THREE ESSAYS ON REPRESENTATION, DECISION MAKING AND BUREAUCRATIC PERFORMANCE IN LAW ENFORCEMENT

Danyao Li

Submitted to the faculty of the University Graduate School in partial fulfillment of the requirements for the degree Doctor of Philosophy in the Paul H. O’Neill School of Public and Environmental Affairs, Indiana University May 2022
Accepted by the Graduate Faculty, Indiana University, in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

Doctoral committee

___________________________________
Sean Nicholson-Crotty, PhD

___________________________________
Jill Nicholson-Crotty, PhD

___________________________________
Thomas M. Rabovsky, PhD

___________________________________
Coady Wing, PhD

April 15, 2022
I owe this dissertation to my parents – Yujing Chang and Xiaoye Li, for always being my rock. Mom and dad, you have shown me unconditional and infinite love, every minute of every day in my life. Thank you, mom, for being the most optimistic person I have ever known in the world. You always believe that around the corner some incredible new experience is waiting for us, and you convince me that the best is yet to come. Thank you, dad, for not taking on an authoritative father role but being a friend by my side. I love your sense of humor and the ways in which you use it to deal with the most dreadful situations in life. I hope it passes on to me. We are a happy crew, and I certainly will carry that family tradition on and stay an upbeat person, like you two have always been. I know my bad habit of not expressing love enough, but I do love you both, from the bottom of my heart. This dissertation is dedicated to you.

I would like to express my deepest appreciation to my committee, without whom this dissertation would not have been possible. I am deeply indebted to my advisor Sean Nicholson-Crotty, for his mentorship, advice, time, and patience. Sean, I came to the program – I think it is safe to say – cluelessly about my research agenda. I stumbled into current research space because of research assistance work with you but I am extremely happy about where I am now – I find a topic I am passionate about and determined to build a career on. I must thank you for showing me the many possibilities in research and giving me the intellectual freedom to explore them in my first several years. Of course, you teach me more than that. Thank you for being a generous and outstanding advisor, and for every opportunity you have afforded me to grow as a young member of the academic community. My deepest gratitude extends to other members of my committee, Jill Nicholson-Crotty, Tom Rabovsky and Coady Wing, who have contributed substantively to this dissertation and my growth as a scholar and as a teacher during my doctoral
studies. I am also beyond grateful to countless others – the extremely kind, patient, and inspiring faculty and staff at O’Neill School who have helped me every step of the way.

I hit the jackpot of having a lovely cohort in the program throughout a tough doctoral journey. My special thanks go to my gang – Michelle Graff, Ruth Winecoff, and Ricardo Bello-Gómez. I cherish the memories we create together in classes, in the lunchroom on the 4th floor where we did most of our stats and microeconomics homework, in restaurants we went to for celebrations, and of course in our WhatsApp chat group which will always be my favorite virtual space. My thanks also go to the entire doctoral student community at O’Neill, from which I have received enormous support, both emotionally and intellectually.

I believe I have made great advancements in my research and teaching, and I have experienced tremendous personal growth, in the past six years. I hope this dissertation represents those well.
Danyao Li

Three Essays on Representation, Decision Making and Bureaucratic Performance in Law Enforcement

This dissertation investigates the relationship between bureaucratic representation of minority groups, individual administrators’ decision making regarding those groups, and the performance of public organizations. In the context of law enforcement, three papers seek to answer the following questions. First, does racial/ethnic representation change the behavior of white officers when they encounter citizens of color? Second, what is the level of minority representation at which we should expect that behavioral shift to occur? Third, how do the multiple identities (i.e., race, ethnicity, and gender) of officers impact their law enforcement activities?

Using data on millions of traffic stops across multiple U.S. states and years that allow one to observe both individual officer behavior and organizational characteristics, the first essay finds that white officers are more likely to treat Hispanic drivers similarly to white drivers, when working alongside more colleagues of that ethnic group. Put differently, the ethnic disparities in policing outcomes are reduced with enhanced minority representation on police force. Building upon the first essay, the second one estimates the conditions under which that observed behavioral change happens. The analysis shows that when minority officers constitute approximately 9-11 percent of the force, white officer’s law enforcement activities concerning drivers of color begin to become less biased. The third essay considers multi-dimensional identities officers possess simultaneously and finds evidence of intersectionality of race, ethnicity and gender in shaping police behavior. It also finds that congruence in identities
between officers and citizens, especially intersectional match, produces less disparate policing outcomes.

This dissertation makes significant theoretical contributions to the scholarship on representative bureaucracy by addressing three major gap questions in that body of work. It also has important implications for policymakers and practitioners seeking to reform law enforcement and lessen racial disparities in policing in future.

Sean Nicholson-Crotty, PhD

Jill Nicholson-Crotty, PhD

Thomas M. Rabovsky, PhD

Coady Wing, PhD
Table of Contents

ESSAY 1: SPILLOVER EFFECTS OF MINORITY REPRESENTATION ON MAJORITY BUREAUCRATS’ BEHAVIORAL CHANGE ................................................................. 1
  INTRODUCTION .......................................................................................................................... 2
  REPRESENTATIVE BUREAUCRACY: A BRIEF OVERVIEW ......................................................... 4
  RACE, REPRESENTATION AND POLICING IN THE UNITED STATES ........................................ 5
    Race and Policing in the United States .................................................................................... 6
    Representation: A Potential Solution? ..................................................................................... 8
  AN UNDEREXPLORED MECHANISM: MAJORITY BUREAUCRATS’ BEHAVIORAL CHANGE IN A REPRESENTATIVE BUREAUCRACY ......................................................... 9
    Micro-Level Causal Links of Representation .......................................................................... 9
    Spillover Effects of Minority Representation on Majority Bureaucrats’ Behavior ............... 10
  TRAFFIC LAW ENFORCEMENT: AN EMPIRICAL CONTEXT ...................................................... 13
    Race/Ethnicity in Traffic Law Enforcement ......................................................................... 13
    Police Discretion in Implementing Traffic Laws .................................................................. 14
    Substantial Impacts on Communities of Color ...................................................................... 15
  DATA, VARIABLES AND METHODS ........................................................................................... 15
    Data ........................................................................................................................................ 15
    Independ Variables ................................................................................................................ 17
    Dependent Variables .............................................................................................................. 17
    Methods: Within-Officer Estimation ..................................................................................... 19
  FINDINGS ................................................................................................................................... 20
    Descriptive Analyses ............................................................................................................. 20
    Within Officer Analyses ........................................................................................................ 22
    Robustness Check .................................................................................................................. 26
  FURTHER DISCUSSION ................................................................................................................ 26
  CONCLUSIONS AND CONTRIBUTIONS ...................................................................................... 28
  LIMITATIONS AND FUTURE DIRECTIONS ............................................................................... 30
  NOTES ........................................................................................................................................ 31
  REFERENCES .............................................................................................................................. 35
  TABLES AND FIGURES ................................................................................................................ 47

ESSAY 2: CRITICAL MASS CONDITION OF MAJORITY BEHAVIORAL CHANGES IN REPRESENTATIVE BUREAUCRACY: A NONPARAMETRIC EXPLORATION ............................................. 55
  INTRODUCTION .......................................................................................................................... 56
  CRITICAL MASS, INTERGROUP PROCESSES AND PERFORMANCE .......................................... 59
  CRITICAL MASS IN REPRESENTATIVE BUREAUCRACY ............................................................ 60
    Where Does Empirical Evidence Stands? ................................................................. 60
    What Mechanism and Which Critical Mass? ........................................................................ 63
  DATA, VARIABLES AND METHOD ........................................................................................... 67
    Data ........................................................................................................................................ 67
    Method and Variables ............................................................................................................ 68
  FINDINGS ................................................................................................................................... 72
    Linear Model ......................................................................................................................... 72
    Semiparametric Regressions .................................................................................................. 73
  FURTHER DISCUSSION: QUANTITY VS QUALITY OF INTERGROUP CONTACT ..................... 75
  CONCLUSION, CONTRIBUTIONS AND LIMITATIONS ................................................................. 77
# ESSAY 3: IDENTITY, INTERSECTIONALITY AND BUREAUCRATIC DECISION MAKING

## INTRODUCTION

Representative Bureaucracy: Identity Matters in Bureaucratic Decision Making

Intersectionality: Race versus Gender or Race and Gender?

- Race versus Gender
- Race and Gender

Intersectionality in Bureaucratic Decision Making: Some Expectations

An Empirical Test

- Traffic Policing: Decision Making with Low Information and High Discretion
- Identity-Based Stereotypes and Profiling
- Police Characteristics Matter for Policing Outcomes

Data

Methods

- Estimator 1
- Estimator 2
- Estimator 3

Findings

- Descriptive Statistics
- Race or Gender: Which Predicts Police Search?
- What about Intersectional Identities?
- When Intersectional Officers Encounter Intersectional Drivers

Further Discussions

- Situational Intersectionality: High vs Low Threat in Traffic Stops
- The Power of Socialization: Why Race/Gender May Not Matter

Conclusions, Limitations and Contributions

Notes

References

Tables and Figures

Appendix

Curriculum Vitae
Essay 1: Spillover Effects of Minority Representation on Majority Bureaucrats’ Behavioral Change

Abstract: Representative bureaucracy scholarship has rarely examined whether passive representation of minorities changes the behavior of majority bureaucrats. To address this omission, this article explicitly tests the relationship between the two, in the context of traffic law enforcement. Using individual-level data over multiple years in Washington and South Carolina, analyses show that minority representation has spillover effects on decisions made by white officers. They are more likely to treat drivers of color similarly to white drivers, when working on a more racially representative police force. These findings support an under-explored causal mechanism whereby representation improves policy results for historically underprivileged groups, making a theoretical contribution to representative bureaucracy. It also has managerial implications for practitioners who seek to reform future law enforcement for greater racial equity in policing outcomes.

Keywords: representative bureaucracy; bureaucratic decision making; racial disparity; law enforcement; traffic stop
**Introduction**

The theory of representative bureaucracy contends that a bureaucracy that is descriptively representative of the constituent population will make decisions that correspondingly are responsive (Long 1952; Mosher 1968). Numerous studies have empirically established the link between demographic representation and beneficial outcomes to the groups being represented (e.g., Meier 1993; Meier and Stewart 1992; Atkins and Wilkins 2013; Keiser et al. 2002). Work to date has almost exclusively focused on two mechanisms that underlie that link. One is “advocacy” by minority and female bureaucrats – they likely embrace the “role of representative,” under right conditions, and act actively in the way that advances substantive interests for bureaucratic clients who share their characteristics (e.g., Meier and Nigro 1976; Selden 1997). The other is “symbolization.” It hypothesizes that representation may change bureaucratic clients’ attitude and behavior, which eventually adds to their improved outcomes (e.g., Gade and Wilkins 2013; Riccucci, Van Ryzin, and Li 2016).

An important gap in literature remains, however, because previous research has not been able to conclusively decide whether passive representation of minorities in public organizations also changes the behavior of majority members, although scholars have long speculated this theoretical possibility (see Lim 2006 for a review). Lack of empirical evidence may be, in part, due to data limitations. Findings on active representation thus far draw heavily on aggregate data at the organization level, which do not allow scholars to disentangle behavioral patterns of bureaucrats of different groups.

This article theorizes that increased minority representation in public organizations will alter majority bureaucratic decision making about minority clientele. This behavioral change is a
result of several plausible scenarios, including a reduction in their implicit biases toward minorities after repeated contacts with minority colleagues at work, peer pressures, and/or change in organizational norms and regulatory policies that curb discriminatory behavior. Using data on millions of traffic stops performed by the State Patrol in two states over multiple years, Washington (2009-2016) and South Carolina (2005-2016), within-officer analyses find supporting evidence for this theoretical proposition. Specially, white officers, who work in police districts that are more racially representative, demonstrate behavioral shifts toward drivers of color that eventually reduce racial disproportion in policing outcomes. Interestingly, these patterns are more evident and robust when it comes to the effects of Hispanic representation. Though this research is not able to pin down the source(s) of observed behavioral alterations, findings provide empirical support for the theorizing that minority representation likely has positive spillover effects on majority members of the organization. Thus, this article addresses a significant omission in representative bureaucracy literature and advances our understanding of representation processes by unveiling a causal mechanism that is rarely explored by previous work.

The rest of the article starts with a brief review of representative bureaucracy theory and connects it to the large literature on race and policing. It then examines causal mechanisms of representation to develop the hypothesis. Next, it introduces the empirical context of traffic policing, data, measures, and methods. After presenting results, it concludes with a further discussion of the findings, contributions, implications as well as limitations that may inform directions for future inquiries.
Representative Bureaucracy: A Brief Overview

The theory of representative bureaucracy argues that a demographically diverse bureaucracy will lead to democratic outcomes through responsive public policies and administrative actions (Kingsley 1944; Mosher 1968; Meier 1993; Meier and Nigro 1976; Selden 1997). Mosher (1968) distinguishes between the concepts of “passive representation” and “active representation.” The former notion concerns the degree to which bureaucrats mirror demographic origins of the local population, in terms of race/ethnicity, gender, class or other characteristics (Kingsley 1944; Mosher 1968). Research on passive representation constitutes the focus of early representation studies and is greatly motivated by a normative view that descriptive representation is necessary for organizational legitimacy. Active representation, however, refers to the bureaucratic outputs that are responsive to those being represented (usually historically underprivileged groups) (Meier 1993). The distinction, but more importantly, a presumed connection between the two, has informed subsequent analyses and theoretical advancements in representative bureaucracy literature for decades.

