North Carolina from 2002 to 2016 and tested whether there was an intersectional effect of race and gender on search thresholds. They found that black women were searched with similar thresholds to their white counterparts and the overall racial disparity was due to the concentration of low-suspicion searches of black men. Pierson et al. (2017) applied a hit rate test and the threshold test to a larger body of 60 million state patrol stops across the United States. They estimated search thresholds for the 100 counties with the most traffic stops in each state with the requisite data. In the hit rate test, they found that black and white drivers who are searched possessed contraband at the same rate (about 28% of searches) while Hispanics had a lower hit rate (22%). In contrast to the hit rate test, threshold tests within states generally showed lower thresholds for both black and Hispanic drivers compared to whites.

Current Study

In contrast to previous research, I estimate officer-specific hit rate tests and threshold tests. While location-based disparities are an important aspect of racial bias, another question is whether specific officers are biased. Previous implementations of both tests have focused on departments as a whole. I focus specifically on patrol officers in the first three years of their careers because

they are all in structurally equivalent positions within the police department and have the same level of experience. I also examine how hit rates and search thresholds change over time in the first three years of officers' careers. The focus on patrol officers who are new to policing is a novel application of hit rate and threshold tests. Most research pools all officers within a jurisdiction; however, officers have different assignments that affect their enforcement actions. Job tenure may also impact hit rate because officers should become better able to distinguish between drivers who have contraband and those who do not as they gain professional experience. Officers are also likely to establish their own normative search thresholds in the foundational early years of their career. I test the following hypotheses:

Hypothesis 1: Officers will be less likely to find contraband on black and Hispanic drivers than on whites.

Hypothesis 2: Officers will become more successful at finding evidence on drivers over time.

Hypothesis 3: Officers' hit rate over time will improve more for white drivers than black or Hispanic drivers.

Hypothesis 4: Officers will initiate a search of a black or Hispanic drivera with a lower threshold of suspicion than for white drivers.

Theoretical Framework

This paper is informed by several bodies of theory that are discussed in-depth in the first paper of this dissertation. Bias is not a static process but is a combination of preconceived ideas about groups—i.e. statistical discrimination—as well as a process of reinforcement through social experiences or social conditioning. In addition to processes that may lead to bias, the organizational structure in and of itself may contribute to the priorities officers place on conducting

searches. Smith and Alpert's (2007) social conditioning theory argues that officers develop associations between racial minorities and crime through direct exposure to stressful interactions on the job. By repeated interactions with racial minority suspects, officers can develop an "illusory correlation" between race and criminality. Smith and Alpert (2007) do not distinguish between on the job exposure with stereotypes brought from previous experience and training on race and crime statistics. Statistical discrimination theory (Pager and Karafin 2009; Schwab 1986) argues that people make decisions using their perceptions of groups in search of efficiency. If, for example, a police officer knows that the majority of homicide suspects and victims in Nashville are black (Federal Bureau of Investigation 2017), he or she may be more likely to assume that a black driver could be involved in criminal activity. That assumption is statistical discrimination because it applies a group-level statistic to an individual encounter. In combination, statistical discrimination and social conditioning create a process where officers bring previous knowledge and stereotypes from their lived experiences and training and then, while interacting with suspects, those stereotypes can be confirmed or denied. When applied to hit rates, it is likely that officers become more accurate at finding evidence over time because they have had time to hone their skills. It is also likely that racial disparities change over time as well. If there is a gap in the first year, it is most likely that statistical discrimination is a contributing factor. If the hit-rate gap expands, social conditioning may be leading to more discrimination. In contrast, if the gap declines, social conditioning may be having an anti-discriminatory effect by exposing officers to racial minorities in a variety of contexts.

Organizational structure may also contribute to decisions to conduct searches. Specifically, within a structured bureaucracy, promotion is guided by fixed and variable criteria (Halaby 1978). In Nashville, one fixed criteria for new officers being promoted is that they must spend

three years on the force prior to being eligible for a promotion. Variable criteria includes productivity or the number of stops, searches, and arrests made by officers (Armenta 2017; B. N. Williams et al. 2003). Therefore, in the third year on the force, officers may be more likely to conduct searches with lower thresholds of suspicion. If this is the case, their hit rate would decline in the third year and their threshold for conducting a search would be lower in the third year.

METHODS

This analysis uses administrative data received through open records requests to Metro Nashville Police Department (MNPD). Two databases are used in the analyses that span 2010 to 2017. First, records from all traffic stops conducted in the jurisdiction. Officers are required to submit an electronic form whenever a traffic stop is conducted. On the form, they indicate whether a search was conducted, the legal justification for the search, and whether evidence was found in the search. The second database is employee demographics and unit assignments. Officer race, gender, and age are included in the dataset as well as the precinct and unit assignment for every officer. Officers are selected for inclusion in the analysis if they were listed as a trainee as their first entry in the database and subsequently completed three years as an officer. Officers are required to complete three years to be eligible for a promotion. Since officers join the force in staggered cohorts, years on the force are calculated in relation to the first assignment after the training academy.

A total of 417 officers were eligible based on joining the force and completing three years as an officer; however, 15 conducted no searches in the time period and are excluded from the analysis. The 402 included officers conducted 485,443 traffic stops that had complete data for

driver's race, ethnicity, age, and the reason for the stop. Since this paper focuses on discretionary searches, 3,606 searches conducted for non-discretionary reasons (i.e. incident to arrest, warrant, or inventory) are excluded. For this paper, I focus on two types of searches, discretionary searches in general and searches conducted with probable cause. The hit rate analysis examines only the stops that led to a search, 13,871 discretionary searches and 4,840 probable cause searches. The threshold analysis uses all 481,937 stops meeting the above criteria to estimate the signal distribution.

Measures

For the hit-rate analysis, the dependent variable is whether evidence was found during the search. When conducting a search, officers select whether evidence was found ("yes" or "no") and then they can optionally specify whether drugs, weapons, or other contraband were found. They do not specify the type or quantity of drugs or weapons found. I code a search as having a "hit" if the officer identifies that evidence was found and I do not disaggregate by type of evidence. Independent variables for the hit rate analysis include *time* which is measured as a continuous variable coded as 0, 1, or 2 based on the number of years the officer has been on the police force. *Driver race/ethnicity* is measured as two binary variables for black non-Hispanic drivers and Hispanic drivers. White non-Hispanic drivers are the reference category. Driver race/ethnicity is recorded based on officer perception. Tennessee driver's licenses do not list race. Therefore, categorization is not based on racial or ethnic identity but on how an officer categorizes the driver. Driver gender is measured as female compared to male. Driver age is a continuous variable centered at age 25. The *reason for the stop* is a set of binary variables that adjust for the stated reason the officer initiated the traffic stop. Variables included in the model measure the hit

rate for investigatory stops, vehicle equipment violations, parked vehicle stops, regulatory stops, seatbelt stops, and safety stops compared to moving violations, which can include speeding or running a stop sign.

The threshold test relies on four observed quantities: the driver's race, the officer's ID number, whether the stop resulted in a search, and whether contraband was found during the stop. All other quantities are produced through the Bayesian estimation procedure.

Analysis

Hit rate test

The hit rate analysis aims to estimate the probability of finding evidence if a search is conducted in the first three years of an officer's career. I estimate a conditional logistic regression model using the *clogit()* function in R's *survival* package (Therneau 2015). The model estimates a fixed-effects logistic regression which holds constant unmeasured heterogeneity in the strata variable, officer ID number. Conditional logistic regression is fit using a conditional maximum likelihood estimator that uses only within-group variation (Allison 2005). Groups with no variability are excluded from the estimation. For instance, if an officer conducts two searches and finds evidence in both there is no variability in their outcome and they are excluded from the analysis. In the analysis of all discretionary searches, 61 officers found no evidence and three found evidence in 100% of their searches. In the probable cause analysis, 63 officers found no evidence and 35 found evidence in 100% of searches. The loss of information due to no variability in the outcome is a limitation of fixed effects models (Allison 2005). Alternate models estimated with Generalized Estimating Equations (GEE) were tested and the results are substantively similar. GEE estimation produces population-averaged coefficients while conditional logistic regression

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produces a subject-specific coefficient. Since the goal of this analysis is to estimate the pattern of officers over time, conditional logistic regression is the best choice for the analysis (Allison 2005). I test for racial disparities and time trends in contraband discovery rate for probable cause searches as well as all discretionary searches. To examine whether the time trends vary by driver race/ethnicity I estimate models that include two-way interaction effects. I include a fixed effect for the officer which adjusts for all time invariant characteristics of officers including, race, gender, and age.

Search thresholds

As discussed above, outcome tests such as the hit rate test are limited by the problem of infra-marginality. There is a possibility that black, Hispanic, and white drivers tend to give different signals of suspiciousness that could lead to erroneous conclusions from the hit-rate test. Using the threshold test (Simoiu et al. 2017), I examine search thresholds for individual officers. I estimate the models on probable cause searches specifically as well as all discretionary searches more generally. Finally, I estimate a threshold model on each of the first three years of officers are on the force to examine how thresholds change in response to bureaucratic promotion theory. To test for racial or ethnic differences in the posterior threshold distributions, I compute the difference between the implied threshold for whites and the comparison group at each step of the MCMC chain. This process is similar to comparing group means where, after subtracting one from the other, zero indicates no difference; however, this method computes the difference on 2,000 MCMC samples creating a probability distribution for group differences. From this distribution, I calculate the highest density interval (HDI) to quantify the probability that the thresholds are equal (Kruschke 2011). If a 95% HDI of the difference distribution does not include zero, the likelihood

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that the thresholds are equal is less than 2.5%. An important advantage of Bayesian methods is the ability to calculate the percent of samples below zero to better quantify the likelihood of a null finding.

RESULTS

Descriptive Statistics

Table 5 shows descriptive statistics for the stops and searches conducted by officers in the sample. The left column includes all stops conducted, the center column includes all discretionary searches, and the right column includes only probable cause searches. Officers conducted 481,937

Table 5: Descriptive Statistics of Stops, Discretionary Searches, and Probable Cause Searches

	Stops		All Discretionary Searches		Probable Cause Searches	
	N/mean	%/(SD)	N/mean	%/(SD)	N/mean	%/(SD)
Total	481,937		13,871		4,840	
Evidence Found	3,307	1%	3,307	24%	2,423	50%
Black Driver	205,326	43%	8,772	63%	3,304	68%
Hispanic Driver	29,036	6%	735	5%	246	5%
White Driver	247,575	51%	4,364	31%	1,290	27%
Female Driver	195,667	41%	2,984	22%	1,100	23%
Driver Age	37	(14.0)	30	(11.1)	27	(9.3)
Moving Violation	184,766	38%	5,049	36%	1,784	37%
Investigatory Stop	6,212	1%	771	6%	273	6%
Vehicle Equipment Violation	168,796	35%	4,383	32%	1,590	33%
Parked Stop	631	0%	17	0%	8	0%
Regulatory Stop	53,470	11%	1,513	11%	484	10%
Seatbelt	8,490	2%	454	3%	166	3%
Safety	57,701	12%	1,571	11%	493	10%

traffic stops, 13,871 discretionary searches and 4,840 probable cause searches. They found evidence in 3,307 discretionary searches (24%) and 2,423 probable cause searches (50%). Black officers made 30,960 stops (6%), 576 discretionary searches (4%), and 196 probable cause searches (4%). Non-black officers of color made 46,803 stops (10%), 1,375 discretionary searches (10%) and 500 probable cause searches (10%). White officers made 404,174 stops (84%), 11,920

discretionary searches (86%) and 4,144 probable cause searches (86%). Black drivers composed 43% of all stops, 86% of discretionary searches, and 86% of probable cause searches. Hispanic drivers composed 6% of all stops, 5% of discretionary searches, and 5% of probable cause searches. White drivers composed 51% of all stops, 31% of discretionary searches, and 27% of probable cause searches. Female drivers were stopped 195,667 times (41%), searched 2,984 times based on all discretionary reasons (22%), and 1,100 times based on probable cause (23%). The mean age of drivers stopped was 37 (SD=14), drivers searched for all discretionary reasons were, on average, 30-years-old (SD=11.1), and those who were searched based on probable cause were 27-years-old (SD=9.3) on average. The most common reason for a stop is a moving violation, a total of 184,766 stops (38%), followed by vehicle equipment violations, 168,796 stops (35%). These categories are also the most common for searches. Of the discretionary searches, 5,049 (36%) were conducted during a moving violation and 4,383 (32%) during a vehicle equipment violation stop. For probable cause searches, 1,784 (37%) were conducted during a moving violation and 1,590 (33%) during a vehicle equipment violation stop.

Fixed Effects

Table 6 shows estimates from fixed effects models predicting discovery of contraband in searches. Model 1 predicts the likelihood of finding contraband during all discretionary searches while Model 3 includes only searches conducted based on probable cause. When examining all discretionary searches, officers become more successful at finding evidence over time. Model 1 estimates that an officer will improve their hit rate 25% each of their first two years on the force. Officers are less likely to discover contraband on black or Hispanic drivers than on white drivers. Given a search, and holding all time invariant officer characteristics constant, the odds of an officer

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finding evidence on a black driver are 19% lower than the odds of finding evidence on a white driver. For Hispanic drivers, discretionary searches are less likely to find contraband than searches of whites. The odds of finding contraband during a discretionary search of a Hispanic driver are 24% lower than when a white driver is searched.

Turning to probable cause searches (Model 3), hit rates do not increase over time. The coefficient for time in Model 2 measures within-officer change over time and shows that, in general, more experience is not associated with finding evidence more often when conducting probable cause searches. Contraband is less likely to be found on black and Hispanic drivers than on whites during probable cause searches. The odds of finding contraband on a black driver during a probable cause search are 33% lower than the odds that a white driver will have contraband. Similarly, the odds that a Hispanic driver has evidence in a probable cause search are 24% lower than for whites.

Interaction models

Table 6 shows two-way interaction effects of time with driver race/ethnicity. Fixed effects for officers are included in all interaction models. Model 2, showed graphically in Figure 6, finds that the hit-rate disparity in all discretionary searches between white drivers and black and Hispanic drivers declines over time. There is a positive slope over time for all groups indicating that officers are better able to discover evidence with more experience but the increase is greater for drivers of color. The groups converge over time but there is still a disparity between white and non-white drivers. This result supports a positive interpretation of social conditioning theory. With more experience, officers become less biased in their decision making. In regard to probable cause

searches, the interaction terms in Table 6, Model 4 show that the hit rate for probable cause searches does not differ by race/ethnicity over time.

Table 6: Conditional Logistic Regression Estimates Predicting Probability of Finding Contraband in Traffic Stop Search

	All Discretionary Searches		Probable Cause Searches	
	(1)	(2)	(3)	(4)
Time	.22***	.13**	.04	-.04
	(.03)	(.05)	(.04)	(.06)
Black Driver	-.21***	-.39***	-.40***	-.58***
	(.04)	(.10)	(.05)	(.13)
Hispanic Driver	-.27**	-.72**	-.27*	-.67*
	(.09)	(.26)	(.11)	(.34)
Female	.01	.01	-.07	-.07
	(.04)	(.04)	(.05)	(.05)
Driver Age (Centered at age 25)	-.01***	-.01***	.001	.001
	(.002)	(.002)	(.002)	(.002)
Investigatory Stop (Ref=Moving Violation)	.15	.15	.14	.15
	(.08)	(.08)	(.10)	(.10)
Vehicle Equipment Violation	-.07	-.07	-.06	-.06
	(.05)	(.05)	(.05)	(.05)
Parked Stop	.89*	.91*	.66	.66
	(.37)	(.37)	(.43)	(.43)
Regulatory Stop	-.19**	-.19**	-.002	-0.0000
	(.06)	(.06)	(.08)	(.08)
Seatbelt Stop	-.11	-.11	-.16	-.16
	(.11)	(.11)	(.13)	(.13)
Safety Stop	-.04	-.04	-.05	-.05
	(.07)	(.07)	(.08)	(.08)
Time X Black Driver		.12†		.12
		(.06)		(.08)
Time X Hispanic Driver		.29†		.25
		(.15)		(.19)
Observations	13,871	13,871	4,840	4,840
Hits	3,307	3,307	2,423	2,423

Note: †p<.10, *p<.05, **p<.01, ***p<0.001

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Figure 6: Within Officer Change in All Discretionary Search Hit Rate by Driver Race/Ethnicity Over Time
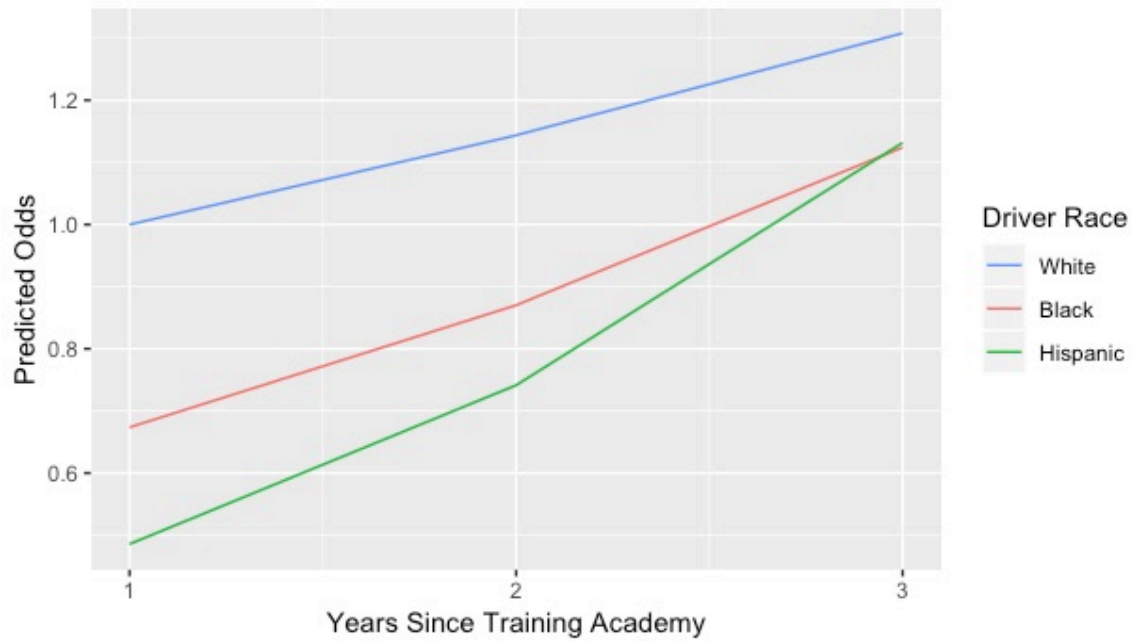
Threshold Analysis

Table 7 gives the number of stops, search rate, and hit rate for the threshold test. The number of stops differs because officers without searches of a group are excluded from the group's estimation. Comparing search and hit rates in Table 7 indicates that both black and Hispanic drivers are searched more often than whites and contraband is less likely to be found. The hit-rate disparity is particularly large for probable cause searches. These figures are consistent with the results of the fixed effects models, which showed lower hit rates for black and Hispanic drivers as compared to whites.

Table 7: Number of Stops, Search Rates and Hit Rates organized by Search Type (Columns) and Unit of Analysis (Rows)

	All Discretionary Search				Probable Cause Search		
	Stop count	Search rate	Hit rate		Stop count	Search rate	Hit rate
White	234,705	1.9%	26%	White	180,648	0.7%	61%
Black	201,647	4.4%	23%	Black	185,122	1.8%	46%
Hispanic	20,625	3.6%	21%	Hispanic	13,121	1.9%	47%

Recall that the threshold test predicts race-specific search thresholds by drawing from a posterior signal distribution of drivers' likelihood of carrying contraband. Each officer has a race specific threshold (t_{ro}) which is then weighted based on the number of stops made to produce a single predicted threshold and signal distribution. The threshold is represented as percentage indicating the probability of contraband possession required for an officer to initiate a search.

Table 8: Search Thresholds and Highest Density Intervals (HDI) organized by Search Type

	All Discretionary Search			Probable Cause Search	
	Search Threshold	95% HDI		Search Threshold	95% HDI
White	8%	(4.5%, 11.1%)	White	36%	(29.1%, 43.6%)
Black	6%	(3.5%, 7.7%)	Black	26%	(20.6%, 30.0%)
Hispanic	1%	(0.0%, 3.1%)	Hispanic	18%	(4.9%, 27.8%)

Table 8 shows predicted thresholds and 95% HDIs for each test. As expected, the thresholds for conducting a search when examining all discretionary searches are substantially lower than for probable cause searches. The 95% HDIs are narrower when all discretionary searches are combined ($\pm$ 2-4%) than when probable cause searches are examined alone ($\pm$ 4-20%). The threshold for searching Hispanic drivers (1% all discretionary; 18% probable cause) is lower than for whites (8% all discretionary; 36% probable cause) and the 95% HDIs do not overlap which indicates discrimination against Hispanic drivers. Officers require less suspicion of contraband possession to conduct a search of a Hispanic driver than a white driver. The threshold for all searches of 1% indicates that officers need little, if any, suspicion to pursue a search. The thresholds for black drivers (6% all discretionary; 26% probable cause) are lower than for whites (8% all discretionary; 36% probable cause). The 95% HDIs overlap in both

cases. One advantage of Bayesian methods is the ability to calculate the proportion of MCMC samples that could lead to an equal threshold between groups or a lower threshold for whites. For all discretionary searches, white and black thresholds differ on average by 2.4% and overlap in 7.1% of samples. White and Hispanic thresholds differ by 6.7% and overlap in 0.5% of samples. For probable cause searches, white and black thresholds differ on average by 10.6% and overlap in 1% of samples. White and Hispanic thresholds differ by 18.7% and overlap is 0.6% of samples. White-Hispanic threshold differences clearly show a lower standard of evidence being applied to searches of Hispanic drivers compared to whites. White-black threshold differences show that, especially during probable cause searches, a lower standard of evidence is applied to black drivers compared to whites. When examining all discretionary searches, the white-black difference is relatively small and while most posterior samples indicate a lower threshold for black drivers, there is considerable uncertainty with 7.1% of samples showing equal or higher thresholds for black drivers.

In addition to an average search threshold across officers, each officer has a predicted race-specific threshold for conducting a search. Figure 7 plots implied search thresholds for

Figure 7: Implied Officer Thresholds, All Discretionary Searches
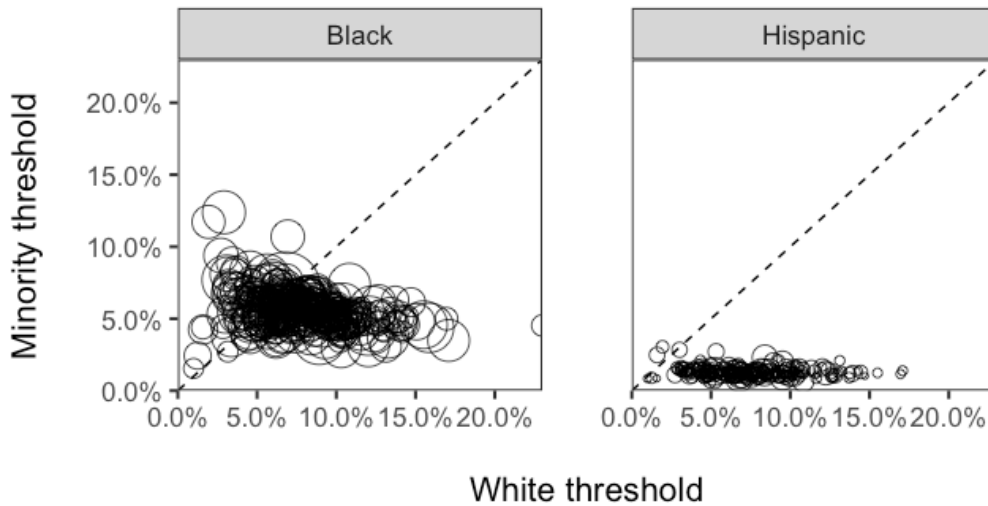
Figure 8: Implied Officer Thresholds, Probable Cause Searches
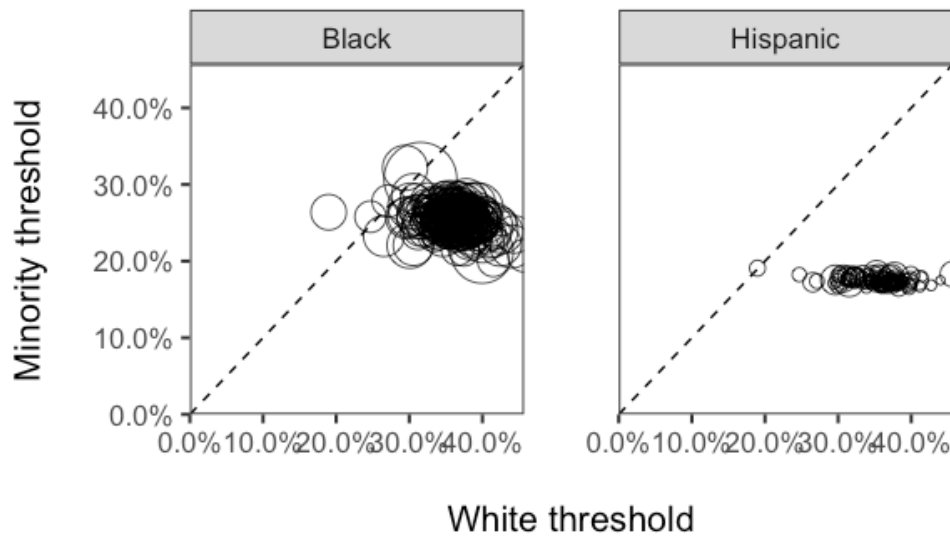
officers by driver's race/ethnicity for all discretionary searches and Figure 8 plots probable cause

searches. Each officer is represented by a circle which is sized by the number of stops he or she

made. On the x-axis is the threshold needed for a white driver to be searched. On the y-axis is the

threshold for a racial or ethnic minority driver. The dashed line on the diagonal would indicate

parity in search thresholds. For all discretionary searches, there is more heterogeneity between

officers when searching white drivers (x-axis) than there is when searching either black or

Hispanic drivers (y-axis). The black-white comparison shows that many officers are clustered around the parity line but a large portion of officers are also applying a lower threshold to black drivers. The Hispanic-white comparison shows very high consistency among officers searching Hispanics with less suspicion than whites. Plotting predicted officer thresholds for probable cause searches (Figure 3) show similar results. The black-white comparison for probable cause search thresholds is clearly below the diagonal indicating a lower threshold for black drivers. The Hispanic-white comparison also is below the diagonal indicating discrimination.

Figure 9: Empirical Cumulative Density Function of Differences Between White Officers and Black Officers: All Discretionary Searches (Left), Probable Cause Searches (Right)
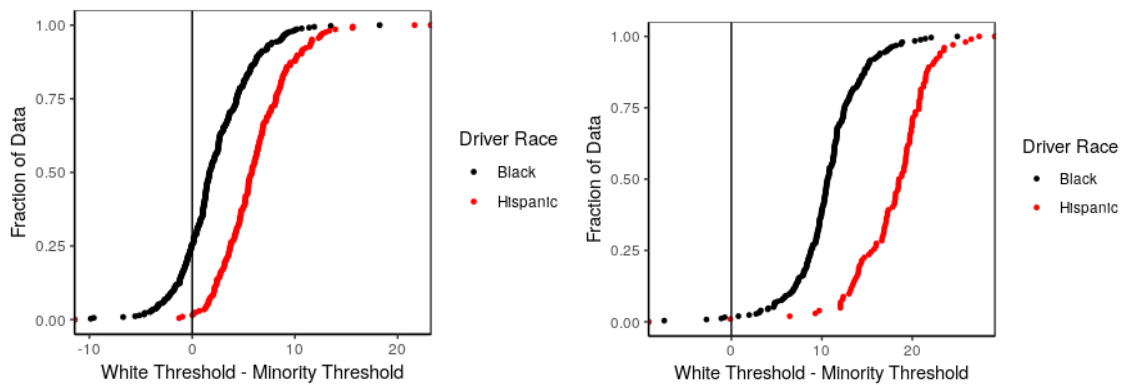
Another way to visualize how individual officers differ in their search threshold toward groups is by subtracting the threshold for minority drivers from the threshold for white drivers for each officer. A positive difference indicates that whites have a higher search threshold than the minority group. The resulting empirical cumulative density function for each difference is shown in Figure 9. Each dot represents one officer and the vertical line represents an equal threshold applied to minority and white drivers. The left panel shows threshold differences for all discretionary searches. For black drivers, 89 (24.2%) officers apply a higher or equal threshold to whites than blacks in all discretionary searches and the median officer has a threshold for blacks

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that is 1.7% lower than for whites. For Hispanic drivers, only two officers (1%) apply a higher

threshold to whites than Hispanics and the median officer has a threshold for Hispanics that is

5.8% lower than for whites. The right panel of Figure 4 shows threshold differences for probable

cause searches. Only four officers (1.6%) have a threshold for blacks that is greater than or equal

to their threshold for whites and the median officer has a threshold for blacks that is 10.6% lower

than for whites. Only one officer (1%) has a threshold for Hispanics that is greater than or equal

to their threshold for whites and the median officer has a threshold for Hispanics that is 18.7%

lower than for whites. Figure 4 shows that the majority of officers apply lower thresholds to

black and Hispanic drivers than they do for whites.

Figure 10: Signal distribution and Predicted Search Thresholds: All Discretionary Searches
(Left), Probable Cause Searches (Right)
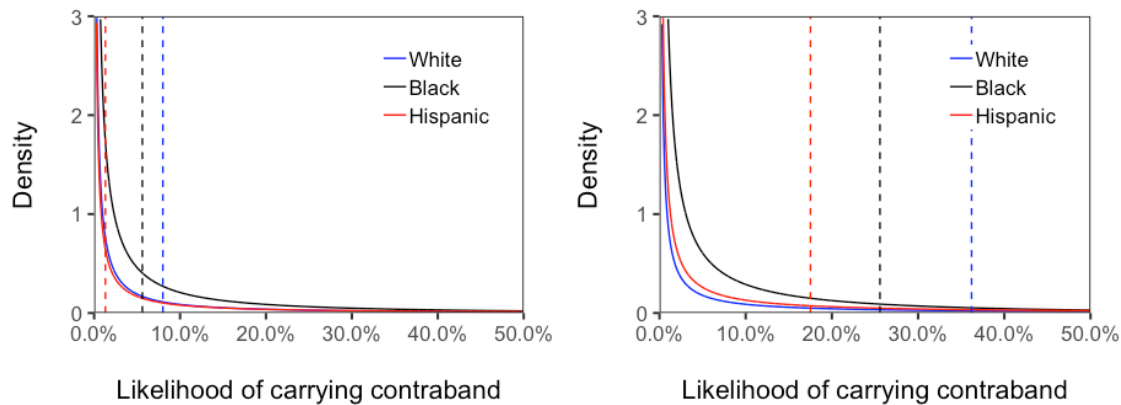
Finally, average inferred signal distributions and search thresholds are plotted in Figure

10. The signal distributions show the officer-weighted probability of drivers possessing

contraband. In both plots, the signal distribution shows that at low levels of suspicion, more

black drivers display signals of suspiciousness. Since the signal distribution takes unobserved

variability into account there could be many factors contributing to the difference. On the

officers' side, they may be assuming that blacks are more suspicious due to racial bias or their

previous experiences with blacks as suggested by social conditioning theory. Black drivers may be more likely than whites to be nervous around police, which can be interpreted as suspicious behavior. White and Hispanic drivers have very similar signal distributions but are searched with a lower threshold than whites. These results provide strong evidence that Hispanics are discriminated against in search decisions and suggest that black drivers face discrimination particularly when officers allege probable cause.