A large and still growing body of research across sectors of public service has led empirical support to the notion that passive representation can translate into substantive policy benefits for the represented clients when certain preconditions are met. These policy domains include public education (Nicholson-Crotty, Grissom, and Nicholson-Crotty 2011; Meier and Stewart 1992), federal contracting (Fernandez, Malatesta, and Smith 2013), farmers loan application (Selden 1997; Selden, Brudney, and Kellough 1998), child support (Wilkins 2006; Wilkins and Keiser 2004), local police (Meier and Nicholson-Crotty 2006), Equal Employment Opportunity Commissions (EEOC) charges (Hindera 1993), environmental justice (Liang, Park,
and Zhao 2020) and many others. Scholars have identified several conditions under which representation likely manifests, such as the identity saliency of the demographic group under discussion, discretion that bureaucrats have in implementing policies, and direct and substantial impact of bureaucratic actions on the group in question (Meier 1993; Keiser et al. 2002; Meier and Bohte 2001; Sowa and Selden 2003; Riccucci and Meyers 2004).

**Race, Representation and Policing in the United States**

Policing is one of the frequently examined contexts by representative bureaucracy scholarship (e.g., J. Nicholson-Crotty, Nicholson-Crotty, and Li 2018; Theobald and Haider-Markel 2008; Wilkins and Williams 2008). This body of research is intertwined with work from other disciplines that seeks to understand racial disproportion in policing outcomes, but goes on to discuss, from the viewpoint of public policy and administration, whether increasing representation is a remedy available to address the stark racial disparities that widely exist and sustain in U.S. policing. Before discussing where empirical evidence stands on the effectiveness of police representation in reducing racial inequalities, it is beneficial to start with a discussion of the broader literature on race and policing. It goes beyond the scope of this article to thoroughly review that long-running research tradition, but a brief overview is necessary because policing is related to both the force responsible for policing and of the characteristics of the population being policed. It gains us a better understanding of how representation relates to the larger conversation on racial justice in law enforcement.
Previous work in sociology and criminology, among other fields, has identified three major categories of contributors to racial disproportion in policing outcomes. These include factors at psychological/individual, sociological/situational, and organizational/institutional levels. Research in the first category examines how social identity, prejudice, and many other elements in individual officers predict their behavior at the frontline. The second stream of research turns attention to social dynamics and situational cues in police-citizen encounters that are used by officers to inform their decision making. The third approach argues that characteristics of institutions, such as police culture, administrative practices, and larger legal contexts, impact policing results in a more systematic and broader way (see Nicholson-Crotty and Nicholson-Crotty 2020 for a review).

Note that components at three levels usually co-exist, interact, and contribute collectively to racially biased policing outcomes. First, police targeting at minorities may be driven by officers’ personal stereotypes or overt racism in some cases. For example, social categorization is commonly used by individuals as a psychological mechanism to make sense of a vast social world. Differences between individuals evoke a subjective classification process that divides others into in- and out-groups. This categorization acts as a system of orientation for self-reference and a guide to action (Tajfel et al. 1971; Tajfel 1982). One detrimental consequence of it, however, is that “categorization, per se, propels the individual down the road to bias” (Wilder 1986). As Tajfel and Wilkes (1963) show in their experiments, it leads to an accentuation of within-group similarity and between-group difference. Combined with “us vs them” mentality that is deeply ingrained in police since very early stage of their careers (e.g., Li, Nicholson-
Crotty, and Nicholson-Crotty 2021), individual processes such as social categorization likely result in stereotypical and sometimes-faculty interpretation of minority behavior and further lead to mistreatment and discrimination of those groups.

Alternatively, aggressive policing on minorities may be a product of societal factors. These include, but are not limited to, fear of crimes, competition for finite economic resources, and perceived threats of rising political power (e.g., Liska and Yu 1992; Chiricos, Hogan, and Gertz 1997). To give one example, racial threat and social control theories see policing as a social control strategy, used by majority-controlled institutions, to maintain dominance and order over minority groups that are viewed as threats (e.g., Blalock 1967; Liska and Yu 1992; King and Wheelock 2007; S. Nicholson-Crotty et al. 2020).

Last, many argue that perpetuating racial differences in policing are fundamentally explained by institutional practices and organizational policies that put certain incentives in place. Those incentives further interact with individual biases and societal factors to create or exacerbate disparities (Ward and Rivera 2014; Epp, Maynard-Moody, and Haider-Markel 2014). As one prominent example, Epp et al. (2014) explicitly argue for the institutional source of bias when studying racial disproportion in traffic law enforcement. They thoroughly examine how the legal use of and a heavy reliance on “pretext stops” add to the widespread disparities in stop outcomes. Pretext stop, oftentimes referred as “investigatory stop,” is made not necessarily to enforce traffic laws but to check out people who look suspicious.¹ It is one of the most frequently used professional policing tactics and has now become increasingly standardized and institutionalized by police agencies across the country (Epp, Maynard-Moody, and Haider-Markel 2017). Although the Supreme Court ruling prohibits police from using perceived race as
the sole basis to make such stops – which is virtually impossible to enforce – in actuality, the motivating factor is oftentimes the physical appearance or race. Uneven deployment of investigatory policing strategies and negative consequences that follow have burdened communities of color disproportionately (Baumgartner, Epp, and Shoub 2018; Harris 1999).

**Representation: A Potential Solution?**

One approach that public administration scholarship has repeatedly proposed to address issues of racial discrimination in policing seeks to change an institutional parameter – minority representation on police force. The proposal rests in part on potential advantages of having a representative workforce. Through the theoretical lens of representative bureaucracy, scholars routinely hypothesize that increased representation of minorities on force will lead to a reduction in racial disparity in policing outcomes.

Empirical findings, unfortunately, are largely inconclusive (see Bradbury and Kellough 2011 for a review), regardless of policing outcomes in discussion. Some have found supporting evidence of active representation with the presence of black/Hispanic officers on force (e.g., Headley and Wright 2020; Hong 2017; Smith and Holmes 2003), while others have yielded opposite results, finding that black officers may treat black citizens even more harshly (e.g., Wilkins and Williams 2008; Brown and Frank 2006), or in some cases they do not discover direct relationship between racial congruence and officer behavior (e.g., Legewie and Fagan 2016). To reconcile the inconsistencies, Wilkins and Williams (2008) suggest that the unique culture of police departments that effectively socializes members to organizational norms likely prevents the passive-active representation translation. Nicholson-Crotty et al. (2017) build on
this argument and suggest that the difficulty of attaining a critical mass of minority officers makes it hard to observe active representation in policing.

Mixed findings cited above suggest missing pieces in the puzzle of police representation. The evaluation of its effectiveness will benefit from a careful re-examination of previous literature, especially of those studies with the aim to explore the causal mechanisms of representation processes. To this end, the next section will return to the theory of representative bureaucracy and delve into its micro-foundations.

An Underexplored Mechanism: Majority Bureaucrats’ Behavioral Change in A Representative Bureaucracy

Micro-Level Causal Links of Representation

Positive correlations between passive and active representation lead naturally to the question of what causal mechanisms underlie the translation. Scholars have articulated several major possibilities (see Lim 2006; S. Nicholson-Crotty et al. 2016 for a review). The first of them argues that it comes directly from minority bureaucrats’ action on behalf of clients of their own groups (e.g., Selden 1997; Meier and Nigro 1976). It operates on a premise that bureaucrats who exhibit certain demographic characteristics tend to develop more sympathetic and supportive attitude towards clients of shared backgrounds, because of similar socialization, life experience, values, and norms. These commonalities further translate into administrative actions that pursue substantive interests for minority clientele (e.g., Meier and Nigro 1976). The second mechanism posits that minority representation has symbolic effects. Instead of actions initiated by bureaucrats, changes in citizens’ attitude about a public organization contributes to their
improved outcomes eventually because they may view a bureaucracy as more legitimate when its workforce reflects characteristics of who it serves, and thus show more willingness to coproduce (e.g., Riccucci, Van Ryzin, and Lavena 2014; Riccucci, Van Ryzin, and Li 2016). A third but much less examined explanation contends that representation impacts minority clients’ outcomes indirectly through the changes it may bring about in the attitude and behavior of majority members of the organization (e.g., Meier, Wrinkle, and Polinard 1999).

Note that, first, these mechanisms remain largely speculative, due to the limitations of aggregate data used by most of past research. With the organization being the unit of analysis, those studies have successfully established the passive-active link but were not able to, by construction, disentangle different mechanisms at play. Several recent studies have begun to unpack representation processes by taking advantage of individual-level data. For instance, with individual surveys of Swiss federal bureaucrats, Zwicky and Kübler (2019) find that minority administrators are more sensitive to minority issues and are more likely to engage in active representation. Recent experimental studies have also found supporting evidence for symbolic representation that minority and female citizens hold a more favorable view of government and cooperate with a representative agency more willingly (e.g., Riccucci, Van Ryzin, and Jackson 2018; Riccucci, Van Ryzin, and Li 2016). Second, three mechanisms have not received equal attention in past research. While the first two (i.e., active advocacy and symbolization) have been explored more frequently, the third one remains yet an uncharted area.

**Spillover Effects of Minority Representation on Majority Bureaucrats’ Behavior**

Despite lack of empirical evidence, representative bureaucracy scholars have long suggested that majority bureaucrats may act in a similar manner to minority administrators that
eventually produce beneficial outcomes to minority clientele. As Selden, Brudney and Kellough (1998) explicitly articulate, “While minority employees can be expected to embrace this [representation] role most often and most closely, nonminority administrators may also adopt it as a result of their background or socialization."

The behavioral change on the part of majority bureaucrats in a representative organization may be an outcome of four processes as follows, at least. First, compelling evidence in studies of intergroup contact shows that exposure to diverse environment significantly reduces prejudice and leads to continued openness to diversity (see Pettigrew and Tropp 2006; Paluck, Green, and Green 2019 for a review). Although some social psychology theories, such as social categorization and similarity/attraction theory, may suggest the opposite – diverse workforce negatively impacts group dynamics due to conflicts that stem from differences between individuals – research has generally found that, as time goes by, the group becomes more cohesive and having members of different backgrounds eventually leads to superior performance (e.g., Pitts and Jarry 2009). As Lim (2006) explicitly argues, the presence of minority bureaucrats can “re-socialize” their majority co-workers through frequent exchanges between the two groups on a daily basis. Minority representation can sensitize majority bureaucrats to the unique demands of historically disadvantaged clients, which they may not fully comprehend otherwise, as Selden (1997) articulates, “the presence of underrepresented groups should enhance the majority group’s empathic understanding.” It may also lead to an update of majority administrators’ perceptions of minorities, rewriting their sometimes-faulty assumptions about this group of clients and reducing their implicit biases toward citizens of color (S. Nicholson-Crotty et al. 2016).
Next, following attitudinal changes, one can reasonably expect that representation will further impact the actual behavior of majority bureaucrats. There is empirical evidence in favor of this supposition. As one example, in a series of interviews with teachers in Georgia public schools, Atkins and Wilkins (2013) find that white teachers are very aware of the significance of racial congruence in interaction with black students, and thus sometimes seek guidance from their black colleagues and mimic the behavior of black teachers in order to improve their communications with students of color.

In addition to increased empathy and reduced implicit bias, a higher degree of minority representation may influence the behavior of majority members through a regulatory mechanism (Lim 2006). The actions of, or even the mere presence of, minorities in the organization increases the likelihood that discriminatory behavior by majority members will be observed and reported (Juris and Feuille 1973; Thompson 1976). Alternatively, mimetic pressures may change majority behavior as increased representation changes acceptable behavior, norms and cultures within the organization (Zwicky and Kübler 2019).

Finally, minority representation potentially results in changes in administrative procedures and organization policies that concern minority clients, which in turn regulate majority bureaucrats’ actions. For instance, Roch, Pitts and Navarro (2010) find that teacher representation impacts school policy design and that schools with more balanced racial representation in faculties are more likely to shift away from sanction-oriented policies and adopt learner-centric discipline policies instead.
Taken together, regardless of the underlying processes as outlined above, one may expect that organizational representation of minorities likely changes the ways in which majority bureaucrats treat and interact with minority clientele, therefore, this article argues:

**Hypothesis 1**: Increasing levels of minority representation in the bureaucracy will have spillover effects on majority bureaucrats, causing a decrease in their biased behavior toward citizens of color.

**Traffic Law Enforcement: An Empirical Context**

Traffic policing serves as the empirical context for theory testing in this article because, first, it is a setting where theoretical assertion noted above can reasonably be expected to manifest since several crucial prerequisites (e.g., identity saliency; discretion) are satisfied. Second, traffic stop is one of the most common channels through which minorities interact with law enforcement and criminal justice system. Racial disproportion in stop outcomes has been repeatedly observed and it goes a long way to shape the consequences downstream for minority citizens who are mistreated in stop encounters.

**Race/Ethnicity in Traffic Law Enforcement**

A large volume of research has regularly identified race/ethnicity as a strong predictor to disparate traffic stop outcomes (e.g., Alpert, Macdonald, and Dunham 2005; Giles et al. 2012; Miller 2009; Pierson et al. 2017). Just to name a few, Miller (2009) finds that black drivers are more likely to be stopped and issued tickets than similarly-situated white drivers. Pierson et al. (2017) discover similar results for Hispanic and black drivers in their research using traffic stop records across the nation. Antonovics and Knight (2009) demonstrate that a vehicle search is
more likely to occur when the race mismatches between the officer and the driver, after controlling for a host of stop specific variables (see also Close and Mason 2006, 2007; Fagan et al. 2016). Taken together, it is safe to say that race has been a persistent and salient issue in traffic law enforcement, or more broadly speaking, policing overall in the U.S.

**Police Discretion in Implementing Traffic Laws**

Police is often seen as a typical example of street level bureaucrats – government employees who work at the frontline and interact with clients directly. They usually have a fair amount of latitude to interpret and enforce laws and rules in implementation and thus greatly shape client outcomes (Maynard-Moody and Musheno 2000; Hupe and Hill 2007; Lipsky 1980). In exercising their discretion, a mixture of factors may come into consideration, including organizational rules, legal restrictions, informal norms and culture, and their personal values and beliefs (Scott 1997).