Threshold change over time

Figure 11: Search thresholds and 95% HDI by Driver Race/Ethnicity and Time
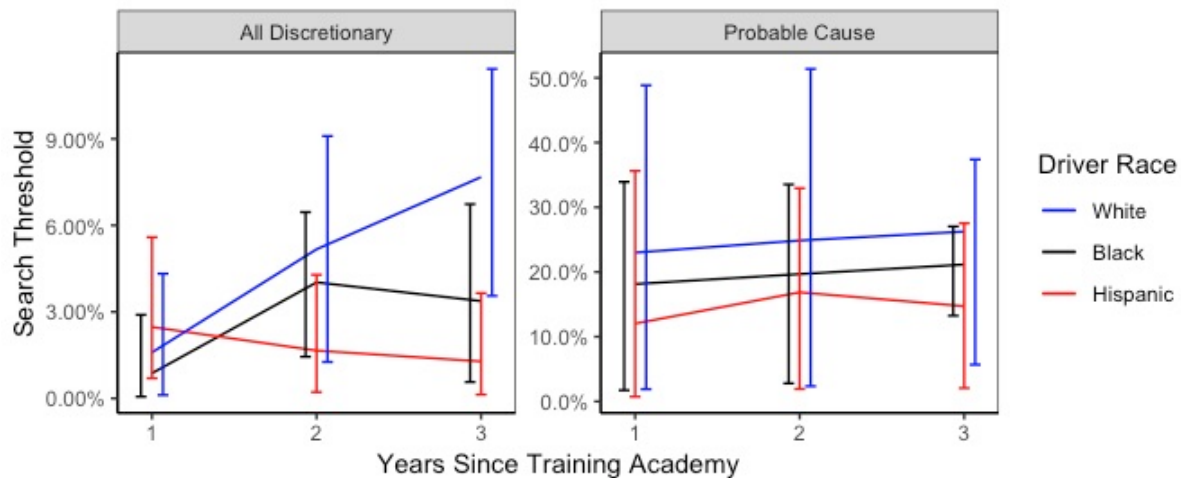
One potential factor that could influence racial discrimination is how long officers have been on the force. The results reported in the previous section pool all three years on the force. When models are estimated by year, the numbers of stops and searches decreases and the error increases but the results can help illustrate trends. Figure 11 shows the inferred average threshold estimated each year after the training academy. For all discretionary searches, officers apply a similarly low threshold to all racial/ethnic group—if they have any suspicion, they pursue a search. Over time,

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the threshold for whites increases while the threshold for black drivers and Hispanic drives both remain lower. By year three, the 95% HDI for the white threshold no longer overlaps with the highest density interval for Hispanic drivers indicating discrimination. For probable cause searches, the thresholds remain relatively stable over time. With the reduced sample size, the HDIs are large but the thresholds show the same pattern of the pooled model with whites having the highest threshold followed by black drivers and Hispanic drivers.

DISCUSSION

This paper investigated racial bias in police decisions to conduct searches during officers' first three years on the force. Two tests for bias were conducted. The hit rate test has been a common test for racial bias in searches but has also faced controversy because of significant limitations (For a review see Engel 2008). This paper applies the hit rate test as a longitudinal trajectory of officers using a fixed effects model adjusting for observed and unobserved time invariant officer characteristics (Allison 2005). The hit rate test suffers from several forms of bias including omitted variable bias and infra-marginality (Ayres 2002; Engel 2008; Engel and Tillyer 2008; Neil and Winship 2019; Simoiu et al. 2017). Simoiu and colleagues (2017) developed an alternate test, the threshold test, which sidesteps the limitations of the hit rate test through estimation of a hierarchal Bayesian latent variable model. The model infers the amount of suspicion an officer would need to initiate a search on drivers of different races or ethnicities. In contrast to previous research that applies the threshold model to geographic units (departments or counties), I apply the model to rookie police officers in the first three years of their careers with officers as the hierarchal unit of analysis. I also compare two different categories of searches,

probable cause searches and a more general category of discretionary searches which includes searches based on alleged probable cause, consent, and protective frisks.

Results from the hit rate and threshold test are relatively consistent and show discrimination in search decisions against black and Hispanic drivers. The hit rate analysis shows that officers are better able to find evidence over time when all discretionary searches are combined but not when probable cause searches are examined in isolation. The improvement seen in discretionary searches shows that officers have more success over time in searches where their discretion is highest; however, the hit rate for non-probable cause searches is low. Probable cause searches produce contraband in 50% of searches but when including other non-discretionary searches the hit rate is only 24% meaning that searches without probable cause produce evidence infrequently. There is slightly more improvement in searches of black and Hispanic drivers but the higher hit rate for whites is consistent. Probable cause is the highest standard of evidence that officers apply when conducting a vehicle search. If the hit rate for probable cause searches is stable, that indicates that they are consistently applying probable cause criteria from the academy onward. Black and Hispanic drivers have lower hit rates in probable cause searches. Overall, the hit rate analysis suggests that racial bias is occurring in search decisions. These findings support a substantial body of research finds that racial bias from police officers is common but is novel by focusing on how hit rates change over a career trajectory. Due to the limitations of the test the results should be triangulated using the threshold test.

Results from the threshold test support the findings of the hit rate test. The clearest finding is that the threshold used to search Hispanics is substantially lower than the threshold used to search whites. This result is consistent with Armenta's (2017) research on policing of

Latinos in Nashville where officers' decisions often "hinged on whether [officers] believed Latino men were workers or possible gang members" (68). When there was a language barrier, officers often erred on the side of suspicion. The threshold test shows that almost no suspicion is needed to pursue a discretionary search with a Hispanic driver. The threshold for probable cause searches of Hispanics is considerably lower than for whites.

For black drivers, the threshold for probable cause searches is lower than for whites which suggests that being black adds to suspiciousness. The inferred signal distribution indicates that officers perceive a greater portion of the black drivers they stop as potentially carrying contraband. Similarly, the hit rate test showed a larger disparity in hit rate between black and white drivers when examining probable cause searches compared to all discretionary searches. This finding is also consistent with research showing that in the United States blackness is associated with suspiciousness (Davis 2017; Eberhardt 2019; Eberhardt et al. 2004; Thompson and Bobo 2011). For discretionary searches overall, the threshold is likely lower for blacks than whites but not to a large degree. The difference between probable cause searches and all discretionary searches points to the importance of disaggregating by search types since different results can be found when multiple search types are pooled.

In the broader context of research on racial bias in police searches, these findings add additional evidence that discrimination against racial minorities, especially blacks and Hispanics, by police is common. Whites are given the benefit of the doubt from officers while racial and ethnic minorities are not. Officer-specific predicted thresholds show that officers are relatively consistent in their lower search threshold for racial and ethnic minorities. For whites, officers vary with a wide range of thresholds being applied. Over time, officers are changing their discretionary search threshold with whites but are keeping their thresholds for black and

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Hispanic drivers relatively stable. If higher thresholds are being applied to whites, they could be less likely to be caught with contraband than a black driver giving the exact same signals to police officers. Threshold differences could be a contributing factor leading to the overrepresentation of people of color in the criminal justice system for minor offenses.

There are several limitations to this analysis. Administrative data can often underestimate bias since there is no information about people who were not stopped by police (Knox et al. 2019). The unknown "at-risk" population can systematically bias outcomes and the direction of bias can be difficult to predict (Hannon 2019). A focus on post-stop outcomes should reduce the impact of the unknown population who was not stopped but the unknown population on the roads is still a concern (Fridell 2004). The threshold test should reduce some of the bias from the at-risk population problem because unobserved processes are accounted for when sampling the posterior signal distribution. Further research should examine how well the threshold test adjusts for underlying bias in data. Administrative records also assume accuracy on the part of officers filling out paperwork. It is likely that officers differ in their classification of searches. It is common for officers to identify searches as both consent-based and probable cause-based. In this study, if probable cause was selected, the search was counted as a probable cause search regardless of other selected categories. If officers conducted searches without indicating that a search was conducted, the results would be biased and overestimate the hit rate or threshold assuming that unrecorded searches did not yield contraband. Limitations of the hit rate analysis include infra-marginality and omitted variable bias, both of which the threshold test aims to reduce. The threshold test has its own limitations. The level of aggregation (i.e. officers, units, patrol zones, precincts, counties, police jurisdictions, states) may show different thresholds because policies and practices may vary at different levels (Neil and Winship 2019; Simoiu et al.

2017). It is also not clear what magnitude of threshold difference should be interpreted as bias. This study finds a 2% difference between whites and black when examining all discretionary searches. It is unlikely that this difference is random based on comparing the posterior distributions but it is not clear whether the difference has a substantive difference. This study, to my knowledge, is the first to apply the threshold test at the officer level and finds that thresholds vary more for white drivers than black drivers. Focusing on the individuals who are making the decisions can be useful for identifying whether bias is due to several officers or is systematic across the department. These results lend support to the contention that bias is systematic rather than caused by a few "bad apples."

CONCLUSION

Racial justice advocates in the United States have called attention to the ways that police treat people of color differently from whites. The tools researchers use to show the extent of bias have faced a number of significant limitations but the multiple methods used in this paper paint a picture of disparate, discriminatory treatment of black and Hispanic drivers in Nashville, Tennessee. Police administrators, officers, policy makers, and advocates should work to make changes to officer training and monitoring procedures to ensure that all people are treated equally. Searches will never be 100% accurate at finding evidence but the standard used to make decisions to conduct searches can be improved and applied more consistently across population groups. Creating equity in policing is a long-term project that will require extensive social change as well as analysis to track the efficacy of policy changes.

CHAPTER 4

UNFAIR TREATMENT BY POLICE, NEIGHBORHOOD PROACTIVE POLICING, AND
MENTAL HEALTH IN NASHVILLE, TENNESSEE

ABSTRACT

In an effort to combat crime, police agencies target specific areas for proactive, aggressive

enforcement strategies. Targeted proactive policing has been cited as a reason why racial

minorities report unfair or discriminatory treatment from police officers more often than whites.

Recent research suggests that both aggressive policing and police mistreatment may undermine

psychological wellbeing. This paper examines the effect of personal and vicarious unfair

treatment by police (UTBP) and neighborhood proactive policing on depressive and anxiety

symptoms for a sample of black and white residents of Nashville, TN. The results show that

personal and vicarious UTBP is more likely to occur to blacks than to whites. Personally

experienced UTBP is associated with increased depressive symptoms for blacks but not for

whites in models split by race. Similarly, proactive policing is associated with a higher risk of

depressive symptom for blacks prior to controlling for socioeconomic status but is not associated

with depressive symptoms for whites. Neither unfair police treatment nor proactive policing are

associated with anxiety symptoms. Interaction models show that living in high proactive policing

areas is a greater risk for depressive symptomatology when UTBP has been personally

experienced. Together, the results show that police mistreatment is not only commonly reported

but undermines certain forms of mental health for black residents of Nashville. The findings

support a growing body of research suggesting that both experiences of police mistreatment and

police practices undermine psychological wellbeing for black Americans.

INTRODUCTION

Police officers are given the power to detain, search, and arrest people that they suspect are violating the law—by force, if necessary. For many black people in the United States, police shootings of black men and women represent the worst fear of what can happen to their family, friends, or themselves when interacting with police (Bor et al. 2018). Even without force, police contact can be invasive, frightening, and detrimental to future life plans (Fagan and Ash 2017; Geller and Fagan 2019; Tyler, Jackson, and Mentovich 2015). If someone has experienced unfair treatment by police in the past, they are likely to be more concerned about the possibility that future interactions could also be unfair or discriminatory. Additionally, if they also live in an aggressively policed neighborhood, their distress could be more pronounced. The exposure to unfair treatment by police and aggressively policed neighborhoods has been linked to a variety of deleterious health outcomes, especially for blacks (DeVylder et al. 2017, 2018; Geller et al. 2014; Geller, Fagan, and Tyler 2017; McFarland, Taylor, McFarland, et al. 2018; McFarland, Taylor, and McFarland 2018; Oh, DeVylder, and Hunt 2017; Sewell 2017; Sewell and Jefferson 2016; Sewell, Jefferson, and Lee 2016). The stress associated with discrimination from police and the chronic strain of living in highly policed neighborhoods are both potential stressors that could influence the psychological wellbeing of black people in the United States.

Unequal policing between black and white communities is not a new phenomenon but a reflection of historic and current racial inequities. Racial inequalities in policing are multifaceted and take place on both the individual as well as neighborhood levels (Braga et al. 2019; Braga and Weisburd 2010). On the individual level, police officers are more likely to stop and search

blacks compared to whites in the United States (Alexander 2012; Ariel and Tankebe 2016; Baumgartner, Epp, et al. 2018; Davis et al. 2018; Epp et al. 2014; Langton and Durose 2013). There is little debate among scholars that black people have disproportionate rates of police contact relative to whites. Black people often report increased police scrutiny as discriminatory and are less likely to turn to police for protection than whites (Avakame, Fyfe, and McCoy 1999; Desmond, Papachristos, and Kirk 2016; Kirk and Papachristos 2011; Weitzer and Tuch 1999). Even though black people see disproportionate police contact as discriminatory, scholars debate whether the increased risk is due to racial bias on the part of officers or from non-race-based policing decisions targeting specific locations (Braga et al. 2019; Fridell 2004; Gumbhir 2007; Rojek et al. 2012).

Social psychologists often argue that police officers have implicit biases against racial minorities that lead to differential, unfair treatment and more punitive outcomes (Eberhardt 2019; Eberhardt et al. 2004; Glaser 2014; Voigt et al. 2017). Individual interactions with police officers that a community member perceives as discriminatory or unfair is referred to as *unfair treatment by police* (hereafter UTBP) in this paper. The definition of UTBP used in this paper does not measure an officer's actions or the severity of police treatment but rests on the perception of respondents as having been unfairly treated during an encounter with police. I return to the subjectivity of the measure in the discussion section toward the end. While bias occurs in police-public interactions, the neighborhood-level strategies that police use to combat crime may also expose communities to police contact at different rates. Criminologists have shown that crime is often concentrated within specific parts of urban areas and police target these hot spots with proactive law enforcement strategies (Braga et al. 2019; Braga and Weisburd 2010; Weisburd, Groff, and Yang 2012). *Proactive policing*—encompassing a variety of

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aggressive, location-specific crime reduction tactics—aims to deter crime by seeking out people breaking the law and making police visible in areas where crime is likely to occur. Deterrence, however, does not only impact those likely to commit crimes but spills over onto entire communities.

Research on the health correlates of UTBP and proactive policing practices has examined the two phenomena separately. UTBP has been measured in several social epidemiological surveys and has been found to be a unique form of social stress that can undermine psychological wellbeing (DeVylder et al. 2017; Geller et al. 2014, 2017). Aggressive policing—particularly Stop, Question, and Frisk in New York City—has been measured using police administrative data and linked to health surveys that do not contain a measure of UTBP (Sewell et al. 2016). I use data from the Nashville Stress and Health Study (NSAHS) combined with administrative records from Metro Nashville Police Department to test whether UTBP and proactive policing both contribute to depressive and anxiety symptoms. This paper contributes to the existing research literature by testing whether these two measures of policing have independent effects on mental health or whether they act together to limit psychological wellbeing. A second contribution of this paper is an examination of racial differences in the mental health effects of UTBP and proactive policing. I test whether black and white residents of Nashville are differently affected psychologically by UTBP and proactive policing in their neighborhood.

BACKGROUND

Recent high-profile police shootings of black men in the United States have brought race to the forefront of discussions about police (Davis 2017). Following the August 2014 shooting of Michael Brown—an 18-year-old black teenager in Ferguson, Missouri—by a police officer, the

community responded with protests claiming that police misconduct was rampant. Police responded to the protests with military equipment, tear gas, and rubber bullets. Similarly, in April of 2015, Freddy Grey was arrested in Baltimore for allegedly having a switchblade. Eye-witnesses say that the police used excessive force when making the arrest. While being transported to the police station, Grey sustained a spinal cord injury that ultimately led to his death. Following his death, Baltimore residents protested for six nights. Both of these events sparked dozens of solidarity rallies in the United States (Williamson, Trump, and Einstein 2018) and around the world (Winsor 2016). While these incidents are not unique, the subsequent investigations of the Ferguson and Baltimore police departments by the U.S. Department of Justice (DOJ) certainly are. The Ferguson report found that police officials focused on black neighborhoods in order to generate revenue through ticketing and imposed severe court penalties for minor technical violations (U.S. Department of Justice 2015). They also found evidence of racial bias by officers and widespread community mistrust of the police department. The DOJ report on Baltimore found similar practices of unconstitutional stops, searches, and arrests as well as excessive force directed toward black community members (U.S. Department of Justice 2016). Ferguson and Baltimore are not isolated cases. According to the Associated Press, in 2017, 14 police departments were operating with consent decrees—reform agreements with the DOJ usually overseen by a federal judge—related to racial bias in police procedures (Seewer 2017).

Blacks in the United States have generations of accumulated experience with discrimination from police (Natl. Acad. Sci. Eng. Med. 2018; Stevenson 2017). In the proceedings of the ninth Atlanta University Conference in 1904, W.E.B. DuBois (1904:54) reported that in a survey of 1,500 black school children, 36 percent reported that policemen were

"unkind." As enforcers of the legal code, police officers upheld segregation and met reformers with violence and repression. By the 1950's, the modern concept of police responding to emergencies and tackling social problems was solidified but there was deep inequality in the assistance that blacks received compared to whites. Throughout the Civil Rights Movement of the 1950's and 1960's, police were often used to crack down on peaceful protests and undermine political movements (Bergesen 1982). President Johnson's Crime Commission published a 1967 report, *The Challenge of Crime in a Free Society*, finding that racial minorities had little trust in police officers and police institutions. The report stated that Commission observers had "seen instances of unambiguous physical abuse [including] officers striking handcuffed suspects…[and] reported that officers too seldom use polite forms of address to members of minority groups or juveniles" (President's Commission on Law Enforcement and Administration of Justice 1967:102). Around the same time as the Crime Commission, James Baldwin (1966) wrote that "Harlem is policed like occupied territory." Police officers aggressively patrolled the streets of Harlem creating two nations, separate and unequal (Embrick 2015). Fifty-years after Baldwin, Ta-Nehisi Coates (2016) similarly argued that "wanton discrimination is definitional to the black experience, and very often it is law enforcement which implements that discrimination with violence."

Clearly, the institution of policing in the United States is inseparable from the racialized social system (Bonilla-Silva 1997; Tonry 2011). Given the racial history of police mistreatment, it is no surprise that research shows that police abuses are not experienced equally for whites and blacks (DeGue, Fowler, and Calkins 2016; Kramer and Remster 2018; Smith and Holmes 2014). Since police mistreat black civilians more often than whites, when mistreatment occurs it may be a more salient form of stress for blacks than for whites. The potential of police mistreatment

could also act as a chronic stressor for blacks because the risk of police abuse is omnipresent. Whites might be more likely to see unfair police treatment as an aberration and the experience may not affect their sense of personal security. However, another argument could be made that the unexpectedness of police mistreatment for whites may make it salient for their wellbeing and would be similarly affected by UTBP. Beyond individual treatment, the law enforcement strategies that police choose to use may also affect blacks differently than whites. In Baldwin's description of Harlem, whites may not have seen police as occupiers but protectors because they were concerned about crime and did not assume they were at risk of abuse. In a community report of Nashville that interviewed 25 black residents, a local non-profit found that the interviewees were concerned that the police did not protect them as they do whites in the city (Gideon's Army 2016). Several interviewees in the report said that they felt anxiety when having to interact with police due to their past experiences. A common theme was differences in how predominantly black neighborhoods are policed. This paper examines how black and white Nashville residents have been treated by police and how the amount of proactive policing near their home can influence depressive and anxiety symptoms. The analysis is guided by the stress process model and conceptualizes UTBP and proactive policing in the neighborhood as potential stressors.

Unfair Treatment by Police

Recent research indicates that UTBP is a unique form of discrimination separate from other forms of unfair or biased treatment (DeVylder et al. 2017; Geller et al. 2014, 2017; McFarland, Taylor, McFarland, et al. 2018; McFarland, Taylor, and McFarland 2018). As a social institution with state authority, police are uniquely given the power to stop, search, arrest,

and use force if a suspect does not comply (Bittner 1970). Black people in the United States are more likely than whites to have police contact and to be searched, arrested, or have force used against them (Braga et al. 2019; Natl. Acad. Sci. Eng. Med. 2018). Police officers often stereotype blacks as more likely to be engaged in criminal activity than whites (Eberhardt 2019; Eberhardt et al. 2004; LeCount 2017). Stereotypes that lead to unfair treatment can be formed through multiple mechanisms. One mechanism is statistical discrimination. Police officers are aware of crime statistics that show racial disparity may apply this knowledge to how they treat individuals (Glaser 2014; Pager and Karafin 2009). Police officers may also develop bias over time though commonly interacting with racial minorities as suspects. They may develop a stronger association of race and suspiciousness over time, a process of social conditioning (Smith and Alpert 2007). Both statistical discrimination and social conditioning theory predict that police officers will display racial bias against people of color. Regardless of the causes, racial bias leading to unfair treatment can be seen in routine police-public contacts. In an analysis of body camera footage from traffic stops in Oakland, police officers were less likely to use respectful language with black drivers than they were with white drivers even after controlling for the race of the officer (Voigt et al. 2017). While it's clear that blacks are more likely to experience UTBP than whites, the psychological impact of UTBP has only recently become a focus of research.

Reporting findings from a 2012-2013 telephone survey of 1,261 young men in New York City, Geller et al. (2014) demonstrate that young men who experience intrusive police contact are at a greater risk of anxiety and trauma symptoms. They measure police intrusion as a scale of whether officers asked for identification, frisked or searched them, used harsh or racially tinged language, or threatened or used force during their most memorable police interaction. Similarly,

DeVylder and colleagues (DeVylder et al. 2017) surveyed residents of Baltimore, New York City, Philadelphia, and Washington D.C. who were part of Qualtrics Panels, a standing database of survey respondents run by the company Qualtrics, to assess exposure to police victimization and mental health. Using a newly created measure of police victimization measuring physical, physical with weapon, sexual, psychological, and neglect experiences from police officers, they found that black and Latino respondents were more likely to experience police victimization across most types of victimization than whites. These forms of victimization were also correlated with psychological distress and depressive symptoms scales.

Several other studies examine UTBP on physical health outcomes. In two studies of UTBP using data from the Nashville Stress and Health Study, UTBP is measured using an item drawn from a larger major discrimination scale (McFarland, Taylor, McFarland, et al. 2018; McFarland, Taylor, and McFarland 2018). In one study, McFarland, Taylor, McFarland, and Friedman (2018) test whether personally experienced and vicarious (close personal others) UTBP is associated with telomere length—an indicator of biological aging associated with stress. Focusing on black and white men, the authors find that black men were more likely than whites to experience both personal and vicarious UTBP. Both personal and vicarious UTBP was associated with shorter telomere length for black men but had no relationship for white men. In another study, McFarland, Taylor, and McFarland (2018) tested whether the same personal and vicarious measures of UTBP in Nashville were associated with waist circumference. They found that vicarious but not personal UTBP was associated with higher waist circumference. Vicarious UTBP explained 12% of the black-white disparity in waist circumference. These findings suggest that UTBP can have a variety of impacts on wellbeing and delineating between personal and vicarious exposures may help identify mechanisms linking UTBP to health.

Geller et al. (2014) and McFarland, Taylor, McFarland, and Friedman (2018) argue that UTBP is linked to the structural context of proactive policing. They both argue that proactive policing has made UTBP more common for men of color because it targets low-level offenses and the majority of those stopped have done nothing wrong. However, neither study measures proactive policing or whether police activity modifies the effect of UTBP on health outcomes. This paper includes measures of both UTBP and proactive policing.

Proactive Policing

Police aim to reduce crime in problem areas through focused deterrence (Braga and Weisburd 2010; Braga, Welsh, and Schnell 2015; Nagin 2013; Nagin et al. 2015). Deterrence theory argues that the criminal justice system should not only be about punishing criminals but convincing others not to commit crime in the future. Effective deterrence relies on three aspects of punishment: swiftness, severity, and certainty (Beccaria 1785). Modern research shows that the certainty of punishment is, by far, the most important aspect of deterrence (Nagin 2013; Nagin et al. 2015). Certainty is comprised of a number of conditional probabilities. When police focus on a specific area with proactive strategies, the probability that a crime is investigated and a suspect is arrested increases. Others in the community also recognize that the probability of apprehension is high and will therefore avoid criminal activity (Nagin 2013; Nagin et al. 2015). Proactive policing also draws from theories of zero-tolerance, order-maintenance, and broken-windows policing (Braga and Weisburd 2010; Fagan et al. 2010; Wilson and Kelling 1982). To reduce serious crime, police focus on making arrests for misdemeanor crimes like minor drug possession or loitering. Common proactive enforcement strategies in communities include increasing police patrols in specific areas, increasing traffic or pedestrian stops and searches, and

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using mobile crime suppression units (Koper 2014). Officers may also use "offender-oriented" strategies that focus on suspected gang members, known offenders, probationers, or parolees (Koper 2014). While all strategies are employed to reduce crime, black people are much more likely to experience these targeted, aggressive tactics than whites in ways that are not fully explained by differing rates of offending or neighborhood crime rate (Braga et al. 2019; Natl. Acad. Sci. Eng. Med. 2018). Living in areas that are targeted with proactive enforcement exposes people in those areas to higher risk of police contact, searches, arrest, and police use of force. By creating a racialized environment of social control, police also may be creating a social environment marked by chronic strain.

To test the proposition that neighborhood policing practices can influence health, Sewell, Jefferson, and Lee (2016) merged data from the New York City Stop, Question, and Frisk (SQF) database with individual data from the 2012 NYC Community Health Survey to investigate the impact of SQF on psychological distress. The authors argue that since aggressive policing is primarily targeted toward men of color, they are likely to experience hypervigilance which is often linked to poor mental health. Examining two aspects of aggressive policing—the proportion of stops where frisking occurs and proportion of stops with use of force—the authors found that men living in aggressively policed areas are more likely to show symptoms of psychological distress than men in areas with less aggressive policing. Notably, this study controls for arrest rate, robbery complaint rate, neighborhood racial/ethnic/class composition, and individual demographic correlates of mental health. The results suggest that the neighborhood context of police activity may be experienced as a source of chronic strain. One major limitation of the NYC Community Health Survey is that it does not include measures of

police contact or subjective appraisals of unfair police treatment, a limitation addressed in this study.

Racial Stress, Police, and Mental Health

The stress process framework argues that stressors that are most likely to lead to psychological distress are those that are traumatic and undermine a sense of personal control and stability (Pearlin et al. 1981; Turner and Avison 2003; Wheaton 1994). For racial minorities, discrimination is critical for understanding stress (Pascoe and Smart Richman 2009; Williams and Mohammed 2009). Discrimination occurs when individuals or social institutions give differential or unfair treatment to a person based on group membership. Discrimination need not be intentional and can take many forms. For a person experiencing discrimination, the intent of the actor is less important than their understanding of their treatment being unfair, unjust, or different than other racial groups. Racial discrimination is common and has substantial mental and physical health impacts for black people in the United States. Several review articles conclude that experiences of racism and discrimination contribute to depression, psychological distress, anxiety, hypertension, poor self-rated health, certain cancers, obesity, substance abuse, and other chronic medical conditions (Mays, Cochran, and Barnes 2007; Paradies 2006; D. R. Williams et al. 2003; Williams and Mohammed 2009). In a meta-analysis, Pascoe and Richman (2009) examined 110 studies on discrimination and mental health. They found a robust relationship between discrimination and multiple mental health outcomes including depressive symptoms.

Depressive symptoms and anxiety symptoms are interrelated types of psychological distress that may be influenced differently by discrimination. Examining each type of distress

independently provides a better understanding of the specific effects of stressors and types of interventions that are appropriate (Banks, Kohn-Wood, and Spencer 2006). Epidemiological research on depressive and anxiety symptoms show that even though blacks experience more stress than whites, they report the same or fewer symptoms of depression or anxiety (Barnes, Keyes, and Bates 2013; Erving and Thomas 2017; Erving, Thomas, and Frazier 2019; Keyes 2009; Louie and Wheaton 2019; Mouzon 2013; Soto, Dawson-Andoh, and BeLue 2011). This finding is paradoxical given that stress exposure has a robust influence on mental health. Even though there are often differences in average levels of distress between blacks and whites, exposure to particular circumstances may have similar or different effects across groups. As discussed above, UTBP and proactive policing are racialized stressors more common in the lives of racial minorities than whites. For whites, proactive policing may be a salubrious factor since police are often understood as protectors against the risk of crime victimization while blacks may see police as a source of victimization (Anderson 1999; Stuart 2016; Stuart et al. 2015). Research on perceptions of police by race shows that blacks are less likely to trust the police and feel as though police are biased against blacks. A Pew Research Center survey from 2016 found that blacks are half as likely as whites (35% of blacks compared to 75% of whites) to think their local police treat racial and ethnic groups equally (Morin and Stepler 2016). The current study aims to better understand how UTBP and proactive policing can influence both depressive and anxiety symptoms as a form of racialized stress. Since both outcomes are interrelated forms of distress, the predicted relationships with UTBP and proactive policing are the same.

Depressive symptoms are the most common form of psychological distress (Kessler et al. 2005; Turner and Lloyd 1999). Symptoms often include sadness, hopelessness, an inability to carry out daily activities, trouble sleeping, thoughts of suicide, and poor appetite (Mirowsky and

Ross 2003; Radloff 1977). Racial discrimination is degrading and can undermine a person's

sense of happiness and worth leading to depression (Brown et al. 2000; Taylor and Turner 2002;

Wheaton et al. 2017). For instance, Wheaton et al. (2017) found in the NSAHS that major

discrimination events were associated with depressive symptoms for older black men in

particular while younger black men were more affected by chronic everyday experiences of

discrimination. Proactive policing is a chronic neighborhood strain and UTBP is a major

discrimination event. These experiences could negatively affect mood since police are often

viewed as a source of racial discrimination and unfair social control.

Anxiety symptoms are also a type of psychological distress but reflect worry, tension,

and panic about events and situations (Hunter and Schmidt 2010; Soto et al. 2011). Hunter and

Schmidt (2010:213) argue that "awareness of racism influences anxiety via cultural mistrust, a

collection of interpretations and behaviors considered an adaptive response to being an

ethnoracial minority." Police contact may be a particular situation that could evoke an anxious

response (Geller et al. 2014). Past negative personal or vicarious experiences with police may

make a person fear future police contact. Knowing that blacks are more likely than whites to face

police abuses could foster cultural mistrust and anxiety (DeVylder et al. 2018). High police

presence could exacerbate anxiety for people who have experienced UTBP.

The stress process framework includes several important insights that assist with

understanding how UTBP and proactive policing can affect psychological distress (Pearlin 1989,

1999). Stressors are the experiences and circumstances that lead to stress. An individual's social

statuses and social context are associated with both the exposure to stressors as well as the

coping resources available to manage stress. For instance, parental status may expose parents to

stress related to children's wellbeing that non-parents do not have. Stressors can also be

understood as life events or as chronic strains (Pearlin 1989; Wheaton 1994; Wheaton et al. 2017). Pearlin (1989) argues that there are at least three potential relationships between stressful events and chronic strains that can create stress: 1) events leading to strains; 2) strains leading to events; and 3) strains and events providing meaningful contexts for one another. UTBP is a stressful event while aggressive policing practices in neighborhoods are chronic strains. The second and third potential relationships proposed by Pearlin (1989) could be taking place between UTBP and proactive policing. Policing practices could increase the probability of experiencing UTBP. For psychological distress, however, the most likely relationship is that UTBP and proactive policing create meaningful contexts for one another. UTBP is unlikely to be universally experienced. If a person sees unfair treatment as an anomaly, the exposure to the stressor may not translate to stress. However, seeing police conducting aggressive, proactive enforcement may make an experience of UTBP more likely to create stress. Similarly, prior UTBP could sensitize an individual to the policing context in their neighborhood creating stress. This relationship is potentially confounded by fear of crime victimization which may impact views of police presence.

The Present Study

Based on the previous review of UTBP, proactive policing, and mental health, this study tests whether black residents of Nashville are experiencing a psychological cost from police activity and unfair police treatment. Metro Nashville Police Department's (MNPD) Manual states that "it is the policy of the department to police in a proactive manner" (Metropolitan Nashville Police Department 2018:441). Armenta (2017) found in her 2012 ethnography of MNPD that officers were encouraged to stop and search drivers to show their supervisors that

they were productive. Officers said that if they made more stops they would be rewarded with more desirable days off and assignments. Community activists have criticized MNPD's use of traffic stops claiming that black drivers are overrepresented in stopped vehicles and that MNPD conducts more than double the traffic stops of similarly sized cities (Gideon's Army 2016). Gideon's Army (2016), a local non-profit, analyzed traffic stop and search data and found that black drivers were more likely to be searched and officers were less likely to find contraband indicating a lower threshold of suspicion applied to blacks compared to whites. In interviews with black community members, reports of feeling treated unfairly, harsh language, and arbitrary commands from officers were common themes (Gideon's Army 2016). These findings suggest that Nashville is a city where policing requires more study and this paper examines whether police treatment in Nashville may be contributing to psychological distress of residents.

I test the following hypotheses in the analysis:

Hypothesis 1: Black respondents will be more likely to report personal and vicarious UTBP.

Hypothesis 2: Living in an area with more proactive policing will increase risk of UTBP.

　　Hypothesis 2a: Proactive policing will have a stronger association with UTBP for black respondents than whites.

Hypothesis 3: Personal and vicarious UTBP will be associated with higher depressive and anxiety symptoms.

　　Hypothesis 3a: Black respondents will have a stronger relationship between UTBP and depressive and anxiety symptoms than whites.