In traffic law enforcement, officers can decide, at their own discretion, to initiate a traffic stop, perform a vehicle search and/or impose different degrees and types of sanctions on the motorist, despite protocols and procedures to follow. For instance, when studying investigatory stops, Epp et al. (2014) find that police usually have a large zone of discretion to decide about the length and content of interactions with the driver. They may choose to prolong the stop so long as they feel necessary to scrutinize the driver and assess the next courses of action. Thus, the discretionary nature of decision-making in a traffic stop serves as a precursor to police representation behavior that may follow.
Substantial Impacts on Communities of Color

Statistics from Bureau of Justice Statistics show that over 20 percent of U.S. residents age 16 or older, approximately 54 million in total, come into some type of contact with police annually (Davis, Whyde, and Langton 2018). Among those, it is no exaggeration to say that traffic stop is by far the most common avenue through with ordinary citizens encounter law enforcement, with over 20 million Americans stopped each year for traffic violations (Langton and Durose 2016). The high visibility of race issues in traffic policing has important implications for police-community relations. Research suggests that racially biased practices in traffic law enforcement has severely eroded the trust of communities of color. It negatively impacts the way in which they perceive police and goes a long way to further shape their evaluation on government broadly (Baumgartner, Epp, and Shoub 2018). It has additional downstream impacts, since small disparate treatments at the front end of criminal justice pipeline may accumulate across the system and eventually result in much higher degree of disparity in later stages (e.g., Nicholson-Crotty and Nicholson-Crotty 2020). Negative contact with police has also been shown to demobilize political participation and impact other aspects of citizens’ involvement in democratic and civic life (White 2019; Weaver and Lerman 2010).

Data, Variables and Methods

Data

The data at use come from the Stanford Open Policing Project. A research team at Stanford University filed a series of public records requests on traffic stops nationwide in 2017 and made these data available to the public for research use.6 For the purposes of this study, it
uses data from two states, Washington (WA) and South Carolina (SC). Note that there is no national requirement or a standardized reporting system of traffic stops. According to a report by NAACP (2014), only 18 states require mandatory data collection of all stops and searches, and 15 require analysis and publication of them. States also vary a lot in the degree of details of reporting. In the Stanford project, only WA and SC have the information needed to answer the research question proposed in this article. Specifically, empirical tests of the hypothesis require records of race/ethnicity of both officers and drivers, and indicators of search and contraband discovery simultaneously. Following sections will discuss these variables in detail.

These data report the population of traffic stops made by the State Police during the analytic window, January 2009 to March 2016 in WA and January 2005 to July 2016 in SC. Each stop record lists the officer who made the stop, attributes of the officer and the driver, stop outcomes, such as search, contraband found, warning, citation, and arrest. Stop time and location are reported as well.

Restricted by data availability, instead of a test nationwide, this study is only able to examine the research question in two states. That said, keep in mind that single-state studies are still appropriate and valuable if conditions in the states allow for rigorous theory testing and when the research aims to generalize to a unit of analysis other than the states themselves (Nicholson-Crotty and Meier 2002). Additionally, note that WA and SC are two distinct states, representing almost two opposite ends of the spectrum if we compare them along dimensions such as demographics, political ideology, region, urbanization, and many others.
Independ Variables

Minority bureaucratic representation is operationalized as a percent measure – in a police district, percent of officers that are black and percent of Hispanic officers. See figure A1-6 in appendix for the distribution of these measures. “District” (or called “troop” in some states) is the organizational unit of traffic policing by State Police, and they usually correspond well to state-defined geographic areas (i.e., counties). There are 8 districts, covering 38 counties in WA, and SC has 44 counties and 7 districts. Officers are assigned by the agency to one district for law enforcement duties. Though the assignment may not occur in a perfectly random fashion, yet it seems very unlikely that troopers are fully able to self-select into working units, as suggested by previous traffic policing research (e.g., Anwar and Fang 2006; Antonovics and Knight 2009). More importantly, the potential of such sorting should not bias the estimations since the effect of interest in this study is how representation in working environment impacts their behavior after officers arrive at the post.

The second set of independent variables is the reported race/ethnicity of the driver and the officer. They are coded in analysis as binary indicators.

Dependent Variables

Literature on traffic law enforcement is interested in a wide variety of policing behavior during the course of a stop, among which vehicle search and results that follow (i.e., if the search uncovers crimes, also referred as “hit”) have drawn the most attention (Becker 1968; Knowles, Persico, and Todd 2001; Close and Mason 2006, 2007; Stashko 2018; Manski 2005, 2006). This study examines them both, because they are directly related to the overall objectives of policing
and closely capture officers’ actual behavior on the ground. In general, police organizations aim to minimize criminal activities and ensure public safety. In traffic stops, that effectively means maximizing “hits,” or the number of illegal activities uncovered per vehicle search. Officers may be incentivized to do so because anecdotal evidence show that police agencies sometimes incorporate some measure of hit rate as a metric of personal performance (Knowles, Persico, and Todd 2001; Stashko 2018). As such, on one hand, in order to maintain public order and safety, officers are expected to search when there is a reasonable amount of suspicion that crime is being committed. On the other, they may want to avoid unnecessary search as much as possible because it will drag down hit rate, and waste limited time and resources that could have been allocated for other policing tasks. By overly conducting unnecessary search, officers also increase the risk of damaging police-community relationship.

Now with these specific contexts and variables in mind, it would be helpful to re-visit the hypothesis. A commonly held implicit bias against minorities is that they are oftentimes associated with higher levels of criminality, and evidence show that this bias exists among a nontrivial percent of white officers (Correll, Urland, and Ito 2006; Correll et al. 2007; Eberhardt et al. 2004; Plant and Peruche 2005; Plant, Peruche, and Butz 2005). As a result, stereotype-based policing may lead to hostile and inefficient searches, even in the absence of de jure discrimination. Increased police representation of minorities, however, offers a chance that prior biases held by white police are curbed, reduced, or even eliminated, and thus leads to greater equality in treatment of citizens across racial groups. Therefore, Hypothesis 1 can be further stated as below:
**Hypothesis 1a:** When working with more black (Hispanic) colleagues, white officers’ search likelihood on black (Hispanic) drivers will become similar to the probability of their search on white drivers.

**Hypothesis 1b:** White officers’ probabilities of finding contraband after searching black (Hispanic) motorists will become similar to contraband discovery rate on white drivers when they have more co-workers from that racial/ethnic group.

**Methods: Within-Officer Estimation**

To identify the effects of minority representation on white police actions, the research design takes advantage of the within variation of representation in the district where the officer works. The workhorse models are *within-officer* estimations on the probability of search and hit, with multiple fixed-effects. Following analyses are limited to white officers only.

Equation (1-1) shows the function of the model without interacting variables of driver’s race/ethnicity and representation of that group on force. The goal is to establish a baseline understanding of policing patterns by white officers. Equation (1-2) is the interactive model of primary interest.

\[
S_{ijt} = f(B_{ijt}, BRep_{jt}; H_{ijt}, HRep_{jt}; X'_{ijt}; \theta_t, \tau_c, \rho_j) \quad (1-1)
\]

\[
S_{ijt} = f(B_{ijt}, BRep_{jt}, B_{ijt} \times BRep_{jt}; H_{ijt}, HRep_{jt}, H_{ijt} \times HRep_{jt}; X'_{ijt}; \theta_t, \tau_c, \rho_j) \quad (1-2)
\]

\(i = i \ldots N\) index traffic stops, \(t = 1 \ldots T\) are time periods, and \(j = 1 \ldots J\) denote individual officers. On the left-hand side, \(S_{ijt}\) is a binary variable that is set to 1 if officer \(j\) conducted a search during stop \(i\) that happened at time \(t\). On the right, \(B_{ijt}\) is an indicator set to 1 if the driver
is black. $H_{ijt}$ is defined in the same way to indicate that the driver is Hispanic. $BRep_{jt}$ and $HRep_{jt}$ are district-level black and Hispanic representation measures, repetitively.

$\rho_j$ is the officer individual fixed-effects, the inclusion of which yield within estimations. $\theta_t$ is time fixed-effects that include year, month, and the hour of the day. $\tau_c$ represents county fixed-effects, accounting for unobserved heterogeneities in locations where the traffic stop happened. $X'_{ijt}$ contains control variables, such as driver’s and officer’s age and gender, that are commonly included in traffic stop analysis. Percent of black and Hispanic populations and percent of democratic votes in presidential elections, in the jurisdiction, are also included to account for political, societal, and cultural factors that potentially impact officer behavior.  

To examine search accuracy, contraband discovery is used as the dependent variable instead in models above, conditional on search performed. The outcome this time is set to 1 if the officer found contraband following the search and 0 if the search was fruitless or if no search was conducted. Again, baseline and interactive models are fit separately.

Findings

Descriptive Analyses

The analyses begin with a description of traffic policing outcomes in two states. It is an important first step because it offers an initial picture of the level of racial disparity in stop searches and the accuracy of those decisions. Table 1 lists, by officer and driver race, the proportion of search performed, and hit rate (i.e., the fraction of those searches turned out to find contraband).
Data from both states suggest that minority drivers experience higher search rates than white drivers do, and that, in some cases, those searches turn up less evident of criminal activities. The situation is particularly bad for Hispanic drivers – only 11.3% of searches of them in WA finds contraband, but the corresponding rate for whites is 16.6%. The situation is similar in SC – while being searched at a substantively higher rate (7.5% of all stops) than whiter motorists (2%), searches of Hispanic drivers only appear warranted in 13.4% of cases. That is, again, much lower than the hit rate among white drivers (26.5%). Alternatively, black drivers are searched more than whites are, in both states (5.3% compared to 2.2% in WA; 2.8% compared to 2% in SC), but the accuracy of those searches present more mixed patterns. In WA, hit rate on black drivers is lower than that of white drivers (14.2% compared to 16.6%) but the pattern is opposite in SC (28% compared to 26.5%).

Conveniently, scholars on race and policing, legal investigators and reporters have frequently used “hit rate” as an indicator for discrimination in law enforcement actions (Knowles, Persico, and Todd 2001; Department of Justice 2015; LaFraniere and Lehren 2015). Hit rate test, or often referred as “outcome test”/ “KPT test,” assumes that officer aims to maximize arrests. Hit rates, therefore, must equate in equilibrium. Otherwise, police can make more arrests by strategically reallocating searches from the driver group with low propensities of hit to the group with higher prosperities. As such, if police search a group more frequently than others but with less success, it then is indicative of bias against that group.

For the purposes of this study, as a reminder, working mechanisms of representation suggest that it will change white police behavior in those cases where bias may primarily drive
their actions. Descriptive data shown above indicate that representation is likely to have the largest impact on policing outcomes for Hispanic drivers because that is where the influence of bias appears to be the most evident.

**Within Officer Analyses**

Turning to within-officer analyses, results of baseline models are presented in table 2 (see full results in appendix table A1-2.1). Search and hit probabilities are exhibited in separate columns. Panel A and B demonstrate findings for two states respectively.

[See Table 2]

Panel A column 1 shows that a white officer, who works in a district with the mean level of representation in WA, is significantly more likely to search black drivers by 1.65-percentage points ($p<0.001$), and to search Hispanic drivers by 0.82-percentage points ($p<0.001$), compared to the search probability when the driver is white. To better understand the magnitudes, white-on-white search rate in WA is 2.2%, therefore, estimations above represent relative increases, to that reference point, of 75% and 37% respectively for black and Hispanic drivers.\(^\text{10}\) These evidently show that white police search decisions on drivers of color are significantly and substantially different from those on white drivers.

Meanwhile, white officers are significantly less accurate in searching minority drivers (column 2). Specifically, their likelihood of discovering contraband after searching black drivers is lower by 1.69-percentage points ($p<0.01$), compared to the situations where they search white drivers (a relative 9.83% decrease to the reference rate of 17.2%). Moreover, they appear to be particularly inaccurate at searching Hispanic motorists because the hit probability in this case is
significantly lower by 7.59-percentage points ($p<0.001$), which translates into a 44.13% relative decrease in hit performance. The findings in SC, presented in panel B, resemble those of WA. Taken together, above results corroborate previous work that finds racial disparities widely exist in traffic policing – minority citizens are subject to significantly higher search rates even when there is less evidence suggesting their wrongdoings.

Turning to the primary interest of this study – the effects of minority representation on white police decisions about minority drivers – table 3 presents the interactive analyses (see full results in appendix table A1-3.1).

[See Table 3]

For the ease of interpretation, average marginal effects (AMEs) of driver’s race/ethnicity on dependent variables, at different levels of black/Hispanic representation, are graphed in figures 1 through 4. In each of these plots, the solid line represents the gap in stop outcomes between the situations where white officers encounter minority drivers and those where they stop white motorists. As a reminder, foregoing analyses show that, when pulled over by white police, black and Hispanic drivers experience higher search rates but lower hit rates than their white counterparts do. The hypotheses suggest that white police would treat minority drivers increasingly similarly to white drivers, when organizational representation of that minority group is enhanced. If supported, we should see that the line representing the gap in search probability (left panels) slopes downward towards zero when minority representation increases, and the line of hit rate gap (right panels) heads upward toward zero as representation goes up.
As shown in the left panel of figure 1, in WA, the effect of black representation on white officers’ search of black drivers is rather limited, suggested by the relatively flat slope. Specifically, white officers conduct significantly more searches on black drivers across the full range of black representation, and representation does not seem to have a substantial impact on the racial gap in search. Results in SC reveal a similar pattern (left panel in figure 2) – white officers’ search on black drivers is almost nonreactive to the degree of black representation in their work units.