Hypothesis 4: Proactive policing will be associated with higher depressive and anxiety symptoms.

Hypothesis 4a: Black respondents will have a stronger relationship between

proactive policing and depressive and anxiety symptoms than whites.

Hypothesis 5: Proactive policing will have a stronger relationship to depressive and

anxiety symptoms for those who have experienced UTBP.

Hypothesis 3a: Black respondents who have experienced UTBP will have a

stronger relationship between proactive policing and depressive and anxiety

symptoms than whites.

METHODS

Data

The Nashville Stress and Health Study (NSAHS) is a population-based community sample of

Nashville, Tennessee. Black and white adults between the ages of 21 and 69 were randomly

sampled using a multistage, stratified approach. Between 2011 and 2014, 1,252 respondents—

627 black men and women and 625 white men and women—were surveyed. To select cases, a

simple random sample of 199 block groups was taken and households were randomly selected in

proportion to block group population size. Block groups were defined using boundaries from the

2000 Census since 2010 boundaries were not available when sampling began. Black households

were oversampled with the goal of selecting equal numbers of black men, black women, white

men, and white women. Participation rates for screening and interviewing were calculated based

on the American Association for Public Opinion Research (AAPOR). The Response Rate 1 is

30.2, the Cooperation Rate 1 is 74.2, the Refusal Rate is 30.2, and the Contact Rate 1 is 40.7.

The survey design and sampling strategy have been described in detail in other studies (Brown,

Turner, and Moore 2016; Turner 2013; Turner, Thomas, and Brown 2016). Ten participants had

invalid block groups and an additional 34 respondents were missing data on study variables.

They are excluded from all analyses. The present study uses data from 1,208 respondents, 604

black and 604 white. NSAHS data are supplemented with administrative records from Metro

Nashville Police Department (MNPD), obtained through a public records request for case-level

data for all traffic stops, arrests, and incident reports made by officers from 2010 through 2014.

Measures

     Dependent variables.

Past month *depressive symptoms* were measured using the 20-item CES-D scale (Radloff 1977).

Items include, "you felt depressed," "you felt lonely," "you felt that you could not shake off the

blues," and "you felt sad." Responses were coded on a one-to-four scale with categories of "not

at all" (1), "occasionally" (2), "frequently" (3), and "almost all the time" (4). Higher values

indicate greater depressive symptoms. The 20 items were averaged (α=.92). *Anxiety Symptoms* is

a scale comprised of five items. They include, "I felt worried over possible misfortunes," "I felt

tense, "I felt anxious," I felt nervous," and "I felt over-excited." Responses were on a one-to-four

scale from "not at all" to "very much." Higher values indicate more symptoms of anxiousness.

The five items were averaged (α=.83).

     Unfair treatment by police.

UTBP is measured as being experienced personally or vicariously. As a part of the Major

Discrimination Scale (Williams et al. 1997), respondents were asked if they or someone close to

them has "been unfairly treated by the police (e.g., stopped, searched, questioned, physically

threatened or abused)?" If they respond "yes," they are asked if it happened to themselves, their

spouse, child, other relative, or close friend. Two mutually exclusive variables were created for discrimination against the respondent and others. The first, *unfair treatment by police against self,* is coded as a binary variable measuring whether the respondent had been treated unfairly by police. Respondents indicating personal UTBP were not included in the second variable measuring vicarious experiences. The second, *vicarious unfair treatment by police,* is a dichotomous variable with value 1 for anyone who reported police unfair treatment against their spouse, child, other relative, or close friend but not themselves. The reference category is respondents who have not experienced personal or vicarious UTBP. Fourteen respondents selected that they had both personally experienced unfair treatment by police and had a significant other also experience UTBP. These individuals were counted in the personal UTBP variable and not in the vicarious UTBP variable because personal experiences are likely to be more salient for mental health. Creating mutually exclusive categories is also necessary for the regression coefficients to be interpreted as a comparison to those who have not experienced UTBP and is consistent with previous research examining UTBP (McFarland, Taylor, McFarland, et al. 2018; McFarland, Taylor, and McFarland 2018).

   Policing and crime

Policing and crime variables are calculated at the level of patrol zones, administrative regions of the city used for police deployment. MNPD officers are assigned to one of eight precincts in the city. Each of the precincts is demarcated into zones that are used for disbursing officers through the precinct. During each shift, one patrol officer responds to all non-emergency calls within their assigned zone. Zones can also be used to focus proactive policing units on problem areas. The shapefile for patrol zones was received from MNPD via a public record request. To link

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NSAHS respondents to patrol zones, the Census block group shapefile was spatially joined to the shapefile of MNPD patrol zones. After joining, I calculated the percentage of each block group's area that fell into each patrol zone. I assigned the block group to the zone with the largest area falling within it. The median area overlap of block groups with their assigned patrol zone was 99.8% meaning that the majority of block groups were fully encompassed by their assigned zones. After assigning NSAHS participants to patrol zones, I aggregated total population counts of the block groups from the 2000 Census to the patrol zone level. Aggregated total population of patrol zones was used as the denominator for all policing and crime rates. For each respondent, the patrol zone rate per 1,000 residents was calculated using the following formula:

$$rate \ per \ 1{,}000 = {}^{\Sigma \, x_{tz}}/_{n_z} \times 1{,}000 \tag{1}$$

Where x_{tz} represents instances of policing or crime occurring in patrol zone z during the year prior to the respondent's survey date, t. Policing and crime variables are calculated for the year prior to the survey date to improve temporal ordering. Since the survey was fielded over a three-year period, pooling the entire time span would not accurately reflect the exposure to police or crime that an early respondent would have experienced. Policing and crime variables are all highly skewed so they are log transformed prior to creating scales based on the following equation.

$$logged \ rate \ per \ 1{,}000 = \log\left(\left({}^{\Sigma \, x_{tz}}/_{n_z} \times 1{,}000\right) + 1\right) \tag{2}$$

Scales based on crime or police data can be created in a variety of ways. Even though the unit of measurement for all items is the same, a simple sum of rates may not be the best way to measure proactive policing and crime. In an additive measure, all incidents are given equal weight. But should one murder be given equal weight as one vehicle theft? One strategy used in previous

research is weighting incidents based on seriousness (Blumstein 1974). However, it is not clear how much weight should be applied to make categories equivalent. Is one murder equivalent to 10 vehicle thefts? 100 vehicle thefts? Rather than weighting incidents based on seriousness, I standardize each indicator with mean of 0 and standard deviation of 1 prior to averaging the items in the index. Standardizing the items produces scores for each patrol zone relative to other zones. Averaging the standardized, logged rates treats each item as an equal component of the index and the units can be understood as standard deviations from the mean patrol zone.

Proactive policing is a composite of three measures of aggressive policing calculated from MNPD administrative records. First, the discretionary search rate per 1,000 residents measures the number of discretionary searches conducted during traffic stops within the respondent's patrol zone for the year preceding their survey date. Discretionary searches are conducted based on the judgement of an officer and fall into three primary legal justifications; probable cause, reasonable suspicion of weapon possession, or driver consent. Searches conducted incident to arrest, due to an outstanding warrant, or for inventory when impounding a vehicle are excluded because they are non-discretionary. Non-discretionary searches are a byproduct of proactive policing due to increasing the number of traffic stops but they are not a policy objective of the enforcement strategies. Many non-discretionary searches are conducted because an arrest was made. The next item in the scale would incorporate searches incident to arrest. The second measure of proactive policing is the misdemeanor arrest rate per 1,000 residents. In a "zero-tolerance" or "order maintenance" approach to policing, misdemeanor arrests are increased to create deterrence in the targeted area. All misdemeanor arrests in the patrol zone in the year prior to the survey date are used to calculate the misdemeanor arrest rate. The third indicator of proactive policing is the self-initiated incident rate per 1,000 residents.

Incident reports are either dispatched in response to a call for service or self-initiated by an officer. All incident reports that were self-initiated by a police officer are included in this measure. The three indicators of proactive policing—discretionary search rate, misdemeanor arrest rate, and self-initiated incident rate—were logged as shown in equation 2, standardized, then averaged to create the proactive policing scale (α=.96). Figure 12 shows a map of patrol zones in Nashville. The map is shaded by the proactive policing index described above.

Figure 12: Proactive Policing Index in MNPD Patrol Zones
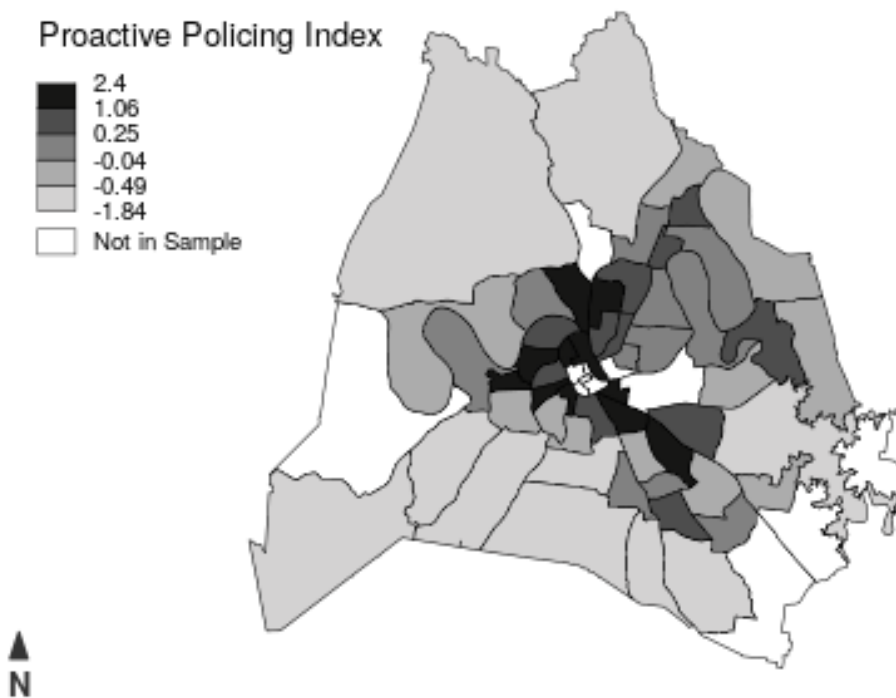
Crime rate is an index of five crime types; burglary, auto theft, aggravated assault, robbery, and homicide. Incidents per 1,000 residents are computed for each of the five crime categories as shown in equation 1. To create the crime index, the five crime types are logged as shown in equation 2, standardized, then averaged (α=.81). The crime index and proactive

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policing index are highly correlated ($r=.86$). Table 9 shows patrol zone level variables that

comprise the proactive policing and crime indices prior to transformation as shown in equation 1.

Proactive policing and crime variables are rates per 1,000 residents in the patrol zone.

Sociodemographic and control variables.

Sociodemographic variables were included due to their relationship with UTBP, proactive

policing, depressive symptoms, or anxiety symptoms. *Race* is measured as a binary variable that

compares black to white respondents. *Age* is measured in years and ranges from 22 to 69. *Gender*

Table 9: Descriptive Statistics for Patrol-Zone Level Variable Comprising Proactive Policing and Crime Indices

Statistic	N	Mean	SD	Min	25th Pctl	Median	75th Pctl	Max
Total Residential Population	54	9,753.1	5,122.8	1,211	6,055.2	9,002.5	12,866.8	23,997
Proactive Policing (per 1,000)								
Misdemeanor Arrests	54	149.9	159.2	12.5	50.7	93.2	199.3	730.4
Self-Initiated Incidents	54	28.2	29.1	2.0	9.4	16.8	38.4	137.7
Discretionary Searches	54	45.1	51.4	3.1	15.2	24.5	56.3	232.5
Crime (per 1,000)								
Homicide	54	0.1	0.2	0.0	0.0	0.1	0.1	0.8
Robbery	54	1.0	1.0	0.04	0.4	0.8	1.3	4.6
Aggravated Assault	54	5.7	4.6	0.3	3.1	4.1	7.8	22.6
Burglary	54	2.1	1.2	0.3	1.4	1.9	2.8	6.6
Vehicle Theft	54	0.2	0.2	0.0	0.1	0.1	0.3	0.9

Note: SD=Standard Deviation, Pctl=Percentile

distinguishes between women and men (reference). *Years of education* is the number of years of

schooling that the respondent has completed. *Employment* variables are a set of binary indicators

measuring full time employment (reference), part time employment, retired, unemployed, or

other employment. *Household income* is measured using a scale from zero to 15. Zero indicates

no income and each one unit interval represents a $5,000 increase up the fifth response range, an

income of $20,000-$24,999. Each subsequent interval represents a $10,000 increase in

household income, for instance interval six ranges from $25,000 to $34,999. Category 15 includes households earning $135,000 per year and above. *Marital status* compares married respondents (reference) to those who are separated or divorced, never married, and widowed. Parental status measures respondents with children in the home (reference) compared to those with children not living at home and those without children.

Three other control variables were included to adjust for potentially confounding factors for UTBP, proactive policing, or crime. Since the UTBP measure was drawn from a larger measure of discriminatory treatment, the other six, non-police, items are included to adjust for other forms of discrimination that may also impact mental health. The other items include being unfairly denied a promotion, not being hired for unfair reasons, being discouraged from completing education, being discouraged from pursuing a job or career, denial of housing by a landlord, and if neighbors have made their life difficult for unfair reasons. If the participant responded "yes," they were asked if the event happened to themselves, spouse, child, other relative, or close friend. Two counts were created, *non-police unfair treatment toward self* and *non-police vicarious unfair treatment*. These two measures of non-police unfair treatment are correlated with UTBP (personal UTBP and personal non-police unfair treatment, r=.28; vicarious UTBP and vicarious non-police unfair treatment, r=.26). Finally, *fear of crime* was included to adjust for the possibility that perceptions of victimization could affect how police are viewed in the neighborhood. Fear of crime is a 10-item scale asking respondents how afraid they are of potential victimization. Items include, "having someone break into your house and take your personal belongings while you are away," "being sexually assaulted or raped," "having something taken from you by force (robbed)," "being the victim of a carjacking," and "being

harassed by gang members." All items are measured on a four-point scale from "not at all afraid" to "very afraid." The 10 questions are averaged to produce the final measure (α=.94).

Analysis Plan

I conduct the analysis for this paper in several steps. First, means and proportions were calculated by race of the respondent. T-tests and chi-square tests were used to test for differences by race for all individual-level variables. Second, a multinomial logistic regression is estimated predicting unfair treatment by police using the *nnet* package in R (Venables and Ripley 2002). The first model includes only limited demographics, proactive policing, and crime variables; the second model adds all study variables; the third model includes an interaction term of proactive policing with race. Next, ordinary least squares regression models predicting depressive symptoms and anxiety symptoms are estimated for black and white respondents separately by sequentially adding blocks of independent variables to the model. The final model pools black and white respondents and includes a control for race. Robust standard errors clustered by patrol zone are calculated using the *sandwich* package in R (Zeileis 2004). The high correlation between proactive policing and crime makes multicollinearity a concern. The variance inflation factor (VIF) for the full regression models predicting depressive symptoms and anxiety symptoms are 4.0 for proactive policing and 4.1 for crime. While there is not a strict cut off for unacceptable VIFs, a VIF greater than 10 often indicates serious multicollinearity that will impact the estimates (O'brien 2007). The observed VIFs, however, do indicate that the variables are likely sensitive to one another's effect. However, not including both variables likely means that the included variable is a proxy for the other. For instance, if crime is excluded, proactive policing would be a measure of both policing and the underlying crime in the zone. Therefore,

both variables are included in the models. Additionally, due to the fact that multiple respondents lived in the same patrol zone, alternate model specifications were tested. An F-test comparing a model with patrol zone fixed effects to OLS was not significant indicating that fixed effects were not necessary. An empty random intercept model had an intra-class correlation coefficient of .03 indicating that the patrol-zone level errors are not correlated enough to require a multilevel model. Finally, two-way and three-way interaction effects are estimated among race, UTBP, and proactive policing. Significant results are plotted at two standard deviations from the mean of continuous variables using the *plot_model()* function from the *sjPlot* package in R (Lüdecke 2018).

RESULTS

Table 10 shows means, proportions, standard deviations, minimums, and maximums for all study variables. Black respondents are more likely to report personally experiencing UTBP than whites (24.8% vs. 10.6%) and vicariously UTBP (21.5% vs. 7.6%). There were no racial differences in either depressive symptoms or anxiety symptoms. Black residents of Nashville are more likely than whites to live in neighborhoods with more aggressive policing and with higher crime. Correspondingly, black residents also have a higher fear of crime victimization than whites. Whites reported more years of education on average than blacks, 15 years compared to 13 years, respectively. Whites also had a higher household income than blacks. On the household income scale, whites averaged 9.6 while blacks averaged 6.3. Blacks also report more personal experiences of unfair treatment than whites against themselves (mean=.94 vs .67) and vicarious experiences against important others (mean=.52 vs. .39). There were several differences on marital status with whites being more likely to be married and less likely to never have married,

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be separated or divorced, or be widowed than blacks. There is no significant difference in full time employment rate but whites are more likely than blacks to work part time while blacks are more likely to report being unemployed than whites. Finally, whites and blacks did not differ on the proportion of respondents with children at home but black participants were more likely than whites to have children that did not live with them and whites were more likely than blacks to never have had children.

Table 10: Means, Proportions, Standard Deviations, Minimums, And Maximums for All Study Variables Stratified by Race (N=1,808)

Statistic	Black (N=604)				White (N=604)				Sig. Diff.
	Mean/ Prop	SD	Min	Max	Mean/ Prop	St. Dev.	Min	Max	
No UTBP	.536	-	0	1	.818	-	0	1	***
UTBP-Self	.248	-	0	1	.106	-	0	1	***
UTBP-Vicarious	.215	-	0	1	.076	-	0	1	***
Depressive Symptoms	1.686	.478	1	3.350	1.663	.521	1	3.7	
Anxiety Symptoms	1.797	.699	1	4	1.912	.696	1	4	
Proactive Policing Scale	.460	.880	-3.663	2.525	-1.410	2.382	-10.989	6.278	***
Crime Rate Scale	.362	.729	-1.590	2.621	-1.873	2.816	-7.952	12.581	***
Fear of Crime	1.828	.849	1	4	1.614	.580	1	3.900	***
Female	.517	-	0	1	.520	-	0	1	
Age	46.295	11.127	22	68	45.697	11.772	24	68	
Years of Education	13.015	3.097	0	25	15.002	2.824	3	28	***
Household Income	6.328	3.775	0	15	9.642	3.758	0	15	***
Unfair Treatment-Self (count)	.940	1.235	0	6	.699	.990	0	5	***
Unfair Treatment-Vicarious (count)	.515	.767	0	4	.387	.725	0	4	*
Married	.301	-	0	1	.598	-	0	1	***
Never Married	.389	-	0	1	.189	-	0	1	***
Separated or Divorced	.268	-	0	1	.190	-	0	1	**
Widowed	.041	-	0	1	.023	-	0	1	*
Full-Time Employment	.565	-	0	1	.646	-	0	1	
Part-Time Employment	.094	-	0	1	.137	-	0	1	*
Retired	.078	-	0	1	.060	-	0	1	
Unemployed	.197	-	0	1	.118	-	0	1	*
Other Employment	.066	-	0	1	.040	-	0	1	
Children at Home	.457	-	0	1	.407	-	0	1	
Children Out of House	.349	-	0	1	.240	-	0	1	*
No Children	.194	-	0	1	.353	-	0	1	**

Note: *p<.05, **p<.01, ***p<0.001

To better understand the social conditions associated with unfair treatment from police in Nashville, Table 11 reports results of a multinomial logistic regression predicting UTBP. Model 1 includes race, gender, age, proactive policing, and crime. Consistent with Hypothesis 1, black respondents are more likely to experience UTBP personally and vicariously compared to whites. Women are less likely to report personal UTBP but more likely to report vicarious experiences of UTBP than men. Increasing age is associated with lower reports of UTBP personally but it is not associated with vicarious UTBP. Proactive policing is associated with a higher probability of reporting personal experiences of UTBP. Crime rate in the respondent's patrol zone is not associated with UTBP. Model 2 adds all other study variables. Race continues to be a strong predictor of unfair treatment. Proactive policing, however, has a diminished effect when controlling for other variables and is no longer significant. This provides partial support for Hypothesis 2 but the association is diminished when adjusting for covariates. Other forms of discrimination also predict UTBP. The count of personally experienced non-police unfair treatment is associated with a greater probability of reporting either personal or vicarious UTBP. Vicariously experienced non-police unfair treatment is associated with vicarious UTBP. Respondents who are never married or previously married report higher rates of personal UTBP relative to married individuals. More years of education is correlated with a lower likelihood of personal UTBP. Model 3 of Table 11 shows the interaction of race with proactive policing predicting personally experienced UTBP. The interaction term is not significant showing that proactive policing does not independently predict personal UTBP for either blacks or whites in this sample (b=-.418, se=.231, p=.070). Hypothesis 2a is not supported.

Table 11: Multinomial Logistic Regression Predicting Unfair Treatment by Police in Nashville, TN

	Model 1				Model 2				Model 3			
	Self		Vicarious		Self		Vicarious		Self		Vicarious	
Black	1.212***	(.194)	1.621***	(.211)	.782***	(.220)	1.587***	(.232)	.746***	(.216)	1.636***	(.248)
Woman	-1.154***	(.172)	.347	(.178)	-1.386***	(.202)	.307	(.202)	-1.394***	(.202)	.308	(.203)
Age	-.023**	(.007)	-.015	(.008)	-.032**	(.010)	-.011	(.010)	-.032**	(.010)	-.011	(.010)
Proactive Policing Scale	.407*	(.172)	-.043	(.178)	.314	(.186)	.017	(.189)	.575*	(.235)	-.075	(.249)
Crime Scale	-.332	(.214)	-.156	(.226)	-.385	(.234)	-.163	(.238)	-.342	(.235)	-.171	(.239)
Fear of Crime					-.066	(.123)	.031	(.121)	-.070	(.123)	.029	(.121)
Non-Police Unfair Treatment-Self (count)					.662***	(.074)	.269**	(.084)	.657***	(.074)	.269**	(.084)
Non-Police Unfair Treatment-Vicarious (count)					.009	(.138)	.725***	(.103)	-.004	(.138)	.729***	(.103)
Never Married (Ref=Married)					.503	(.258)	-.142	(.269)	.512*	(.258)	-.140	(.270)
Separated or Divorced					.555*	(.246)	-.030	(.262)	.536*	(.246)	-.030	(.262)
Widowed					-.076	(.617)	.070	(.525)	-.095	(.614)	.069	(.526)
Years of Education					-.089**	(.031)	-.008	(.032)	-.086**	(.031)	-.009	(.032)
Part time employment (Ref=Full time)					-.016	(.296)	.211	(.300)	.024	(.296)	.198	(.301)
Retired					.358	(.410)	-.562	(.470)	.408	(.411)	-.561	(.470)
Unemployed					-.133	(.270)	.058	(.281)	-.083	(.270)	.055	(.281)
Other employment					.342	(.398)	-.007	(.409)	.376	(.399)	-.013	(.410)
Household income					-.062*	(.032)	.022	(.031)	-.063*	(.032)	.022	(.031)
Kids out of house (Ref= kids at home)					.215	(.228)	.153	(.244)	.195	(.228)	.154	(.244)
No kids					-.223	(.240)	.103	(.243)	-.264	(.241)	.109	(.244)
Black X Proactive Policing									-.418	(.231)	.111	(.252)
Constant	-1.560***	(.152)	-2.672***	(.199)	-.443	(.573)	-3.426***	(.610)	-.351	(.574)	-3.477***	(.619)
Akaike Inf. Crit.	1,882.042				1,754.295				1,759.227			
McFadden's Pseudo R^2	.097				.186				.185			

Note: *p<.05, **p<.01, ***p<0.001

Depressive Symptoms

Tables 12 and 13 report ordinary least squares regression results with robust standard errors for black and white respondents, respectively. Models 1-4 of Table 12 show that having experienced UTBP personally is associated with depressive symptoms in all models for black participants. Vicariously experienced UTBP is not a significant predictor of depressive symptomatology. Proactive policing is a significant predictor of depressive symptoms for black respondents in Models 2 and 3 of Table 12 but once controlling for socioeconomic status (Model 4) the coefficient becomes non-significant. For whites, shown in Table 13, having experienced UTBP personally predicts depressive symptoms only in Models 1 and 2. Once fear of crime and other forms of unfair treatment are added to the model, personal UTBP is no longer an independent predictor of psychological distress. In supplemental analyses (not shown), the reduction of personal UTBP to non-significance is driven by other non-police forms of unfair treatment rather than fear of crime. Proactive policing does not predict depressive symptoms for whites. The pooled model—Table 16, Model 1—combines blacks and whites while controlling for race. When adjusting for other factors, blacks have fewer depressive symptomatology than whites. In the pooled model, UTBP against the respondent is associated with depressive symptoms which supports Hypothesis 3. Proactive policing does not reach statistical significance in the pooled model (b=-.043, se=.024, p=.073) which does not support Hypothesis 4. Vicarious UTBP is non-significant in all models showing that personal experiences of UTBP are more salient in shaping psychological distress than experiences of close others.

Table 12: Multivariate Regression Results of Depressive Symptoms on Unfair Treatment from Police, Proactive Policing, and Covariates for Black NSAHS Respondents with Robust Standard Errors

	Black Respondents							
	(1)		(2)		(3)		(4)	
	b	(se)	b	(se)	b	(se)	b	(se)
UTBP self	.176***	(.050)	.173***	(.049)	.142**	(.049)	.101*	(.046)
UTBP Vicarious	.005	(.045)	.017	(.044)	-.005	(.044)	.004	(.042)
Woman	.202***	(.039)	.196***	(.039)	.120**	(.038)	.091*	(.038)
Age	-.005***	(.002)	-.006***	(.002)	-.004**	(.002)	-.006***	(.002)
Proactive Policing Scale			.087*	(.035)	.089**	(.033)	.058	(.032)
Crime Scale			-.006	(.043)	-.023	(.040)	-.050	(.039)
Fear of Crime					.163***	(.023)	.146***	(.023)
Non-Police Unfair Treatment-Self (count)					.045**	(.015)	.053***	(.015)
Non-Police Unfair Treatment-Vicarious (count)					.025	(.024)	.036	(.022)
Never Married (Ref=Married)							.006	(.044)
Separated or Divorced							.006	(.046)
Widowed							.143	(.092)
Years of Education							-.005	(.006)
Part time employment (Ref=Full time)							.045	(.064)
Retired							-.053	(.064)
Unemployed							.109	(.057)
Other employment							.269**	(.083)
Household income							-.021***	(.006)
Kids out of house (Ref= kids at home)							.078	(.040)
No kids							.077	(.049)
Constant	1.539***	(.030)	1.502***	(.032)	1.207***	(.045)	1.378***	(.107)
Observations	604		604		604		604	
R^2	.075		.099		.193		.272	
Adjusted R^2	.069		.090		.181		.247	

Note: *p<.05, **p<.01, ***p<0.001

Table 13: Multivariate Regression Results of Depressive Symptoms on Unfair Treatment from Police, Proactive Policing, and Covariates for White NSAHS Respondents with Robust Standard Errors

	White Respondents							
	(1)		(2)		(3)		(4)	
	b	(*se*)	*b*	(*se*)	*b*	(*se*)	*b*	(*se*)
UTBP self	.287***	(.085)	.260**	(.083)	.108	(.070)	.052	(.065)
UTBP Vicarious	.143	(.079)	.154	(.079)	.041	(.068)	.044	(.065)
Woman	.137**	(.042)	.131**	(.042)	.049	(.037)	-.002	(.037)
Age	-.001	(.002)	-.001	(.002)	-.001	(.002)	-.00003	(.002)
Proactive Policing Scale			.027	(.040)	.043	(.036)	.040	(.035)
Crime Scale			.100	(.056)	.019	(.050)	-.020	(.047)
Fear of Crime					.313***	(.037)	.297***	(.035)
Non-Police Unfair Treatment-Self (count)					.125***	(.021)	.091***	(.019)
Non-Police Unfair Treatment-Vicarious (count)					.039	(.028)	.034	(.027)
Never Married (Ref=Married)							.026	(.057)
Separated or Divorced							.052	(.053)
Widowed							-.032	(.091)
Years of Education							-.013	(.007)
Part time employment (Ref=Full time)							.122*	(.059)
Retired							-.082	(.072)
Unemployed							.251***	(.069)
Other employment							.208*	(.099)
Household income							-.021**	(.007)
Kids out of house (Ref= kids at home)							-.006	(.055)
No kids							.001	(.045)
Constant	1.550***	(.029)	1.605***	(.034)	1.042***	(.061)	1.448***	(.135)
Observations	604		604		604		604	
R^2	.043		.063		.248		.330	
Adjusted R^2	.037		.054		.237		.307	

Note: *p<.05, **p<.01, ***p<0.001

Table 14: Multivariate Regression Results of Anxiety Symptoms on Unfair Treatment from Police, Proactive Policing, and Covariates for Black NSAHS Respondents with Robust Standard Errors

	Black Respondents							
	(1)		(2)		(3)		(4)	
	b	(*se*)	*b*	(*se*)	*b*	(*se*)	*b*	(*se*)
UTBP self	.148*	(.068)	.148*	(.068)	.119	(.068)	.086	(.068)
UTBP Vicarious	.137	(.071)	.140	(.071)	.096	(.070)	.097	(.071)
Woman	.221***	(.056)	.221***	(.056)	.115*	(.055)	.081	(.058)
Age	-.010***	(.002)	-.010***	(.002)	-.008***	(.002)	-.008*	(.003)
Proactive Policing Scale			.012	(.055)	.015	(.051)	-.012	(.051)
Crime Scale			.003	(.063)	-.022	(.060)	-.040	(.062)
Fear of Crime					.230***	(.035)	.217***	(.035)
Non-Police Unfair Treatment-Self (count)					.050*	(.022)	.048*	(.022)
Non-Police Unfair Treatment-Vicarious (count)					.065	(.037)	.068	(.037)
Never Married (Ref=Married)							.066	(.074)
Separated or Divorced							.066	(.074)
Widowed							.009	(.138)
Years of Education							.005	(.009)
Part time employment (Ref=Full time)							.057	(.083)
Retired							-.077	(.110)
Unemployed							.179*	(.087)
Other employment							.303*	(.127)
Household income							-.011	(.009)
Kids out of house (Ref= kids at home)							.043	(.065)
No kids							.073	(.076)
Constant	1.620***	(.044)	1.613***	(.047)	1.189***	(.070)	1.130***	(.167)
Observations	604		604		604		604	
R^2	.064		.064		.153		.186	
Adjusted R^2	.058		.055		.140		.158	

Note: *p<.05, **p<.01, ***p<0.001

Table 15: Multivariate Regression Results of Anxiety Symptoms on Unfair Treatment from Police, Proactive Policing, and Covariates for White NSAHS Respondents with Robust Standard Errors

	White Respondents							
	(1)		(2)		(3)		(4)	
	b	(se)	b	(se)	b	(se)	b	(se)
UTBP self	.330**	(.107)	.306**	(.107)	.138	(.096)	.127	(.097)
UTBP Vicarious	.162	(.100)	.174	(.099)	.023	(.087)	.023	(.088)
Woman	.210***	(.056)	.205***	(.056)	.092	(.053)	.054	(.054)
Age	-.010***	(.002)	-.010***	(.002)	-.010***	(.002)	-.007*	(.003)
Proactive Policing Scale			.012	(.057)	.033	(.052)	.021	(.052)
Crime Scale			.109	(.078)	.005	(.073)	.007	(.073)
Fear of Crime					.397***	(.048)	.396***	(.048)
Non-Police Unfair Treatment-Self (count)					.128***	(.028)	.098***	(.027)
Non-Police Unfair Treatment-Vicarious (count)					.083*	(.034)	.082*	(.033)
Never Married (Ref=Married)							.049	(.083)
Separated or Divorced							.064	(.070)
Widowed							-.201	(.115)
Years of Education							.013	(.010)
Part time employment (Ref=Full time)							.044	(.076)
Retired							-.215*	(.108)
Unemployed							.217*	(.088)
Other employment							.113	(.123)
Household income							-.021*	(.009)
Kids out of house (Ref= kids at home)							-.080	(.072)
No kids							-.103	(.067)
Constant	1.753***	(.042)	1.803***	(.048)	1.100***	(.080)	1.158***	(.190)
Observations	604		604		604		604	
R^2	.064		.064		.153		.186	
Adjusted R^2	.058		.055		.140		.158	

Note: *p<.05, **p<.01, ***p<0.001

Table 16: Multivariate Regression Results of Anxiety Symptoms on Unfair Treatment from Police, Proactive Policing, and Covariates for All NSAHS Respondents with Robust Standard Errors