[See Figure 1]

[See Figure 2]

With regards to contraband discovery, however, it is more responsive to the level of black representation, in both two states (right panels in figure 1 and figure 2). But the direction of impact is only consistent with expectation in one case. In WA (figure 1 right panel), the discrepancy in white officers’ hit probability when searching black versus white motorists is narrowed with the increase of black representation on police force. At high end of black representation, the racial difference in hit rate approaches zero, though it never reaches equal treatment within the range of current sample.11

Turing to the case of policing on Hispanic drivers (figure 3 and 4), findings suggest more evident behavioral adjustment of white officers. Starting with WA (figure 3 left panel), Hispanic drivers are more likely to be searched by white officers, than white motorists are, at low levels of Hispanic representation. This gap, however, drops significantly as the organization becomes increasingly representative of Hispanics. As shown by the right panel in figure 3, racial gap in hit
rate is quite large at low levels of Hispanic representation but is *narrowed* significantly, heading towards zero, when Hispanic representation on police force increases to a higher degree. These findings accord well with the theoretical prediction that minority representation alters majority bureaucratic behavior. To better understand the magnitude of these behavioral shifts, estimates show that, for each additional 1percentage point increase in Hispanic representation in police district, first, the search gap shrinks by 0.034 percentage points \((p<0.1)\) (1.55% relative improvement to the reference rate), second, the hit gap closes by 0.274 percentage-points \((p<0.1)\) (1.59% relative improvement).

[See Figure 3]

Moving to figure 4, it shows that search behavior by white police in SC is not particularly responsive to Hispanic representation (left panel). Working with a higher proportion of Hispanic colleagues, however, does impact the accuracy of white officers’ searches in expected ways, as suggested by the positive slope of AMEs plot in the right panel, but that change is not significant.

[See Figure 4]

Last, before drawing conclusions, bear in mind that, first, the above findings are within-officer estimates accompanied with a comprehensive set of fixed-effects that the data allow. Therefore, they should be seen as relatively conservative estimations on white police behavioral change. With stringent settings, results still lend empirical support to the expectation that minority representation on force alters how white police act towards citizens of that minority group, in some cases at least. Second, it is important to be aware of a legal difference between
two states on racial profiling in traffic law enforcement. In WA, pretext traffic stop has been ruled illegal since 1999 (*State v. Ladson*, 138 Wn.2d 343[1999]), but it is not banned in SC. Thus, in SC, the legal use of pretext stop and minority representation should theoretically work in opposite directions to impact white police decision making and that may contribute to the null results found there. In WA, however, behavioral shifts of white officers should be primarily driven by the change in minority representation since pretext stop, which is often racially motivated, is prohibited. The legal constraint should provide a more stringent test against the hypotheses, but one may be cautious when comparing two states side by side because they are not readily comparable due to different legal contexts.

**Robustness Check**

Main findings above are based on linear specifications, the notion of critical mass, however, suggests that only when the organization is adequately diverse, bureaucrats may begin to change their behavior (e.g., Kanter 1993; S. Nicholson-Crotty, Nicholson-Crotty, and Fernandez 2017). To account for the possibility of non-linearities in the relationship between minority representation and white police actions, a series of sensitivity tests are performed. Results are included in appendix. Specifically, quadratic terms (figure A1-1.1, 2.1, 3.1 and 4.1) and quartiles of representation variables (figure A1-1.2, 2.2, 3.2 and 4.2) are used to model curvilinearity. Supplementary analyses find consistent patterns with primary results.

**Further Discussion**

The interesting pattern of more evident effects of Hispanic representation invites further discussion. This section discusses two potential explanations, the first of which concerns the
degree of discrimination experienced by a certain group of drivers. As explained earlier, hit rate test indicates that policing on Hispanic drivers, in current data of both states, appear to be largely driven by biases (i.e., significantly higher search rate but much lower hit rate compared to other groups of drivers). As expected, this is exactly where representation may matter the most in terms of reducing biases in police actions.13

Second, social control and racial threat theory suggest that large or growing minority populations increase the likelihood that majority-controlled institutions, such as the police, will engage in social control activities (Blalock 1967). As such aggressive policing is likely to be used unevenly on racial minorities that grow fast and pose threats to the dominant group. However, a greater representation of that minority group on force has the potential to mitigate negative consequences of intensified and biased policing (Nicholson-Crotty et al. 2020). Figure 5 as below plots the demographic changes in WA and SC during the past two decades. As we can see, the share of Hispanic population has been dramatically growing in both states, especially in WA. Black population, on the other hand, remains a relative stable element of local populations over time. As a result, Hispanic group may pose more perceptible challenges and threats, socioeconomically and politically, to the dominant white group. It may then lead to aggravated police control over them, which is oftentimes racially biased, unfortunately. For the reasons discussed before, representation is likely to manifest itself in circumstances where bias largely drives policy results.

[See Figure 5]
Conclusions and Contributions

This article theorizes that representation of minorities in public organizations changes majority members’ behavior and leads eventually to improved policy results for minority clientele. By using longitudinal micro-level data that allow a close examination of individual officers’ behavior in traffic law enforcement in two states, analyses find supporting evidence for that supposition. Specifically, when working in units that are more representative of minorities, white police are found to shift their behavior toward drivers of color in traffic stops – their search and hit rates of minority motorists become increasingly similar to those of white drivers. Results are particularly consistent in the case of Hispanic representation, potentially for reasons discussed at the end of last section.

This article makes several contributions as follows. First and foremost, it fills in an understudied yet very important area in the theory of representative bureaucracy and advances our understanding of the micro-level working mechanisms that underlie representation processes. With past research mostly focusing on the provision of active representation by minority bureaucrats and symbolic effects, this article takes another approach to examine positive spillovers of representation and empirically shows that bolstered outcomes can also be a product of a change in the behavior of majority public administrators. Second, the results communicate with and complement the large and long running interdisciplinary research on race and policing. Through the lens of representative bureaucracy, it details nuanced ways in which officer attributes work interactively with institutional characteristics and organizational dynamics to impact policy results. Third, methodologically, the use of individual-level data avoids issues of
ecological fallacy, which has been pervasive among past empirical studies in representative bureaucracy (Bradbury and Kellough 2011).

The study of majority bureaucratic behavioral change in representative organizations is important for more than theoretical reasons. If ultimately the goal is to use research findings to inform future reforms that aim to achieve equitability for citizens who have been historically mistreated in policing, accurate knowledge of underlying causal links then matters because different mechanisms would suggest different managerial solutions. As aforementioned, scholars and policy activists have long contended that the lack of representation is likely a cause of racial disparities in policing, and thus have advocated diversifying police force as a candidate solution to the problem. Mixed results regarding its effectiveness, however, may make police executives hesitate on implementing the idea, especially when underrepresentation of minorities in police is pervasive nationwide and it is practically difficult to recruit and retain minority officers (e.g., Kennedy et al. 2017). Findings in this study, however, uncover an overlooked benefit of police representation, and suggest that the presence of more minority officers improve minority citizens’ outcomes, even without individual-level racial congruence. Instead, it does so by changing how white officers treat citizens of color. Recognizing this, building a diverse police force is still an appropriate and promising focus for future reforms.

Moreover, it is not an unattainable goal. Data in this study show that, on average, a district of WA State Police is staffed with about 83 troopers. Thus, 1 percentage-point increase in Hispanic representation substantively suggests adding only one more Hispanic officer, which seems to be an implementable managerial change. Policy implication for SC is similar, because the average staffing level there is about 120 troopers per district. Alternatively, this suggests to
us that creating a diverse environment that allows intergroup learning and adaption to happen is the key. A small increase in minority representation on force may go a long way to eventually produce and deliver desirable outcomes to citizens.

Limitations and Future Directions

Several limitations warrant attention and future inquiries. First, this study is unable to precisely determine the mechanisms of majority behavioral change due to unavailability of related data. Combining several possibilities, behavioral alteration on the part of majority administrators is theoretically expected, however, it remains empirically unclear, with current research, which process(es) the observed behavioral shift is attributed to – re-socialization leading to reduced implicit bias, greater report of discriminatory behavior, and /or changed organizational norms/policies. They could be mutually exclusive or reinforcing. A closer investigation into them is of great value for future research because it would suggest different management practices.

Another limitation regards officer discretion when enforcing traffic laws. This research does not, again due to data constrains, differentiate between discretionary and mandatory search. The latter is dictated by legal requirements and organizational procedures, and thus is where representation effects are the least likely to occur, because it limits the space for police to engage representation behavior. It would be ideal for future research to control for this aspect or to perform sub-analyses for situations where officers have varying degrees of freedom.

Next limitation concerns generalizability issue. First, as briefly discussed before, the fact that the two states under examination are distinct in many aspects should make the findings
somewhat generalizable if one were to draw inferences to other places across the country. That being said, future research certainly will benefit from replicating this study in other geographic locations. Second, external validity of single-state studies may be less of an issue if the goal is to generalize results to other units of analysis, such as public administrators and bureaucracies, instead of states themselves. One may argue that the uniqueness of police profession limits the extrapolation of current results to other public organizations because those may differ drastically in cultures and practices. It is equally important, however, to recognize the similarities between law enforcement and other public services. For instance, public education and social welfare programs are featured as well with a high degree of racial disproportion in outcomes and a large zone of discretion for bureaucratic representation to happen. Therefore, one may expect the theoretical framework developed herein to be reasonably applied in other public sectors, and it merits future exploration to put the question asked here into test in different policy domains and examine it with other policy outcomes.

Notes

1. In *Whren v. U.S.* (517 U.S. 806 [1996]), the Supreme Court unanimously decided that stops justified by minor traffic violations may be used as a pretext for a criminal investigation. Put differently, the practice of pretext stops is constitutional so long as the officer has a legal justification for stopping the vehicle. At the state and local levels, however, because of the high correlation between pretext stops and racial motives, some states, such as Washington, and some local jurisdictions have made them illegal.

3. This study uses “language community” in Swiss federal workforce as the identity indicator, instead of race/ethnicity and gender.

4. Though these are prerequisites that scholars have identified for active representation among minority bureaucrats to occur, they are necessary to consider for representation to transform majority behavior.

5. The rise of investigatory stops happens within a larger background of change in policing practice. In 1980s, policing moved away from a reactive to a proactive approach with the aim to deter crimes by taking preventative measures. The number of police-initiated contacts with the public has dramatically increased following the shift, and those encounters tend to be aggressive because police are trained, encouraged or even required, under the new model, to operate under the assumption of suspicion and distrust (Epp, Maynard-Moody, and Haider-Markel 2014; Fagan and Geller 2015; Harcourt 2003). Legal justifications for investigatory stops come from two important Supreme Court rulings. First, *Terry v. Ohio* (392 U.S. 1 [1968]) significantly lowered the bar for police to pat down/frisk an individual – they can do so based on “reasonable suspicion”, instead of “probable cause.” Later in 1996, as mentioned in Note 1, *Whren v. United States* validated the right of officers to stop a vehicle for any traffic violation, however minor it might be. These rulings jointly have given the police the upper hand in traffic law enforcement.

6. See [https://openpolicing.stanford.edu/](https://openpolicing.stanford.edu/) for more information. The team requested data nationwide and was able to obtain records from some states but not all.

7. Due to specific needs of variables in empirical tests of *this* study, the availability of data is limited to WA and SC only. States that choose to report traffic policing records with greater
detail may differ from those that chose not to, and these differences may matter for whether and
how police representation works to improve racial equity. The author acknowledges the caveat
that current research is not able to control this aspect.

8. First, including the shares of black and Hispanic populations accounts for two competing
possibilities. For one, social control and racial threat theories suggest rising minority populations
in local communities may lead to aggressive policing by white-dominated institutions and thus
result in larger racial disparities. Alternatively, “learning and adaptation” by white officers likely
occur outside the working environment. Increase of minority populations in communities where
officers have close contact with may impact their behavior. Second, political culture/ideology
may correspond to different incentives for and a varying level of reliance on racial profiling.
Republicans are more likely to promote “law and order” whereas Democrats may place more
emphasis on equality. Therefore, the share of democratic votes is expected to be positively
correlated with the reduction in racial disproportion in outcomes.

9. The full model is \( Y_{ijt} = \alpha_1 B_{ijt} + \alpha_2 BRep_{jt} + \alpha_3(B_{ijt} \times BRep_{jt}) + \beta_1 H_{ijt} + \beta_2 HRep_{jt} + \beta_3(H_{ijt} \times HRep_{jt}) + \sigma_1 O_{ijt} + \sigma_2 ORep_{jt} + \sigma_3(O_{ijt} \times ORep_{jt}) + \pi_1 F_{ijt} + \pi_2 FRep_{jt} + \pi_3(F_{ijt} \times FRep_{jt}) + X'_{ijt} + \theta_t + \tau_c + \rho_j + \varepsilon_{ijt} \), where \( O_{ijt} \) indicates other race, \( F_{ijt} \) means
female driver. \( ORep_{jt} \) and \( FRep_{jt} \) measure other-race and female representation on police force,
respectively.

10. The reference search rate in WA is white officers’ proportion of search on white drivers of all
stops. It happened 2.2 times of 100 stops. The relative increase of search on black drivers is
obtained through dividing 1.65 by 2.2, which is a 75% relative increase from the baseline. The
relative changes throughout the article are calculated in the same way.
11. Black representation, however, does not work in expected ways in SC (figure 2 right panel). In this case, white officers search less accurately on black drivers than on white drivers, even when that racial group is highly represented in their units.

12. Prohibition of pretext stop does not impact current estimations in WA because the legal change didn’t occur during the analytic window. Results in SC are not impacted by this either because pretext stops are not banned.

13. The searches of black drivers in two states do not present a definite pattern of biased policing during the study period, at least not according to the outcome test – searches of this group were not systematically less accurate than those of white drivers, as table 1 indicates. That said, it does not negate the discrimination against black drivers, since the test is merely one indicator and is limited in its scope. Instead, it suggests that there is more to explore about traffic law enforcement on that group of motorists.
References


Liang, Jiaqi, Sanghee Park, and Tianshu Zhao. 2020. “Representative Bureaucracy,


Riccucci, Norma M., Gregg G. Van Ryzin, and Huafang Li. 2016. “Representative Bureaucracy and the Willingness to Coproduce: An Experimental Study.” *Public Administration Review*


doi:10.1017/S0003055418000862.