	All Respondents			
	(1)		(2)	
	Depressive Symptoms		Anxiety Symptoms	
	b	(se)	b	(se)
UTBP self	.086*	(.038)	.104	(.056)
UTBP Vicarious	.022	(.036)	.085	(.055)
Black	-.180***	(.031)	-.276***	(.046)
Woman	.045	(.027)	.065	(.039)
Age	-.003*	(.001)	-.007***	(.002)
Proactive Policing Scale	.043	(.024)	.006	(.037)
Crime Scale	-.036	(.030)	-.028	(.047)
Fear of Crime	.195***	(.019)	.274***	(.029)
Non-Police Unfair Treatment-Self (count)	.075***	(.012)	.071***	(.017)
Non-Police Unfair Treatment-Vicarious (count)	.037*	(.017)	.077**	(.024)
Never Married (Ref=Married)	.025	(.036)	.050	(.054)
Separated or Divorced	.020	(.035)	.057	(.050)
Widowed	.082	(.067)	-.051	(.099)
Years of Education	-.010*	(.005)	.006	(.007)
Part time employment (Ref=Full time)	.078	(.044)	.040	(.057)
Retired	-.064	(.048)	-.137	(.076)
Unemployed	.164***	(.044)	.174**	(.062)
Other employment	.248***	(.065)	.229*	(.093)
Household income	-.021***	(.004)	-.016*	(.006)
Kids out of house (Ref= kids at home)	.039	(.033)	-.010	(.048)
No kids	.038	(.032)	-.001	(.049)
Constant	1.542***	(.086)	1.353***	(.129)
Observations	1,208		1,208	
R^2	.281		.213	
Adjusted R^2	.268		.199	

Note: *p<.05, **p<.01, ***p<0.001

Figure 13: Interaction of Unfair Treatment by Police and Proactive Policing in Patrol Zone on Depressive Symptoms
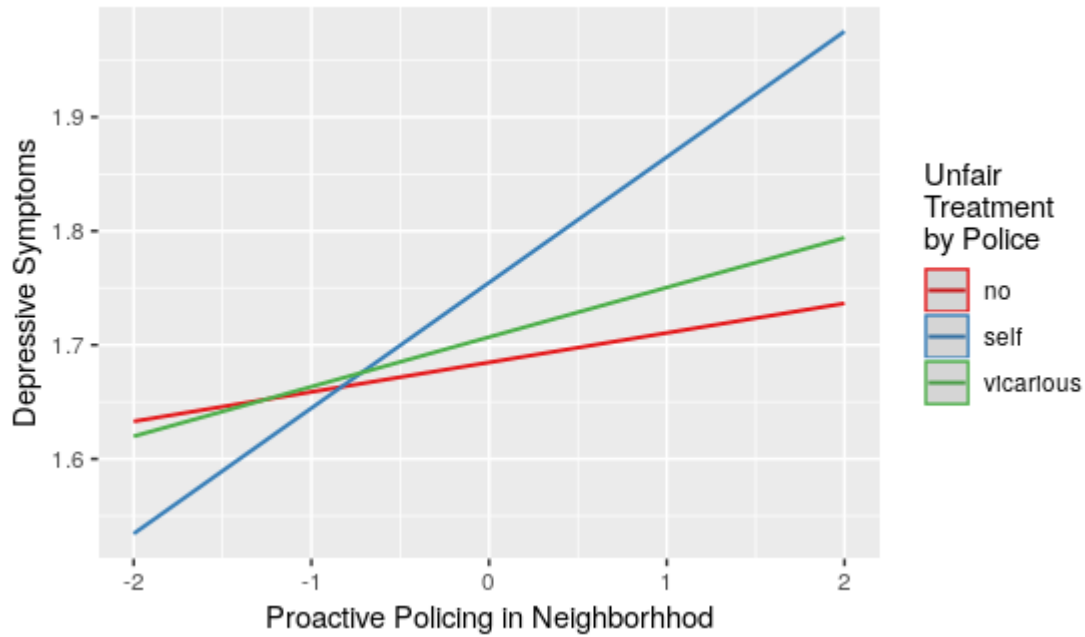

Table 17: Interaction effects of Depressive Symptoms Regressed on Interactions of Unfair Treatment from Police, Proactive Policing, and Race, Robust Standard Errors

	Depressive Symptoms							
	(1)		(2)		(3)		(4)	
	b	(se)	b	(se)	b	(se)	b	(se)
UTBP self	.095	(.059)	.070	(.037)	.085*	(.037)	.134*	(.062)
UTBP Vicarious	.052	(.067)	.022	(.038)	.022	(.038)	.079	(.084)
Black	-.171***	(.037)	-.175***	(.032)	-.182***	(.032)	-.145***	(.039)
Proactive Policing Scale	.043	(.026)	.026	(.027)	.053	(.029)	.034	(.030)
UTBP Self X Black	-.015	(.072)					-.100	(.078)
UTBP Vicarious X Black	-.044	(.080)					-.094	(.097)
UTBP Self X Proactive			.084*	(.036)			.158*	(.073)
UTBP Vicarious X Proactive			.018	(.039)			.048	(.095)
Proactive X Black					-.023	(.031)	-.041	(.037)
UTBP Self X Proactive X Black							-.056	(.087)
UTBP Vicarious X Proactive X Black							.003	(.109)
Constant	1.537***	(.085)	1.538***	(.084)	1.548***	(.085)	1.524***	(.086)
Observations	1,208		1,208		1,208		1,208	
R²	.281		.284		.281		.287	
Adjusted R²	.267		.270		.268		.270	

Note: *p<.05, **p<.01, ***p<0.001

Table 18: Interaction effects of Anxiety Symptoms Regressed on Interactions of Unfair Treatment from Police, Proactive Policing, and Race, Robust Standard Errors

	Anxiety Symptoms							
	(1)		(2)		(3)		(4)	
	b	(se)	b	(se)	b	(se)	b	(se)
UTBP self	.175[*]	(.087)	.097	(.055)	.101	(.054)	.200[*]	(.091)
UTBP Vicarious	.048	(.098)	.082	(.056)	.084	(.056)	.113	(.123)
Black	-.262[***]	(.054)	-.273[***]	(.047)	-.283[***]	(.047)	-.238[***]	(.057)
Proactive Policing Scale	.006	(.038)	-.007	(.040)	.044	(.043)	.022	(.045)
UTBP Self X Black	-.106	(.105)					-.175	(.114)
UTBP Vicarious X Black	.044	(.117)					-.053	(.142)
UTBP Self X Proactive			.046	(.052)			.129	(.106)
UTBP Vicarious X Proactive			.041	(.058)			.110	(.140)
Proactive X Black					-.087	(.045)	-.106	(.055)
UTBP Self X Proactive X Black							-.026	(.127)
UTBP Vicarious X Proactive X Black							-.039	(.159)
Constant	1.341[***]	(.125)	1.349[***]	(.124)	1.374[***]	(.124)	1.340[***]	(.126)
Observations	1,208		1,208		1,208		1,208	
R^2	.214		.214		.216		.219	
Adjusted R^2	.199		.198		.201		.200	

Note: [*]p<.05, [**]p<.01, [***]p<0.001

Anxiety Symptoms

Turning to symptoms of anxiety in Tables 14, 15, and 16, both blacks and whites who personally experienced UTBP report higher anxiety symptoms in the first two models of Tables 14 and 15. When fear of crime and other forms of unfair treatment are added to the model, the coefficient for personal UTBP is reduced to non-significance. Proactive policing and crime rate is not associated with anxiety symptoms in any models. Table 16, Model 2, which pools both black and whites, shows that black participants report fewer anxiety symptoms than whites when controlling for other factors. Hypotheses 3 and 4 are not supported in relation to anxiety symptoms.

Interaction Effects

Two-way and three-way interactions among race, UTBP, and proactive policing are shown in Tables 17 and 18. Table 17 shows interactions when predicting depressive symptoms while Table 18 reports interactions predicting anxiety symptoms. Only one interaction term is significant. Table 17, Model 2 shows the interaction of UTBP with proactive policing and supports Hypothesis 5. The coefficient for personal UTBP interacted with proactive policing is significant. The interaction is plotted in Figure 2. In patrol zones at one standard deviation below the mean level of proactive policing, UTBP has no relation to depressive symptoms. As the amount of proactive policing increases, however, depressive symptoms increase at a significantly higher rate for people who have personally experienced UTBP relative to those who have not experienced UTBP either personally or vicariously. The three-way interaction in Model 4 of Table 17 shows that this finding does not differ by race. No other interaction terms are significant in Tables 17 or 18 which shows that the impact of personally experienced UTBP and proactive policing on mental health is relatively consistent across racial groups. Hypotheses 3a, 4a, and 5a which predicted race differences are not supported.

DISCUSSION

This paper examines the role of unfair treatment by police and neighborhood-level proactive policing on depressive symptoms and anxiety symptoms in a community sample of adults living in Nashville, Tennessee. The stress process model suggests that experiences of trauma—both personally experienced and experienced by significant others—can lead to symptoms of psychological distress (Pearlin 1989; Pearlin et al. 1981). Police may contribute to deleterious

mental health outcomes as an unique form of stress because of the legitimate coercive force they can exercise as an agent of the state (Geller et al. 2017; McFarland, Taylor, McFarland, et al. 2018; Sewell et al. 2016). Experiences of UTBP may be a more salient stressor when living in a neighborhood where contact with police is likely and where police use more aggressive tactics to combat crime. Police often focus proactive policing in areas where crime is high so this analysis also controls for neighborhood crime rates. Finally, this paper examines racial differences in how UTBP and proactive policing may impact mental health.

The findings show that UTBP is common, especially for black residents of Nashville. Blacks were more likely than whites to report UTBP both personally and vicariously through significant others. This result fits into the pattern of extreme racial disparities in policing, courts, and incarceration (Alexander 2012; Bobo and Thompson 2006; Patterson and Wildeman 2015; Tonry 2011). Both education and household income are associated with personal UTBP showing that those with higher socioeconomic status are less likely to report being unfairly treated by police. Higher neighborhood levels of proactive policing—defined as the discretionary search rate, misdemeanor arrest rate, and rate of police-initiated incident reports—were associated with a higher probability of reporting personally experienced UTBP when controls were not included in the model. However, after controlling for other forms of discrimination and socioeconomic status, proactive policing no longer predicts UTBP. A positive regression coefficient on a neighborhood measure of per-capita proactive policing suggests that unfair treatment happens close to home and is most likely in highly policed areas. However, previous research also suggests that unfair treatment is likely to happen when a person of color is deemed to be 'out of place' (Carroll and Gonzalez 2014). Areas that have low per-capita policing may also racially profile people of color in the neighborhood whether or not they live there. Take, for instance,

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high income, predominantly white suburbs. Overall, the measure of proactive policing in this paper would likely indicate low proactive enforcement but police may see young black men in the neighborhood as suspicious possibly leading to a discriminatory police encounter. More research is needed to understand the spatial aspects of unfair treatment and police activity.

Black respondents who personally experienced UTBP are more likely to report depressive symptoms than those who report no UTBP. For whites, personal UTBP is associated with depressive symptoms in initial models but once additional controls are added it is no longer an independent predictor of psychological distress. The results show that both whites and blacks are affected by fear of crime and non-police unfair treatment but for whites these factors outweigh the experience of UTBP. Being unfairly stopped, searched, questioned, physically threatened, or abused by police officers is a racialized stressor that undermines the psychological wellbeing of black residents of Nashville. This result adds to a growing body of research showing that the actions of police have consequences for the psychological and physical wellbeing of communities of color (DeVylder et al. 2017, 2018; Geller et al. 2014, 2017; McFarland, Taylor, McFarland, et al. 2018; McFarland, Taylor, and McFarland 2018; Oh et al. 2017; Sewell 2017; Sewell and Jefferson 2016; Sewell et al. 2016). Interaction regressors of race with UTBP did not show a significant difference between blacks and whites in how personal UTBP affects depressive symptoms. While split models (Tables 12 and 13) show that UTBP is not a significant predictor of depressive symptoms for whites, the pooled model (Table 16, Model 1) shows personally experiencing police mistreatment similarly affects whites and blacks. The fact that UTBP is less common for whites may contribute to the differences between split and pooled models.

Vicarious UTBP is not associated with depressive symptoms. Vicarious UTBP was found

to be associated with telomere length and waist circumference in other studies (See: McFarland,

Taylor, McFarland, et al. 2018; McFarland, Taylor, and McFarland 2018) but this analysis found

no relationship to the two measures of mental health. This finding is interesting given that this

study uses the same dataset where vicarious UTBP was found to contribute to physiological

health measures. Perhaps, vicarious experiences are most likely for people with many close

social ties. Those ties may also be protective for psychological health while physical health could

be impacted through alternative mechanisms.

Similar to personal UTBP, proactive policing is associated with depressive symptoms for

blacks but not whites. In the final model for black respondents controlling for socioeconomic

status, proactive policing tipped to non-significance using a p<.05 cutoff. Proactive policing was

measured as a composite of three population adjusted rates measured at the patrol zone level:

discretionary search rate, misdemeanor arrest rate, and rate of police-initiated incident reports.

Black residents living in areas with higher proactive police activity are more likely to report

depressive symptoms than those living in low-policing areas. Several other studies have found

similar results. Sewell et al. (2016) examined the effect of Stop, Question, and Frisk on mental

health in New York City by assessing the proportion of stops in a neighborhood where frisks and

use of force occurred. The findings similarly show that policing practices can affect

psychological distress of people living in the community. Additional research is needed in other

cities to examine how specific police policies and procedures affect community wellbeing.

Neither personal nor vicarious UTBP are associated with anxiety symptoms when

including controls. This result for anxiety symptoms diverges from Geller et al. (2014) who

found that aggressive police intrusion in New York City had an association, albeit weak, with

anxiety symptoms. An important difference between these studies is the measure of unfair treatment. This paper uses a general measure that does not take severity or intrusiveness into account while Geller et al. (2014) measured the specific actions of the police to assess the intrusiveness of stops. The general nature of the UTBP measure is a limitation of this study.

Finally, drawing on the stress process framework, this study tested whether UTBP and proactive policing created meaningful contexts for one another by including interaction terms in the model. Having experienced UTBP and living in high proactive policing areas is associated with higher depressive symptoms than for those who have not experienced UTBP living in similar areas. For those living in low-proactive policing areas, having experienced UTBP is associated with similar levels of psychological distress to those without UTBP. These two factors—unfair police treatment and high concentration of policing—create meaning for one another. Having had police mistreat you in the past is likely to make high police presence feel like a risk rather than protective. In highly policed areas, knowing that walking out of your home exposes you to police scrutiny may be a chronic strain if you have been mistreated by police in the past. This study shows that the mutual nature of both neighborhood police practices and police mistreatment should be studied further. Most research examines these factors in isolation due to data limitations. Police data is often challenging to obtain and survey data may not match to locations specific enough for neighborhood analysis.

There are several limitations to this study. The data are cross sectional and therefore temporal ordering of events cannot be established. Reverse causality may be occurring in at least two ways. There may be cases in which people exhibiting depressive symptoms are more likely to have contact with police. If a person is experiencing suicidal ideation, police may be called to intervene. People with depressive symptoms may cope by using drugs or alcohol which could

increase their chances of police contact. Those with mental health problems may also be more likely to understand their interactions with police as unfair than those who are not experiencing psychological distress. Social selection processes cannot be ruled out; however, research on causal direction between depressive symptoms and discrimination shows that poor mental health does not predict later perceptions of discrimination (Brown et al. 2000).

There are also limitations with the measure of unfair treatment. In order to preserve cases, the variable includes all individuals who have experienced unfair treatment in their lifetime. For blacks in particular, context may have changed significantly during a respondent's life—for example, a 50-year old respondent in 2014 would have been born the year the civil rights act was signed into law—and reports of UTBP may not reflect present circumstances. However, recalling long past UTBP may mean that the event made a lasting impression which could translate to additional stress. The measure of UTBP also does not include what type of exposure the respondent experienced. Feeling as though a traffic ticket for not coming to a complete stop at a stop sign was unfair is probably not an equivalent stressor to having been physically assaulted by an officer. This study is not able to delineate these instances and relies solely on the respondent's perception of unfairness. The perception of unfairness also does not mean that the officer violated policy or treated the individual in a way differently than any other person. The respondent experiencing the event as unfair, however, is a better indicator for how they will be impacted by the event rather than whether it violated departmental policy. Finally, since one aim of this study was to link neighborhood-level predictors to individual outcomes, the use of ordinary least squares regression is not ideal. OLS is used because the sample size within neighborhoods was low and an empty model showed there was not enough level-2 variance to conduct multilevel modeling. Similarly, a model comparison between OLS and a fixed effects

model shows that fixed effects do not significantly improve the model fit. Robust standard errors are used to more conservatively estimate significance levels.