Wilder, David. 1986. “Social Categorization: Implications for Creation and Reduction of


## Tables and Figures

Table 1. Probability of Search and Hit, by Officer Race and Driver Race, in Two States

### Panel A: Washington

<table>
<thead>
<tr>
<th>Driver Race</th>
<th>Search</th>
<th>Officer Race</th>
<th>Hit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>White</td>
<td>Black</td>
<td>Hispanic</td>
</tr>
<tr>
<td>White</td>
<td>.022</td>
<td>.019</td>
<td>.022</td>
</tr>
<tr>
<td>Black</td>
<td>.054</td>
<td>.043</td>
<td>.045</td>
</tr>
<tr>
<td>Hispanic</td>
<td>.038</td>
<td>.036</td>
<td>.036</td>
</tr>
<tr>
<td>All</td>
<td>.025</td>
<td>.022</td>
<td>.026</td>
</tr>
</tbody>
</table>

### Panel B: South Carolina

<table>
<thead>
<tr>
<th>Driver Race</th>
<th>Search</th>
<th>Officer Race</th>
<th>Hit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>White</td>
<td>Black</td>
<td>Hispanic</td>
</tr>
<tr>
<td>White</td>
<td>.020</td>
<td>.022</td>
<td>.020</td>
</tr>
<tr>
<td>Black</td>
<td>.028</td>
<td>.030</td>
<td>.036</td>
</tr>
<tr>
<td>Hispanic</td>
<td>.074</td>
<td>.083</td>
<td>.078</td>
</tr>
<tr>
<td>All</td>
<td>.025</td>
<td>.028</td>
<td>.028</td>
</tr>
</tbody>
</table>
Table 2. Within Officer Estimation – Driver's Race, Representation and Policing by White Officers (Baseline Model)

**Panel A: WA**

<table>
<thead>
<tr>
<th>When a driver is ...</th>
<th>White Officer</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1) Search</td>
<td>(2) Hit</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>0.0165*** (0.00117)</td>
<td>-0.0169** (0.00573)</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.00818*** (0.000731)</td>
<td>-0.0759*** (0.00632)</td>
<td></td>
</tr>
</tbody>
</table>

**Representation**

<table>
<thead>
<tr>
<th></th>
<th>Black Representation</th>
<th></th>
<th>Hispanic Representation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-0.000286 (0.000271)</td>
<td></td>
<td>-0.00212 (0.00316)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.000127 (0.000233)</td>
<td></td>
<td>0.00411 (0.00274)</td>
<td></td>
</tr>
</tbody>
</table>

**Reference Rate**

<table>
<thead>
<tr>
<th>White-on-White</th>
<th>.022</th>
<th>.172</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>2,876,792</td>
<td>58,619</td>
</tr>
</tbody>
</table>

**Panel B: SC**

<table>
<thead>
<tr>
<th>When a driver is ...</th>
<th>White Officer</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1) Search</td>
<td>(2)</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>0.00662*** (0.000498)</td>
<td></td>
<td>0.00548 (0.00464)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.0485*** (0.00302)</td>
<td></td>
<td>-0.118*** (0.00847)</td>
</tr>
</tbody>
</table>

**Representation**

<table>
<thead>
<tr>
<th></th>
<th>Black Representation</th>
<th></th>
<th>Hispanic Representation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.000365 (0.000230)</td>
<td></td>
<td>0.00167 (0.00196)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.00198** (0.000658)</td>
<td></td>
<td>0.00407 (0.00707)</td>
<td></td>
</tr>
</tbody>
</table>

**Reference Rate**

<table>
<thead>
<tr>
<th>White-on-White</th>
<th>.020</th>
<th>.279</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>5,466,748</td>
<td>135,969</td>
</tr>
</tbody>
</table>

Note: (1) ^ p<.1  * p<.05  ** p<.01  *** p<.001; Standard errors clustered at officer level; (2) Estimations from baseline models; (3) A full set of fixed-effects, including year, month, stop hour and county, are included for WA; SC did not report stop hour and thus that fixed-effect is missing; (4) See appendix table A1-2.1 for full results.
Table 3. Within Officer Estimation – Driver's Race, Representation and Policing by White Officers (Interactive Model)

<table>
<thead>
<tr>
<th>Panel A: WA</th>
<th>White Officer</th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Search</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>White Officer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>When a driver is ...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>0.0152*** (0.00140)</td>
<td>-0.0228** (0.00852)</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.00949*** (0.00107)</td>
<td>-0.0847*** (0.00860)</td>
<td></td>
</tr>
<tr>
<td>Representation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black Representation</td>
<td></td>
<td>-0.000306 (0.000271)</td>
<td>-0.00248 (0.00318)</td>
</tr>
<tr>
<td>Hispanic Representation</td>
<td></td>
<td>-0.0000809 (0.000237)</td>
<td>0.00346 (0.00278)</td>
</tr>
<tr>
<td>Interactions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driver Black#Black Representation</td>
<td></td>
<td>0.000271 (0.000246)</td>
<td>0.00129 (0.00110)</td>
</tr>
<tr>
<td>Driver Hispanic#Hispanic Representation</td>
<td></td>
<td>-0.000342^ (0.000186)</td>
<td>0.00274^ (0.00150)</td>
</tr>
<tr>
<td>Reference Rate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White-on-White</td>
<td></td>
<td>.022</td>
<td>.172</td>
</tr>
<tr>
<td>N</td>
<td>2,876,792</td>
<td>58,619</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel B: SC</th>
<th>White Officer</th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Search</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>White Officer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>When a driver is ...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>0.00585*** (0.000825)</td>
<td>0.0155^ (0.00830)</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.0451*** (0.00338)</td>
<td>-0.121*** (0.0114)</td>
<td></td>
</tr>
<tr>
<td>Representation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black Representation</td>
<td></td>
<td>0.000341 (0.000228)</td>
<td>0.00206 (0.00195)</td>
</tr>
<tr>
<td>Hispanic Representation</td>
<td></td>
<td>0.00180** (0.000655)</td>
<td>0.00379 (0.00714)</td>
</tr>
<tr>
<td>Interactions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driver Black#Black Representation</td>
<td></td>
<td>0.0000687 (0.0000647)</td>
<td>-0.000788 (0.000583)</td>
</tr>
<tr>
<td>Driver Hispanic#Hispanic Representation</td>
<td></td>
<td>0.00335^ (0.00173)</td>
<td>0.00264 (0.00671)</td>
</tr>
<tr>
<td>Reference Rate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White-on-White</td>
<td></td>
<td>.020</td>
<td>.279</td>
</tr>
<tr>
<td>N</td>
<td>5,466,748</td>
<td>135,969</td>
<td></td>
</tr>
</tbody>
</table>

Note: (1) ^ p<.1  * p<.05  ** p<.01  *** p<.001; Standard errors clustered at officer level; (2) Estimations from interactive models; (3) A full set of fixed-effects, including year, month, stop hour and county, are included for WA; SC did not report stop hour and thus that fixed-effect is missing; (4) See appendix table A1-3.1 for full results.
Figure 1. Policing by White Officers on Black Drivers in WA, at Different Levels of Black Representation
Figure 2. Policing by White Officers on Black Drivers in SC, at Different Levels of Black Representation
Figure 3. Policing by White Officers on Hispanic Drivers in WA, at Different Levels of Hispanic Representation
Figure 4. Policing by White Officers on Hispanic Drivers in SC, at Different Levels of Hispanic Representation
Figure 5. Minority Population Change in Washington and South Carolina (2000-2013)
Essay 2: Critical Mass Condition of Majority Behavioral Changes in Representative Bureaucracy: A Nonparametric Exploration

Abstract: Literature on representative bureaucracy examines how demographic characteristics of bureaucrats can be transformed into substantive effects for clients who share those characteristics. One strand of research focuses particularly on “critical mass,” considering it a condition needed to be met before this transformation can occur. Empirical evidence varies greatly across policy contexts, levels of analysis and estimation techniques. This article proposes two major ways to improve precision in critical mass literature. First, in theory, clarify and explicate the mechanism through which representation happens. Second, in estimation, adopt a nonparametric strategy that is not subject to specification errors. This article attends specifically to how minority representation changes majority behavior and evaluates its critical mass condition. Using traffic stop data in Washington and South Carolina, analysis find that when racial minority officers constitute about 9-11 percent on force in WA, white officers begin to show less biased behavior towards drivers of color. A similar threshold on black representation is found in SC, but with an additional turning point estimated to be around 23 percent.

Keywords: representative bureaucracy; critical mass; decision making; law enforcement
Introduction

Literature on representative bureaucracy examines how demographic characteristics of bureaucrats in public organizations can be converted into substantive effects for client groups that share those characteristics (Mosher 1968; Meier 1993b). One strand of research focuses particularly on the concept of critical mass, considering it a condition for the successful transform from passive to active representation. Drawing heavily from Kanter’s seminal work on critical mass (Kanter 1977a; 1977b), representative bureaucracy scholars routinely hypothesize that there exists a threshold and that active representation may only occur after the composition of the minority group reaches that tipping point. The intuition is that members of the minority group will begin to act in the way that promotes their identity, preferences, and interests, only when they are empowered by a sufficiently large number of peers of similar backgrounds within the organization. Empirical evidence regarding where the critical mass is, however, is thus far decidedly mixed, varying across policy contexts, levels of examination and estimation techniques (e.g., Meier 1993a; Atkins and Wilkins 2013; Andrews and Miller 2013; Nicholson-Crotty, Nicholson-Crotty, and Fernandez 2017; Grissom, Rodriguez, and Kern 2017).

In part, the inconsistency in extant empirical literature is due to a lack of concrete and micro theorizing about critical mass in representative bureaucracy (Meier and Xu 2021). One important gap exists that the underlying mechanisms of passive-active transform of representation are largely unspecified when scholars develop hypothesis on critical mass. One traditional view, adopted by most critical mass studies thus far, posits that bureaucrats act in the interests of clients of same characteristics (Selden 1997; Keiser et al. 2002; Wilkins 2006; Nicholson-Crotty et al. 2016). As a result, work to date has been exploring the minimum level of
representation above which minority bureaucrats are more willing to adopt that representative role. This article contends that, before any estimation, one needs theoretical clarification. Because the concept of critical mass is rooted in the intergroup dynamics that shift with the change in group composition, it is important to explicate the underlying relationship – whose behavior is altering due to the accumulation of minority members in the organization? Is a critical mass required for that behavioral change to occur and if yes, where that tipping point empirically is?

Taking a different approach from previous studies, this article attends specifically to the behavioral adjustments initiated on the part of majority group, when minority presence within the organization increases to a critical level. Representation research has long speculated such theoretical possibility (see Lim 2006 for a review), and a recent empirical study by Li (2021) finds quantitative evidence supporting this supposition. That work, however, adopts a linear approximation strategy and does not explicitly address the critical mass condition for majority bureaucrats’ behavioral alterations to become visible.

Using traffic stop data in Washington (2009-2016) and South Carolina (2005-2016), this article empirically estimates the critical mass beyond which majority white officers circumscribe their pre-existing biases and begin to improve performance on minority citizens in stop encounters. Theoretically, it adds clarification to the conversation on critical mass, representative bureaucracy and more broadly speaking, organizational behavior. Methodologically, it uses nonparametric approach to investigate the effects of minority police representation, but in a flexible semiparametric framework where other variables are added linearly. Nonparametric estimation has the advantage of not imposing restrictions on functional forms. In other words, it
makes no prior assumptions about the shape of the relationship between regressor of interest and dependent variable. Thus, it has a great potential to bring more precision to the empirical literature.

Finding shows that in WA, when black officers constitute approximately 9 percent of the force, white officers begin to show behavioral change towards drivers of that racial group. Specifically, their search of black drivers become more successful while the overall levels of search and stop decrease. A same but less notable pattern is found for Hispanic representation, and the turning point falls around 11 percent. Consistent with results in WA, in SC, 9-11 percent of black representation is shown to have similar effects on white police behavior. Additionally, a second turning point shows around 23 percent where the success of search improves while law enforcement activities reduce. Interestingly, the critical mass points found here does not seem to be “massive” numbers, smaller when compared to those found in previous studies. Thus, this article offers some discussion on how critical mass in both “quantity” and “quality” of intergroup contact may impact outcomes.

The remainder of the article proceeds as follows. The first section briefly reviews relevant literature on critical mass in organizational behavior studies. The second evaluates where the empirical evidence stands regarding critical mass in representative bureaucracy scholarship. This section also identifies a major shortcoming in current literature and develops a more precise expectation that a critical mass of minority representation is needed for majority bureaucrats to change behavior. Next, it introduces data, variables, and method, followed by a presentation and further discussion of the findings. In the final section, it draws conclusions and implications.
Critical Mass, Intergroup Processes and Performance

The notion of critical mass is rooted in the original theory developed by Kanter (1977a). In her book titled *Men and Women of the Corporation*, she conducted case studies of 20 saleswomen’s experiences with working in a male-dominated organization, a multinational Fortune 500 firm with 300-person sales force. The aim was to better understand how numerical gender composition impacts organizational processes. She first used the term “token” to define the subgroup that represents less than 15 percent of the overall workforce. Tokens lack the power and are in a disadvantaged position to initiate changes within the organization. As a result, they attempt to minimize their differences with others and keep a low profile. Not until the presence of tokens reaches a critical mass of 15 percent can we observe them starting to break silence. She also suggested, however, for tokens to assert their social identities and advocate for their preferences, an even higher proportion should be obtained (above 35 percent) (Kanter 1977b). Although some have questioned the arbitrary nature of her drawing of the cutoff points, many turn to Kanter’s early work as a framework to study group size and conformity behavior of minority members, and 15 percent has often been seen and used as the “magic number.”

Building upon Kanter’s seminal work, one stream of research in the broad literature on diversity tackles the question of critical mass. A line of business research suggests that corporate decision-making and subsequent performance are products of varying degrees of group composition at the board table. It contends that an increase in the number of minorities on corporate boards results in a buildup of critical mass that will substantially change power balance and add to firm performance (e.g., Bear, Rahman, and Post 2010; Campbell and Minguez-Vera 2008; Fredette and Sessler Bernstein 2019; Mahadeo, Soobaroyen, and Hanuman 2012). When
exploring how large that critical mass should be, many of those studies measure diversity in the board room as a “ratio,” as suggested by Kanter’s conceptualization of critical mass. However, some of them end up finding, and sometimes explicitly build their hypotheses on, the phenomena of “at least three” – having three members of the minority group on a corporate board represents the tipping point of change (Torchia, Calabrò, and Huse 2011; Konrad, Kramer, and Erkut 2008; Joecks, Pull, and Vetter 2013). Put differently, critical mass is seen in those works as the “size” of the minority group, and three is the “magic number.” This conceptualization is somewhat different from Kanter’s critical mass and builds on Asch’s work on conformity. The famous Asch experiment concludes that a majority size of three would suffice for the full force of group pressure to be felt. Further increasing the size adds little to the overall effect (Asch 1955). It is an enduring academic debate that what constitutes a critical mass that matters for intergroup processes and organizational decision making, and what the most accurate way to model its shape should be (see Bond 2005 for review of conformity and group size).

**Critical Mass in Representative Bureaucracy**

**Where Does Empirical Evidence Stands?**

Empirical literatures that examine critical mass in representative bureaucracy thus far offer a decidedly mixed picture, at best, of where the threshold points stand. Previous findings vary by the levels of the organization (i.e., representation in managerial position vs at street level), data at use (i.e., aggregate vs individual), services under examination and estimation techniques.
Meier (1993a) is the first to empirically test whether a numerical threshold is required for Latina principals to positively impact educational outcomes of Latina students in Florida public schools. Using school district data, it finds that the levels of critical mass vary, depending on the outcome under examination but they fall within the range of 16 to 26 percent. It, however, finds that no critical mass is needed for teachers to affect the same outcomes.

Also in the setting of public education but with a non-educational outcome in question, Atkins and Wilkins (2013) find that black teachers in Georgia public schools need to obtain a critical mass of at least 20 percent before any significant decrease in black teen pregnancy rates can be observed. In another study, Atkins, Fertig, and Wilkins (2014) use a nationally representative longitudinal survey of adolescents and find that when Latino/a teachers constitute about 40 percent of the school, Latino/a student’s self-reported college expectations begins to increase. Interestingly, the authors also examine how co-ethnic representation may affect students’ perceived connection to their schools and their expectations of graduating colleges. They predict that when the percentage of black teachers reach 70 percent, beyond the sample range, school connectedness reported by Latino/a students will begin to rise. When Latino/a teachers reach a critical mass of 23-28 percent, white students’ college expectations and feelings about school connections both begin to increase. Using a national representative sample of schools, Grissom, Rodriguez, and Kern (2017) uncover evidence of nonlinearities as suggested by critical mass that when black/Hispanic teachers reach 20-30 percent, proportions of black/Hispanic students being placed into gifted programs increase. However, they also find that around the same tipping points, the percent of gifted white students begin to decrease at nearly the same magnitude as the increases found among students of color, which suggests a zero-sum trade-off.
In another service context – policing – Nicholson-Crotty, Nicholson-Crotty, and Fernandez (2017) hypothesize a quadratic shape of the relationship between the black officers’ representation on force and the death of black citizens at hands of police. In their analysis of 100 largest cities in 2014 or 2015, the authors find that a pattern that is consistent with the nonlinear hypothesis and estimate the inflection point to be approximately 42 percent, after which the number of police-involved homicides of black citizens begins to drop. They also acknowledge that the very limited number of police departments with high black representation makes the estimation and inference highly sensitive to specification errors.

Some studies do not find favoring evidence for critical mass argument. For example, when evaluating the relationship between gender representation and the performance of fire authorities in England, Andrews, Ashworth, and Meier (2014) find no evidence of critical mass at upper levels. They speculate that it concerns the very low number of females in managerial positions in fire service. Andrews and Miller (2013) similarly do not find nonlinearities in how women representation on police force affect arrests of domestic violence in England. A plausible explanation they offer is that for active representation to occur (i.e., domestic violence arrests increase), it is necessary that women officers have a sufficient amount of discretion to influence frontline police activities. Using data on national departments in South Africa, Fernandez, Koma, and Lee (2018)’s estimation demonstrates a rather linear relationship between black/female representation and departmental performance. Using school data in Ghana, Agyapong (2018) even find that after certain inflection points, additional increase of female teacher representation negatively impacts girl’s performance on math and science.
With regards to estimation techniques, a method commonly used in the literature to identify the critical mass point is to estimate the model with the variable of interest squared (Meier 1993a; Andrews and Miller 2013; Atkins, Fertig, and Wilkins 2014; Fernandez, Koma, and Lee 2018; Nicholson-Crotty, Nicholson-Crotty, and Fernandez 2017; Agyapong 2018). Another common approach is to separate the percentage of representation variable into adjacent ranges and then add a series of categorical indicators in the model to capture the nonlinearities (Atkins and Wilkins 2013; Grissom, Rodriguez, and Kern 2017).

The fairest summary of empirical evidence up to this point regarding where critical mass stands is probably that we simply do not know. The test for critical mass is often treated as one subpart of the core analysis or as a robustness check that is presented in addition to main findings. This article makes it the primary concern, and to gain a better understanding of whether and when it is needed to generate positive changes, the next section revisits the literature for more theoretical clarification.

What Mechanism and Which Critical Mass?

When estimating critical mass in representative bureaucracy, empirical studies as reviewed above mostly assume that the working mechanism underpinning the active representation effects is the adoption of representative role by minority bureaucrats. Under right institutional conditions, racial and gender minority bureaucrats will act actively in a way that promotes substantive interests for those clients of same demographic backgrounds (Meier and Nigro 1976; Selden 1997). One of those institutional factors is the presence of a critical mass of minority bureaucrats (Keiser et al. 2002). However, decades of representation research have developed more insights about the causal paths that underlie the translation of passive to active
representation. For example, in addition to active advocacy by minority bureaucrats, symbolic representation posits that minority representation in public organizations can change the attitude and behavior of those who are on the receiving ends of symbolization. Research has shown that bureaucratic clients view representative public agencies as more legitimate and co-produce with them more willingly (e.g., Gade and Wilkins 2013; Riccucci, Van Ryzin, and Li 2016). Alternatively, the presence of minority co-workers can indirectly affect the behavior of majority bureaucrats, changing their treatment of minority clients (e.g., Selden, Brudney, and Kellough 1998; Atkins and Wilkins 2013).

Importantly, the extent to which the notion of critical mass has applications to representative bureaucracy theory depends on the specific working mechanisms being investigated. In other words, one may expect differently about where the critical mass is, or even it is necessary, contingent on the type of representation in discussion. Early studies in representative bureaucracy have outlined some theoretical predictions. For example, Thompson (1976) posits that the linkage between passive and active representation is likely to increase when minority bureaucrats work in close proximity to each other, which will reinforce their tendency of adopting the advocacy role. It then implies the need of a critical mass of minority members in the organization. Hindera and Young (1998) similarly argue that the transform of passive to active representation relies on an enhanced minority presence, but different from previous work, they suggest the possibility of more than one single critical mass point – there might be additional ones where minority representation level increases to the point where the group constitutes a plurality and when organization becomes a minority-majority. Taking another approach, Henderson (1978) suggests that passive-active translation of representation conditions on the degree of bureaucratic representation resembling demographic composition of the local
population, and thus one may project a critical mass that instead depends on the clients’
characteristics rather than the bureaucrats’ only. As such, to hypothesize more precisely about
the threshold effect in representation bureaucracy, it first needs a clarification – whose behavior
is being examined, and which critical mass point is being estimated?

This study attends specifically to the much less examined mechanism in the literature
where learning and adaptation are initiated on the part of majority bureaucrats due to spillovers
of minority representation. As noted above briefly, representative bureaucracy scholars have
long suggested that majority bureaucrats may alter their behavior that eventually deliver
beneficial outcomes to minority clientele when working alongside more minority co-workers
(see Lim 2006 for a review). Majority behavioral shifts could be a product of any, or a
combination, of the following processes. First, the presence of, and a higher number of,
minorities in the organization increases the risk that discriminatory behavior against minority
clients will be observed, reported and held accountable (Juris and Feuille 1973; Thompson
1976). If it is a check-and-constraint mechanism at work, it is a credible hypothesis that a critical
mass is needed, to raise the majority’s concern of being reported to the level that they curb
biased behavior consciously. Second, increased minority representation may change procedures,
policies, acceptable behavior, norms and even cultures within the organization, which in turn
regulate majority bureaucrats’ actions (e.g., Roch, Pitts, and Navarro 2010; Atkins and Wilkins
2013). If this is the case, one can reasonably expect a critical mass – possibly a very high number
of minorities and more presence of them in key positions with managerial power – is needed for
the purpose to change organizational factors that are notoriously difficult to alter, such as
organizational culture.
Perhaps the most prominent way that majority members change their behavior is through intergroup contact. Contact hypothesis, originating from Allport (1954)’s foundational work, conjectures that interpersonal contact can be an effective way to reduce prejudice between groups. Compelling evidence over decades generally substantiates this hypothesis. In an influential review of over 500 studies, Pettigrew and Tropp (2006) conclude that intergroup contact can contribute meaningfully to prejudice reduction. A decade later, Paluck, Green, and Green (2019) update the original meta-analysis and attend to new research with experimental design. They find that the majority of studies they review indeed show positive effects of contact. In addition to attitude change, intergroup contact can induce actual behavioral shifts. As one example, using data from U.S. Air Force Academy, Carrell, Hoekstra, and West (2019) assess how random exposure to black peers in freshman year affect white students’ subsequent behavior when selecting roommates in the second year and find that they are significantly more likely to do so. More recently, an experiment study by Mousa (2020) randomly assigned Iraqi Christians displaced by the Islamic State of Iraq and Syria (ISIS) to two soccer teams, one with all Christian members and the other mixed with Muslims. It finds evidence that cross-group contact improves Christians’ behavior toward Muslim teammates and they are shown to be more likely to vote for Muslims for sportsmanship award, to sign for a mixed team next season, and to keep training with them half a year after the intervention.

In representative bureaucracy, intergroup contact effectively means that the presence of minority bureaucrats can re-socialize those in the majority group through frequent contacts, which further lead to majority’s increased empathic understanding of unique challenges historically disadvantaged clients are faced with, and their updates and revision of sometimes-faulty perceptions about minority clients (Selden 1997; Lim 2006; Nicholson-Crotty et al. 2016).
For example, in Atkins and Wilkins (2013)’s qualitative interviews of public school teachers in Georgia, they find that white teachers sometimes intentionally seek advice from their black co-workers because they are cognizant that racial congruence with black students matter for improved teacher-student interactions in some sensitive occasions. Quantitative test is relatively rare in work to date but a recent study by Li (2021) demonstrates empirically that white officers treat citizens of color in a similar way to their racial in-group white drivers, when working alongside more minority colleagues. Combined, if a bias reduction mechanism via intergroup contact is at play, it is very likely that the organization needs a sufficiently large number of minorities to sustain those intergroup exposure and contacts.

Taken together, a need of critical mass is indicated by all processes discussed above but how large the number should be is \textit{a priori} unknown. This article empirical tests that critical mass condition, and the examination is implemented in the context of traffic law enforcement with the use of individual-level data in two U.S. states and over multiple years.

**Data, Variables and Method**

**Data**

Traffic stop data at use are drawn from the states of Washington (WA) and South Carolina (SC), collected originally by Stanford Open Policing Project. The choosing of states is in large part bounded by practical issues of data availability. Despite that law enforcement data are becoming more transparent and increasingly available for public and research use, the degree of details in the data is unlimitedly determined by individual agencies’ recording and reporting protocols. For purposes of this research, at minimum it requires the variables of officer
race/ethnicity, if a search was performed in a stop and if that search was successful. Of all public-use datasets at Stanford project, WA and SC serve as the best places available at this point to explore the topic of critical mass. Each entry in the original data is a stop record and they include the population of traffic stops made by State Police over multiple years, spanning from 2009 to 2016 in WA, and from 2005 to 2016 in SC. Stop-level data are collapsed into an officer-year structure that reports each white officer’s traffic law enforcement activities and performance, by driver’s racial group, including the number of stops, how many of those stops led to search made, and the number of cases where contraband was found following the search.

**Method and Variables**

Given that the functional form of critical mass is *a priori* unknown, this research adopts a nonparametric strategy to investigate the possible nonlinear effect of minority representation on policing outcomes. Nonparametric approach is well suited for this purpose in that it is agnostic about the functional form of the model and thus is not subject to misspecification errors. For more flexibilities, in operation it uses the procedure of semiparametric regression that estimates the variable of interest (i.e., representation) nonparametrically while simultaneously allowing for other variables to enter the model linearly.\(^4\) The equation to be estimated has the following form:

\[
y_{it}^r = f(Rep_{it}) + \alpha_i + \theta_t + X_{it}\beta + \epsilon_{it} \quad (1)
\]

\(i = 1, \ldots, N\) denotes individual white officer, \(t = 1, \ldots, T\) indexes time period (i.e., year). On the left side, three dependent variables are examined, by driver’s racial/ethnic group (i.e., the superscription \(r\)). The first is hit rate – the fraction of contraband discovery of all searches performed. In policing research and among practitioners, hit rate is commonly used as a
convenient and intuitive indicator for discrimination in law enforcement activities (e.g., Knowles, Persico, and Todd 2001; LaFraniere and Lehren 2015; Department of Justice 2015). It assumes that officers aim to maximize hit per vehicle search, and thus it must equate across driver group in equilibrium because otherwise police can shift behavior strategically to perform more searches on the group with a higher propensity of contraband discovery. As such, a significantly low hit rate is indicative of bias against that group of drivers. If minority representation has the effects as hypothesized above, one would except a positive association between hit rates for black/Hispanic drivers and representation of black/Hispanic officers. To better understand the source of change in hit rate, it additionally examines another two outcomes, search number and stop number.