CONCLUSION

Racial discrimination is a common experience for people of color in the United States and the criminal justice system is one source of unequal treatment. Racial inequities in criminal justice involvement and incarceration are now primary drivers of racial stratification (National Research Council 2014; Western 2006). A growing body of research shows that contact with the criminal justice system—from police to incarceration—is associated with deleterious health outcomes (Sugie and Turney 2017; Wildeman and Wang 2017). Even without arrest or incarceration, the way that police treat community members and the policing practices policy makers decide to use can undermine physical and psychological wellbeing (DeVylder et al. 2017, 2018; Geller et al. 2014, 2017; McFarland, Taylor, McFarland, et al. 2018; McFarland, Taylor, and McFarland 2018; Oh et al. 2017, 2017; Sewell 2017; Sewell and Jefferson 2016). Policymakers, police administrators, and police officers must take these findings into account when deciding how to interact with the community. Policing strategies and training should attempt to minimize community perceptions of unfair treatment. When community members feel mistreated, they should have recourse that will help them resolve concurs so that a stressful experience does not become chronic stress. Race must also be a part of any discussion on policing. Given the history and current racial disparities in police mistreatment, police must grapple with the fact that their actions disproportionately fall on groups that are fighting for inclusion and equality. Many neighborhoods are high on police but low on justice. Community-based strategies to transform

the role of police in society are needed to fight the roots of inequality, not only its

manifestations.

CHAPTER 5

CONCLUSION

This dissertation focuses on racial disparities and racial bias in discretionary vehicle searches by police and how proactive police practices affect the mental health of black community members. The first chapter argues that racial disparities in discretionary search decisions are evident throughout the first three years of officers' careers. The data indicate that increased suspicion due to statistical discrimination is applied to black drivers. Additionally, officers conduct more searches, especially on black drivers, in the year prior to being eligible for a promotion which shows that the organizational structure of the police force provides an incentive for conducting searches. The second paper tests whether decisions to conduct discretionary searches and probable cause searches are influenced by racial or ethnic bias for patrol officers in their first three years on the force. I estimate a longitudinal hit rate test and a threshold test to determine whether searches are being conducted on black and Hispanic drivers with lower standards of evidence than for whites. The results indicate that discretionary searches and probable cause searches are applied in discriminatory ways. Probable cause searches have the greatest disparity even though the probable cause standard is a legal requirement that should be applied fairly. Finally, the third paper shifts to the potential impact of police strategy and experiences with police on mental health. I find that living in highly policed neighborhoods and having experienced unfair treatment from police (UTBP) is associated with an increased risk of depressive symptoms. The results have implications both for scholarship on race and policing as well as for policy makers and police organizations.

IMPLICATIONS FOR SCHOLARS AND RESEARCH

One innovation of the first two papers is the treatment of racial disparities as career trajectories. Previous research tends to focus on specific years of police data and treat them as cross sectional. Taking a longitudinal perspective can help show how policing develops and changes over time. The longitudinal focus reveals how organizational norms can affect officers at different stages of their careers. Future research should continue examining career trajectories of police officers and how they affect racial disparities. In particular, research should focus on how racial disparities can be reduced. It is unclear from the existing literature whether implicit bias training, procedural justice training, community oversight interventions, internal affairs sanctions, and other interventions aimed to reduce bias from police have sustained effects on actual policing outcomes. Career stage and level of experience may alter the effect of interventions. Officers with more experience may be less open to changing practices than newer officers. Alternately, more experienced officers could have a better understanding of racial bias and embrace new practices.

Geographic location is important for understanding racial disparities in policing but focusing on officers as the unit of analysis is another important avenue to pursue. Geography is important since agencies prioritize patrol practices based on location; however, practices of individual officers deserve more attention from researchers. As I show in the second chapter, focusing on individual officers presents an organizational setting where racial bias is the norm. Through an officer-level analysis, the "bad apples" narrative can be tested and countered. There is mounting evidence that individual officers do not account for the large racial disparities

evident throughout policing; rather, racial disparities are systemic and part of routine organizational practices (Bains 2018; Baumgartner, Epp, et al. 2018).

In many cases, identifying officers is not possible due to data limitations. For instance, Tillyer and Engel (2013) analyze data that include officer demographics but the unique officer identifier was removed "per the contractual arrangement with the agency to maintain officers' confidentiality" (380). Researchers should push governmental bureaucracies to be transparent. Confidentiality can be maintained in ways that do not sacrifice our ability to conduct rigorous research. Unique officer identifiers should be requested in all police records. When possible, administrative records should be accessed through public records requests rather than contractual agreements so that data sharing is not restricted. Administrative records are usually public and we should encourage police organizations to use open data repositories like the Police Data Initiative through the National Police Foundation.

Determining the appropriate unit of analysis is also an important methodological question. Simoiu et al. (2017) apply the threshold test to statewide traffic stop data from North Carolina and test whether the 100 police departments making the most traffic stops show racial bias in search decisions. Subsequent applications of the threshold test similarly apply the test to counties where state highway patrol officers made stops (Pierson, Simoiu, et al. 2017; Pierson, Corbett-Davies, et al. 2017) and departments in North Carolina (Baumgartner, Christiani, et al. 2018). Simoiu et al. (2017) acknowledge that heterogeneity within jurisdictions may by a useful unit of analysis since policing in urban areas is hyper-localized. I am not aware of any research that applies the threshold test to geographic areas smaller than counties or jurisdiction. The officer-level application of the threshold test in the second paper is novel and shows that the test can be applied successfully to test for bias in officer decisions. Future research should examine

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the impact of level of aggregation on the performance of the threshold test and how estimations of bias differ.

Finally, the third paper of this dissertation adds to a growing body of research showing that aggressive police tactics and experiences of police discrimination affect mental and physical health, especially for blacks in the United States. In this dissertation, I combine a subjective measure of UTBP with a measure of neighborhood-level proactive policing. Those who have experienced UTBP have more depressive symptoms when living in highly policed areas than those who have had unfair police encounters but live in low-policing neighborhoods. Future research should measure subjective experiences of police discrimination more comprehensively as well as measure police practices at the neighborhood level. Currently, several scholars are developing more accurate measures of traumatic police exposure and testing which mental and physical health outcomes are affected (DeVylder et al. 2017, 2018; Geller et al. 2017; Ross 2017). Nuanced measures of police discrimination should be applied in nationally representative data to understand the scale of police abuse in the United States. Researchers should also expand their focus to law enforcement agencies other than local police departments and racial and ethnic groups other than blacks. For instance, Latino and Hispanic communities are targeted by both local police as well as Immigration and Customs Enforcement (ICE) (Armenta 2017; Rios 2011, 2017; Stuart et al. 2015). ICE activities are not reflected in local police records but their activities (e.g. immigration raids, arrests, separating mixed immigration status families) may be a salient form of stress for Latinos and Hispanics regardless of immigration status. If aggressive local policing affects health, it is likely that aggressive immigration policing also undermines physical and mental wellbeing.

IMPLICATIONS FOR POLICE POLICY

Police policy is made at two levels, legislative policy and administrative policy. Legislators can change what constitutes a crime and how police jurisdictions are funded. Marijuana legalization in Colorado and Washington substantially decreased the number of vehicle searches that the state highway patrol conducted in both states (Pierson, Simoiu, et al. 2017). Legalizing or decriminalizing marijuana possession and possession of other drugs would drastically reduce the number of searches that officers conduct and fewer people would feel as though they were treated unfairly. Legalization would shift police focus from the War on Drugs to more serious crime (Alexander 2012). Criminal records due to drug crime should be expunged to increase the life chances of those who have been criminalized in the War on Drugs.

Legislation should be passed creating robust transparency from police and other criminal justice agencies. Police organizations should be required by law to make administrative records publically available online. Open data practices encourage accountability. All of the MNPD data used in this dissertation were obtained through a series of public records requests. Organizations like Gideon's Army in Nashville and The Invisible Institute in Chicago have used public records laws to access data and shine a light on social problems that administrators and legislators overlook. Additionally, independent research and police oversight should be encouraged and funded.

While this dissertation focuses on racial disparities and bias in discretionary searches and the mental health consequences for the community, it also speaks to broader issues of urban policing. Federal, state, and local funding should incentivize reforms to police tactics and reduce police focus on misdemeanor arrests. Police department funding should be attached to reforms that aim to reduce racial bias and unnecessary police actions. Community members have high

expectations of professionalism and service from police officers. Police officer salaries should be commensurate with the expectations the society places on police. Higher pay in addition to a focus on police reform would improve recruitment of officers with diverse experiences who aim to create positive social change.

The consequences attached to traffic citations and misdemeanor arrests also need reform. I do not directly address traffic citations, court fines, or fees in the dissertation but the results show that black people are more likely to be searched by police and the decision to conduct searches of blacks and Hispanics can be racially biased. Presumably, the resulting legal sanctions from discovering contraband will disproportionately impact blacks and Hispanics due to the fact that they are searched more often and with less suspicion than whites. Since police focus on the most marginal communities, legal sanctions will be concentrated among those who are already the most vulnerable. Alternatives to monetary court fines and fees should be encouraged. Monetary fines can exacerbate inequality and contribute to a cycle of debt and punishment (Stuart 2016; Stuart et al. 2015). Fines associated with citations or arrests should not be used by police agencies because they incentivize unethical citation and arrest practices (see U.S. Department of Justice 2015 for an example of unethical arrest and citation practices).

Finally, legislators have a responsibility to redress the social consequences of tough on crime policies. The punitive turn in the United States that led to mass incarceration was accompanied by a reduction in social welfare programs. As the welfare state was rolled back, the resulting economic instability was met with a rollout of larger police forces and penal institutions (Stuart 2016). In practice, police work is often a response to social problems related to poverty and inequality (Herbert et al. 2018; Stuart et al. 2015). The tools that police officers have to respond to social problems are limited. Alternative, community-based resources are needed to

respond to situations where intervention is required but do not require police. Substance abuse and mental health treatment must be more accessible and responsive to immediate needs. Additionally, addressing the fundamental causes of inequality is necessary to change how police interact with the community. Racial residential segregation, concentrated poverty, racism, and discrimination produce the social system where police-community interactions take place (Anderson 1999; Massey 2007; Wilson 2012). To create sustainable change, a concerted effort is needed to reduce inequality and level the playing field for those who are marginalized.

In contrast to legislative policy making, administrative policy change requires police officials and government employees to address current procedures. One key finding of this dissertation is that organizational structure matters. When patrol officers are in their third year on the force, they are planning ahead for when they become eligible for a promotion. Promotion decisions may not be officially based on the number of searches or arrests that an officer makes but there may be implicit (and explicit) messages that productivity will help officers be successful (Armenta 2017). Performance goals should not encourage punitive actions such as stops, searches, citations, or arrests. Instead, officers who have positive interactions with the community should be rewarded. Police officials should emphasize *quality policing, not quantity policing*. Crime analysis units should assess and track officers for changes in search patterns and disparate racial impact. Flagged officers should receive required, targeted interventions. Interventions should be evaluated for efficacy.

The second paper of this dissertation shows that patrol officers in Nashville from 2010-2017 conducted searches on Hispanic and black drivers with less suspicion than on white drivers. When consent-based searches were considered with probable cause searches, the amount of suspicion needed to initiate the search was reduced to the point of being arbitrary. Following

Gideon's Army's demand in the *Driving While Black* report (Gideon's Army 2016), I would similarly call for the abolition of consent-based searches without probable cause. The threshold for initiating a consent search is so low that it is evident officers are conducting searches based on a whim, not the facts and circumstances of the encounter. If officers cannot establish probable cause to search a vehicle, they should not be searching the vehicle.

The probable cause search thresholds for black, Hispanic, and white drivers is troubling. The probable cause standard is based on whether a "reasonable officer" would believe that evidence would be found in a search given the articulable facts and circumstances (Goldberg 2013; Ortman 2016). My results show that officers discriminate against Hispanics and blacks when evaluating the facts and circumstances of a traffic stop. There are several possible reasons why bias is so common. There are likely organizational norms that heighten suspicion of blacks and Hispanics. I find in Paper 1 that statistical discrimination—believing that one group is more likely to have evidence than another based on group-level crime statistics—is a likely culprit. Another factor that could lead to officers practicing statistical discrimination and stereotyping is ignorance of cultural differences (Ray 2015). Rios (2017) argues that officers have very little familiarity with cultural signifiers and assume that innocuous tattoos and clothing are gang related. During her ethnographic observations in Nashville, Armenta (2017) saw MNPD officers debating whether Latino youth were workers or gang members. A lack of cultural awareness may be one cause of discriminatory searches. Officer training should emphasize applying the probable cause standard in culturally informed ways. Additionally, learning to contextualize racial difference in crime statistics may help officers avoid statistical discrimination. Training and continuing education should be rigorously evaluated for efficacy and revised if outcomes do not change.

The findings that previous unfair experiences with police affect mental health show that there are insufficient mechanisms in place to heal the harms that people experience from police officers. Ideally, no one should experience unfair police treatment but the nature of police work as the application of coercive force guarantees that some parties will feel aggrieved. Procedural justice aims to minimize feelings of being mistreated in the legal process. Officers should aim to be procedurally just in all their interactions with the community. When people feel mistreated, they should be heard. MNPD's bias-based policing policy is written so that almost no complaints of officer bias will be sustained. The policy states that biased based policing is "the selection of individuals for enforcement intervention based ***solely*** on a common trait of a group, such as race, ethnic origin, gender, socioeconomic status, sexual orientation, or age" [emphasis in original] (Metropolitan Nashville Police Department 2018:441). Requiring that a group trait is the only reason for a police action virtually precludes accountability for officers who unfairly target racial minorities but provide a pretextual justification for their action (American Civil Liberties Union 2017; Southern Poverty Law Center 2018). When a community member feels as though they have been discriminated against, a complaint will almost never be sustained as a policy violation. Even if a policy violation is not found, police officers should participate in a restorative justice process with the community member who felt harmed. An intervention could help the officer become better acquainted with community members and understand how their actions were interpreted by the person who felt harmed. Nashville's newly formed Community Oversight Board is an exciting opportunity for police officers to heal the injustices that community members have felt from police.

MNPD's bias-based policing policy should be revised from only being applicable in cases where race is the sole reason for a police action to be more inclusive of situations where

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bias occurs. Many states and police departments have revised their policies to be more inclusive

of racially motivated policing. For instance, the New York City Police Department's racial

profiling and bias-based policing policy states:

> Race, color, ethnicity, or national origin may not be used as a motivating factor for initiating police enforcement action. When an officer's decision to initiate enforcement action against a person is motivated even in part by a person's actual or perceived race, color, ethnicity or national origin, that enforcement action violates Department policy unless the officer's decision is based on a specific and reliable suspect description that includes not just race, age, and gender, but other identifying characteristics or information. (New York City Police Department 2016)

The policy from New York City Police Department reduces the risk that officers will unfairly

target racial minorities without specific suspicion or a reliable suspect description. With a more

expansive policy, police officers will be more likely to be held accountable for racial bias.

Community members may also see that the police department is reforming and holding

themselves accountable rather than giving their officers a legal loophole for racism.

Finally, aggressive police practices need to be reevaluated. Experimental research shows

that hot spot policing reduces crime by a small, but meaningful, degree (Braga et al. 2019; Braga,

Papachristos, and Hureau 2014). This body of research does not address the long-term effects of

targeted crime reduction strategies. If a neighborhood is regularly targeted with hot spot

interventions, it is not clear what effects these have on crime or other community outcomes over

longer time spans. The growing body of research on health effects of aggressive policing

suggests that police unintentionally harm the people they are supposed to protect and serve.

Community-based alternatives to aggressive, proactive strategies should be encouraged.

Proactive policing has a place in the tactical repertoire of police forces but the benefits must be

weighed against the costs. A more effective strategy may be to collaborate with community

groups that aim to reduce crime through economic and social development. The "warrior cop"

ideal and the focus on punitive policing is counterproductive for strengthening disadvantaged neighborhoods. Modern policing requires that officers exercise their coercive force responsibly and judiciously. Shifting organizational priorities, changing police culture, reducing racial disparities, and increasing positive police-community interactions will increase police legitimacy while improving public health.

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