On the right side, \( f(\cdot) \) is an unknown smooth function of dependent variable, which is expected to be nonlinear and is the nonparametric part of primary interest. Independent variables of representation \( \text{Rep}_{it} \) are coded as percentage of black/Hispanic officers in each police district (i.e., the unit where officers interact with each other). In these data, black representation ranges from 0 to 12.06 percent in WA state police, with a standard deviation of 3.74. The distribution of Hispanic representation is very similar, falling between 0 and 14.58 percent with a standard deviation of 2.69. SC state police has a much higher level of black representation with a more dispersed distribution. It ranges between 1.65 and 34.97 percent, with a standard deviation of 7.34. Hispanic representation is very limited, between 0 and 6.16 percent and the standard deviation is 1.09.

To address individual’s time-invariant unobserved heterogeneity and common time trends that change from period to period, the model adds sets of dummy indicators for each
officer ($\alpha_i$) and each year ($\theta_t$). Control variables $X_{it}$ contain several characteristics of the jurisdiction that may correlate with both independent and dependent variables are considered. First, percentages of black and Hispanic populations in police district are included in that the jurisdiction-wide population serves as the pool from which state police draw its workforce. They may also impact outcome variables because, as suggested by racial threat theory, a larger share of minority population may engender heightened social control behavior of white-dominated police. Second, percentage of democratic votes in presidential elections is accounted because political orientations may correspond to different incentives of racial profiling in law enforcement, and to differential use of practices such as affirmative actions that increase racial representation on police force. Individual indicators, year dummies, and control variables above enter the model in a linear fashion.

To further simplify notations, the above Equation (1) can be alternatively stated in the matrix-vector form:

$$ Y = F(Rep) + X\gamma + \epsilon $$

(1-1)

where $Y$ is a $NT \times 1$ vector with elements of $y_{it}$. $F$ is the unknown function $f(\cdot)$ of research interest. $X$ here includes both elements of $X_{it}$, $\alpha_i$ and $\theta_t$ in previous equation. $\epsilon$ is the error term and is assumed to have zero correlation with $Rep$ (i.e., $E(\epsilon | Rep) = 0$).

The semiparametric model is fitted using Robinson’s double residual methodology (Robinson 1988). In the first step, conditional expectation is applied on both sides of Equation (1-1) that results in Equation (1-2):

$$ E(Y | Rep) = F(Rep) + E(X | Rep)\gamma $$

(1-2)
By subtracting (1-2) from (1-1), we have:

\[ Y - E(Y|\text{Rep}) = [X - E(X|\text{Rep})] \gamma + \epsilon \quad (1-3) \]

If the conditional expectations are known, parameter \( \gamma \) can be estimated by fitting the above Equation (1-3) using ordinary least squares (OLS). If they are unknown, however, they need be estimated by calling on some consistent estimators \( g_y(\text{Rep}) \) and \( g_x(\text{Rep}) \). To approximate the unknown conditional expectations \( g \), for example, Verardi and Debarsy (2012) propose to use local polynomial fit. Alternatively, it can be fitted with other method such as series estimation (e.g., Baltagi and Li 2002). Either way, by estimating \( E(Y|\text{Rep}) \) and \( E(X|\text{Rep}) \) using some nonparametric function \( g \) and replace them in the above equation, we have two residual components, \( \epsilon_1 = Y - \hat{g}(Y|\text{Rep}) \) and \( \epsilon_2 = X - \hat{g}(X|\text{Rep}) \).

Next, by regressing \( \epsilon_1 \) on \( \epsilon_2 \) using OLS, it is possible to obtain a consistent \( \hat{\gamma} \), which can be plugged back into Equation (1-1) and then we have an error component that can be calculated as below:

\[ \widehat{U} = Y - X\hat{\gamma} = F(\text{Rep}) + \epsilon \quad (1-4) \]

In the final step, the curve \( F(\cdot) \) can be directly modeled by regressing \( \widehat{U} \) on \( \text{Rep} \) through using any nonparametric methods. Verardi and Debarsy (2012) make the above procedure available for Stata users with command “semipar,” where nonparametric fits in all stages are Gaussian kernel-weighted local polynomial regressions. But note that the command also makes it possible to recover the error component on the left side of Equation (1-4), therefore, the last stage fit can be performed in flexible ways to draw any kind of nonparametric regressions.
Findings

Linear Model

Prior to the core results of non-linear estimations, it first shows the linear specification of how minority representation may impact white officer’s law enforcement behavior and performance on minority drivers. Table 1 as below presents corresponding results with two panels representing two states and three columns exhibiting models run with three outcome variables, respectively. Full results are shown in appendix table A2-1.1. For the primary interest, column 1 shows that most of the representation variables positively impact hit rate, consistent with theoretical expectation. If the expected bias reduction, due to enhanced black/Hispanic representation, occurs on the part of white officers, one would expect more of their success in finding contraband after searching black/Hispanic drivers. Note that, however, first, none of the estimated coefficients on representation variables, regardless of states and outcomes, are statistically significant. Therefore, it cautions against reading much into these linear results but rather consider it as a preliminary understanding of the data. Second, the interpretation of changes in hit rate needs to be combined with those changes in search (column 2) and stop (column 3), which are again found to be insignificant statistically in linear specifications.

Before moving on, it is helpful to pause for a moment and think through different scenarios where an increased hit rate can be observed. For one, hit number increases or remain constant while police lessen their search activity. Alternatively, search increases but hit number rises at an even faster speed. Both scenarios would favor the theoretical expectation of white officer’s behavioral change, but with subtle substantive differences. The former scenario suggests an improvement in policing efficiency and accuracy – search less but find more. The
latter one results in a higher hit rate that may come with elevated police targeting at certain driver group, assuming that the driver population and its composition in local area remain relatively constant over a short period of time.

[See Table 1]

Semiparametric Regressions

This section presents estimation results from using a semiparametric regression procedure. The output consists of both a table that reports the estimated coefficients of the linear parts of the model and a graph that illustrates the functional form of the nonlinear component, that is, the relationship between percent black/Hispanic officers on force and stop outcome under examination. Given the main interest of this article, graphs are presented as below, and the table is included in appendix table A2-2.

To start with findings in WA, in figure 1, lines in three panels exhibit the local polynomial smooth function of the relationship between black representation and three policing outcomes on black drivers, respectively. These are generated by fitting Equation (1-4). Shaded areas around the lines correspond to 95% confidence intervals. The points in each graph are error components that have been partialled out from officer individual and year fixed effects and adjusted for the linear effects of control variables. As a result, values on y-axis do not represent the predicted dependent variables, however, given the procedure explained above, the function form represents the relationship of interest. To answer the question of critical mass, keep in mind that the goal when reading the graph is to examine curvilinearities in the functional form and to look for the turning point where the relationship significantly changes.
As suggested by the left panel, hit rate on black drivers has a significant and pronounced jump when the proportion of black officers goes from 6 to 9 percent, after which there is no evidence suggesting continued improvement in search performance. To further understand where this change in hit rate comes from, we turn to the other two panels on search and stop numbers. Both of them have a significant and sharp drop in the neighborhood where hit rate begins to rise. These patterns, taken together, support a bias reduction hypothesis, and the improved search performance appears to be primarily driven by reduced police targeting at this group of drivers.

[See Figure 1]

Moving on to the results of Hispanic representation shown in figure 2, hit rate slightly trends upwards across the range of Hispanic representation. Towards the high end, starting from 11 percent to 15 percent, there seems to be a significant but minor uptick. Overall, it presents a rather linear relationship between hit rate on Hispanic drivers and the level of representation of that ethnic group on police force. When it comes to white police search and stop of Hispanic drivers, both numbers trend downwards with more pronounced curves, and they begin to present a sharp decrease around 11 percent on Hispanic representation, with those places having the highest proportion of Hispanic officers showing the lowest numbers of search and stop. Taken together, similar to previous case of black drivers, the improved hit rate of Hispanic drivers, accompanied by reduced law enforcement activities on them, supports the hypothesis and the threshold point here is estimated to be around 11 percent.

[See Figure 2]
Results in SC are displayed in figure 3 and 4 for black and Hispanic representation, respectively. To begin with black representation, nonparametric fit in the left panel demonstrates again that hit rate increases with an enhanced level of black representation. It first undergoes a significant growth when black officers constitute around 9-11 percent of the force. Another more pronounced jump happens at approximately 19-23 percent, after which no significant continued improvement is found towards the end. Combining patterns of search and stop, in both neighborhoods where hit rate increases, search number remains relatively constant, with a minor decrease around 19-23 percent. Stop number goes through a small dip between 9-11 percent but it has a significant and substantial increase when black representation rises to 19-23 percent. As such, these favor the hypothesized representation effect, however, keep in mind, the improved hit rate at the high end of black representation may have come with heightened police scrutiny at black drivers.

[See Figure 3]

Figure 4 shows that Hispanic representation in SC does not appear to change white officers’ stop and search behavior (middle and right panels), given the almost unchanged curves across the board. Hit rate (left panel) seems to trend downwards slightly when Hispanic representation increases, but the wide confidence bands indicate less precision in estimation.

[See Figure 4]

Further Discussion: Quantity vs Quality of Intergroup Contact

While the findings presented above add evidence to the supposition that a minimum “quantity” of exposure to minority group is needed to improve inter-racial behavior of majority
members of the organization, interview data with several police agencies indicate that the sustained and meaningful contacts, in other words, the “quality” of contact, among officers matter as well. For example, a police official at Washington State Police (WSP), in a semi-structured interview with the author, mentioned that “as an attachment, there’s a very tight camaraderie within that unit... usually at some point during those shifts, all the ones that are working go to break, spend some lunch or whatever it is together. It tends to be a lot of opportunities and time spent in interaction.” The attachment is an institutional arrangement in WSP where several troopers are attached to one sergeant, and it constitutes the base unit of traffic policing. The referred “camaraderie” is certainly not formed overnight and is very likely a product of repeated and substantial interactions over a relatively long period of time. As another example, a sergeant from Indiana State Police said that “they [troopers] do gradually form friendships through scheduled assignments. I cannot tell you how many different personalities have come together because they just continually work and go to calls together. So, they become friends and they were not necessarily friends before when they worked different shifts.” It again indicates that iterations of contacts, especially those deep encounters (e.g., being friends), may drive officer’s behavioral change. In addition to on-job exposure, it seems that interactions occur frequently off duty. Both officials interviewed mentioned that family gatherings (e.g., camping) or children attending the same school being important ties that create more opportunities of interactions of different kinds outside officer’s work environment.

Taken together, both “quantity” and “quality” of contact may contribute in important ways to intergroup relations but keeping these two aspects distinct would help to better understand their differential roles in mediating the relationship between intergroup contact and the outcome. For example, some past research finds that improved quality of interactions, more
so than the quantity, predicts positive outgroup attitudes and helping behavior (e.g., Pettigrew and Tropp 2006; Johnston and Glasford 2018). However, there are also studies finding that the two have roughly the same effects. For instance, the aforementioned study by Carrell et al. (2019) on white students’ roommate selection decision finds that one standard deviation increase in their black peers’ aptitude has the same impact on revealed preference for black roommate as does one standard deviation increase in the number of black peers. More research is certainly needed in future to keep exploring the mediation path, and one credible hypothesis could be that critical mass in numbers serves as an antecedent to contact of high quality.

Differentiating quantitative and qualitative effects can also be important policy wise. Current practices that aim to enhance diversity of public workforce, such as affirmative actions, place an emphasis on increasing the number of employments of historically underprivileged groups. It is a necessary first step for the ultimate purpose to derive benefits of diverse workforce. Policymakers and practitioners, however, may consider a holistic approach, for example, to follow diverse recruitment with practices that foster and sustain meaningful intergroup contacts if the “quality” of exchange, not merely the opportunity, is what needs to be accomplished for real attitude and behavioral change.

Conclusion, Contributions and Limitations

This article is interested in the phenomena of critical mass in organization and seeks to assess such condition in representative bureaucracy. Prior studies have produced varied findings across levels of examination, contexts, and techniques, leaving the field to question which pattern of critical mass are reliable and which are noise. This article proposes and implements two major ways to improve precision in critical mass studies. First, it argues that the underlying
mechanisms through which passive representation can be converted into substantive benefits needs to be specified prior to any hypothesizing and testing of critical mass. While work to date has not been able to offer an adequate level of such clarification, this article does so by attending specifically to how minority representation affects members in the majority group and then evaluates the critical mass condition where majority behavioral change becomes visible. Second, the modeling techniques used by past research to estimate critical mass are subject to misspecification because they make assumptions about the functional form of the relationship between passive and active representation, whereas that shape is \textit{a priori} unknown. This article adopts a semiparametric framework that estimates the variable of interest (i.e., minority representation) nonparametrically but flexibly allows linear effects of other variables. Nonparametric estimation allows the data to speak for themselves and thus adds precision to the empirical literature. It constitutes one major methodological contribution.

Using traffic law enforcement data in WA and SC, which allow one to observe individual-level policing behavior as well as organizational-level characteristics, this article finds evidence in favor of critical mass requirement in representative bureaucracy. Nonparametric estimation shows that when the level of minority representation on WA state police force rises to about 9-11 percent, white officers’ hit rate on drivers of color improves (as an indication of less biased police behavior) without imposing heightened police scrutiny over them (i.e., search and stop do not increase while hit rate goes up). In SC, consistent results around 11 percent are found for black representation, but an additional turning point where hit rate experiences a second round of improvement shows when black officers constitute approximately 23 percent of the force. However, this time it is slightly different because police activities on black drivers elevate at the same time.
This research is of course without limitations and there are several that need to be acknowledged. First, the scope of current research is restricted in part by data availability to two states only and is limited to a single context of traffic policing. Organizations under examination offer a relatively narrow range of representation. Given the characteristics of law enforcement and as seen in the data, the proportion of black/Hispanic officers on average does not exceed 15 percent. A longer spectrum that may be found in contexts outside law enforcement would allow one to further test the supposition of multiple critical mass points as suggested by Hindera and Young (1998). Findings in SC seem to be an early indication of future research in that direction. Another limitation concerns the inadequate information to measure the nature and quality of interaction among officers, and thus it cannot differentiate the role of “quantity” and “quality” of intergroup contact. It however merits future investigation, as explained above. Next, this article only attends to one specific representation process (i.e., majority behavioral change) that is conditioned by critical mass. Research in next steps can certainly be more comprehensive and examine how critical mass condition may differ across types of representation and actions involved, such as symbolization, advocacy, policy change, etc. Despite the limitations, this article serves as one small step towards a much broader future research agenda that aims to achieve both theoretical clarification and empirical precision when evaluating how the linkage between passive and active representation can be strengthened under the condition of critical mass. It takes a first cut at adopting nonparametric strategy in estimating effects of interest and the semiparametric regression framework used here can be readily applied in future inquiries.
Notes

1. First, most of these studies investigate gender minority (i.e., women on board), not racial/ethnicity minority group. Second, see Zaichkowsky (2014) for an example that challenges the critical mass of three. That study finds that the presence of merely one woman on board would make a difference and more importantly, the critical mass number should be contingent on the size of board and type of industry.

2. Outcomes examined in that paper include disciplinary actions, such as corporal punishment, out-of-school suspensions and expulsions, and academic grouping of students, for example, assignment to gifted classes and alternative education.

3. One exception is Atkins, Fertig, and Wilkins (2014). The authors use interview data to find evidence that there are multiple pathways linking passive and active representation, including black teachers acting as role moles for black teens; black teachers actively participate in shaping policies and practices; black teachers impact white co-workers’ behavior.

4. It would be ideal to specify the entire model nonparametrically. However, it will suffer from the “curse of dimensionality,” requiring large samples and intensive computational capacities. It also makes it hard to visualize a regression surface in more than three dimensions.
References


Thompson, Frank. 1976. “Minority Groups in Public Bureaucracies: Are Passive and Active

https://doi.org/10.1007/s10551-011-0815-z.

https://doi.org/10.1177/1536867x1201200411.


### Tables and Figures

**Table 1. Linear Model of Effects of Minority Representation on White Police Behavior and Performance on Minority Drivers**

<table>
<thead>
<tr>
<th>Panel A: WA</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td></td>
<td>Hit Rate</td>
<td>Search Number</td>
<td>Stop Number</td>
</tr>
<tr>
<td>% Black Officer</td>
<td>1.231 (1.136)</td>
<td>0.476 (0.561)</td>
<td>6.992 (8.635)</td>
</tr>
<tr>
<td>N</td>
<td>2,332</td>
<td>4,554</td>
<td>4,554</td>
</tr>
<tr>
<td>% Hispanic Officer</td>
<td>0.782 (0.441)</td>
<td>-1.026 (0.655)</td>
<td>-17.84 (10.90)</td>
</tr>
<tr>
<td>N</td>
<td>2,767</td>
<td>4,720</td>
<td>4,720</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel B: SC</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td></td>
<td>Hit Rate</td>
<td>Search Number</td>
<td>Stop Number</td>
</tr>
<tr>
<td>% Black Officer</td>
<td>0.280 (0.479)</td>
<td>0.182 (0.158)</td>
<td>-0.120 (2.199)</td>
</tr>
<tr>
<td>N</td>
<td>3,848</td>
<td>6,627</td>
<td>6,627</td>
</tr>
<tr>
<td>% Hispanic Officer</td>
<td>-0.725 (1.172)</td>
<td>0.203 (0.406)</td>
<td>1.556 (1.979)</td>
</tr>
<tr>
<td>N</td>
<td>2,443</td>
<td>5,780</td>
<td>5,780</td>
</tr>
</tbody>
</table>

Controls: Yes  Yes  Yes  Yes
Year Fixed Effects: Yes  Yes  Yes
Individual Fixed Effects: Yes  Yes  Yes

Note: standard errors in parentheses; estimated coefficients on controls not shown; see table A2-1.1 in appendix for full results.
Figure 1. Nonparametric Estimation of the Relationship between Black Representation and Policing Outcomes on Black Drivers in WA.
Figure 2. Nonparametric Estimation of the Relationship between Hispanic Representation and Policing Outcomes on Hispanic Drivers in WA.
Figure 3. Nonparametric Estimation of the Relationship between Black Representation and Policing Outcomes on Black Drivers in SC.
Figure 4. Nonparametric Estimation of the Relationship between Hispanic Representation and Policing Outcomes on Hispanic Drivers in SC.
Essay 3: Identity, Intersectionality and Bureaucratic Decision Making

Abstract: The rich literature on representative bureaucracy has well established that identities greatly impact bureaucratic decision making. Far less is known, however, whether – and how – intersections of those identities shape the process. Drawing from literatures on representation and intersectionality, this study seeks to fill in that void. Analyses using individual-level data on traffic stops in two states over multiple years indicate that officer’s race/ethnicity and gender jointly shape police decision to search. Identity congruence decreases search probability when Hispanic male police in WA and black female police in FL encounter same-race female drivers. Evidence of intersectional congruence is also found among the latter. It contributes directly to representative bureaucracy theory by addressing the omission of intersectionality. It expands intersectionality literature to the public administration context and speaks to policing research by adding new nuances of intersectionality in understanding disparate policing outcomes.

Keywords: intersectionality; representative bureaucracy; bureaucratic decision-making; law enforcement; traffic stop
Introduction

Representative bureaucracy scholarship has well established that social identity profoundly shapes bureaucratic decision making (e.g., Atkins and Wilkins 2013; Keiser et al. 2002; Meier 1993; Meier and Stewart 1992). There is considerable evidence showing that, under right conditions, racial minority and female bureaucrats likely embrace the “role of representative,” and act in the way that advances substantive interests of the clients who share their backgrounds (Selden 1997). One important gap remains, however, because work to date has not been able to sufficiently address the reality of intersectionality in bureaucratic decision making. The theory of intersectionality, at its core, contends that individuals are constantly challenged to respond to the numerous privileges and/or constraints that are associated with various social roles they occupy, which are defined simultaneously by identities such as race, ethnicity, gender, class, and profession (Crenshaw 1989; Hancock 2007a). Given that, the question for representative bureaucracy scholars, and those who study administrative behavior broadly speaking, to answer becomes if – and how – bureaucrats respond in terms of the multiple social identities they possess.

Scholars have long called for more research attention to intersectionality in public administration (e.g., Breslin, Pandey, and Riccucci 2017; Meier 2018). Despite a small number of recent research that aims to answer to that call (e.g., Assouline and Gilad 2022; Butz and Gaynor 2022; Fay et al. 2020), our knowledge in this area is rather limited, especially at the individual bureaucrat level. In part it is because of a heavier focus on the citizens side in past research to study how their intersecting attributes are perceived by bureaucrats and thus impact their access to public benefits. It is in another part due to limited availability of administrative
records that document interactions happened in bureaucrat-client dyads. Empirical research is therefore constrained in scope of investigation – by construction, those data do not allow us to unpack how cross-cutting identities impact bureaucratic behavior.

With these theories and challenges in mind, this article seeks to answer the following questions: does one single identity predominates bureaucratic decision making? If not, how do multiple identities work jointly to influence that process and the eventual policy results? For the manageability of empirical inquiry, current study focuses on race/ethnicity and gender only, although it is important to note that intersectionality research goes far beyond these two and discuss widely other sources of identities (Dhamoon 2011; Wadsworth 2011).

In the context of law enforcement, this article examines the effects of race/ethnicity and gender, both separately and intersectionally, on police decision to conduct search in a traffic stop. Using data on millions of micro-level traffic stops in Washington (2009-2016) and Florida (2010-2018), results show that, first, race/ethnicity and gender jointly shape search decision. White male police present the most distinctive search behavior among all, and they usually have the highest search propensity. Relative to that group, women and racial minority officers tend to search less but their behavior generally cannot be differentiated statistically. Second, identity match matters, in some cases at least. When Hispanic male police in WA and black female police in FL encounter in-group female drivers, racial/ethnic congruence is found to decrease search probability. Among the latter group, there is also evidence suggesting that intersectional congruence of both identities reduce search likelihood to the least when black female police stopping black female drivers.
This article complements multiple streams of literatures. The contributions are threefold. First, it directly engages with the omission of intersectionality in representative bureaucracy literature that may bias our understanding of bureaucratic decision making. Second, it adds to the intersectionality literature by expanding it to the context of public administration. It is a setting that is much less examined by intersectionality scholarship but begins to gain more attention recently (e.g., Assouline and Gilad 2022; Butz and Gaynor 2022). Different from those works, this article takes another approach to focus explicitly on cross-cutting identities of bureaucrats. Third, it advances our understanding of identity-based disparities in policing outcomes by considering new nuances and intricacies of officer’s intersecting identities, with past work mostly focusing on driver’s characteristics.

The remainder of the article proceeds as follows. It starts with a review of literatures on representative bureaucracy and intersectionality. By identifying the missing linkage between the two research traditions, it outlines a series of theoretical expectations. Next, it contextualizes the empirical setting in which above hypotheses are tested. It then provides specifics on data, variables, and methods. Finally, it presents and discusses the findings. Limitations and future directions are discussed before conclusions are drawn.

**Representative Bureaucracy: Identity Matters in Bureaucratic Decision Making**

The theory of representative bureaucracy contends that more demographically diverse bureaucracies (“passive representation”) produce more democratic outcomes through more responsive public policies and administrative actions (“active representation”) (Kingsley 1944; Mosher 1968). At the individual level, it suggests that identities, such as race, ethnicity and gender, *directly* shape bureaucratic decision making and policy outcomes that may follow in two
ways at least.\(^1\) First, bureaucrats who exhibit certain demographic characteristics tend to advance substantive interests of their clients of similar attributes, because shared identities lead them to be more understanding of and sympathetic to the challenges faced by similar clients (Krislov 1974; Meier and Nigro 1976; Selden 1997; Zwicky and Kübler 2019). Alternatively, identity congruence works on the mind of bureaucratic clients (Pitkin 1967), changing how they view the bureaucracy and how they interact with it. With symbolization, bureaucratic clients are found to be more positive in evaluating government (Riccucci, Van Ryzin, and Lavena 2014; Gade and Wilkins 2013; Riccucci, Van Ryzin, and Jackson 2018; Theobald and Haider-Markel 2008) and more likely to follow instructions and coproduce with public agencies (Riccucci, Van Ryzin, and Li 2016).

Representation does not occur naturally. Previous research has developed insights on several enabling conditions under which it is more likely to manifest, including, sufficient discretion for bureaucrats, high relevance for the outcome for both bureaucrats and clients, and sufficient impact of bureaucratic decisions on the demographic group in question (Keiser et al. 2002; Meier and Bohte 2001; Sowa and Selden 2003; Riccucci and Meyers 2004).

When foregoing conditions are present, empirical research across a variety of service sectors has repeatedly shown a translation of passive representation to policy outputs favoring the represented demographic group. Just to name a few, in public education, Meier, Wrinkle, and Polinard (1999) find that standardized test scores of minority students increase as school districts hire more minority teachers (see also Meier and Stewart 1992; Meier 1993). Keiser et al. (2002) find similar effects with female representation of math teachers. In federal procurement, Fernandez, Malatesta, and Smith (2013) find that enhanced minority representation enables
agencies to become more effective at achieving the legislatively mandated goal of promoting minority-owned small business participating in federal contracting. In child support service, Wilkins and Keiser (2004) find that an increase in the number of female supervisors is associated with greater child support enforcement. In loan application, Selden (1997) finds that the percent of racial minority administrators in the U.S. Department of Agriculture’s Farmers Home Administration (FmHA) is positively associated with an increase in the number of loan eligibility awards favoring minority loan applicants. In law enforcement, Meier and Nicholson-Crotty (2006) find a positive relationship between proportion of women officers in police organization in large metropolitan areas and the number of sexual assaults reported and the number of arrests for those assaults.

Note that studies mentioned above make claims about the impact of racial/gender representation at the organizational level. Looking at individual bureaucratic behavior, there is also evidence validating the passive-active representation link. For instance, using surveys to FmHA county individual supervisors in 10 southern states, other aspects of Selden’s work on farmers’ loan application find that the adoption of “minority representative role” significantly predicts their decisions to favor minority applicants (Selden 1997; Selden, Brudney, and Kellough 1998). Nicholson-Crotty, Grissom, and Nicholson-Crotty (2011) find that black teachers are more likely to refer black students into gifted programs than their white counterparts are (see also Grissom, Nicholson-Crotty, and Nicholson-Crotty 2009). Wilkins (2006) shows that female supervisors in child support enforcement agencies in Missouri prioritize certain child support goals and spend their time differently than their male counterparts. In the area of law enforcement, the primacy concern of this article, empirical studies have documented some
behavioral differences across officer race, ethnicity, and gender, which will be discussed with more detail in later section for better flow of writing.

Taken together, empirical evidence thus far supports that identities matter in bureaucratic decision making under right conditions. One important omission exists, however, as many scholars have pointed out that intersectionality creates nuanced and unique variation in bureaucratic decision making yet remains a reality that is largely unaccounted for and under-explored empirically (e.g., Bearfield 2009; Breslin, Pandey, and Riccucci 2017). Recent studies focus on the intersectional attributes of citizens and how those uniquely impact their interactions with public agencies, for example, Butz and Gaynor (2022) find that transgender women of color, due to their compounding disadvantaged identities, avoid seeking welfare benefits and are more likely to report discriminatory experience in interacting with social welfare offices. Assouline and Gilad (2022) find that bureaucrat’s categorization of applicants of state incapacity benefits are jointly shaped by the applicant’s multiple identities that include ethnic group, gender, and work history. Only a handful of representative bureaucracy scholars recently began to empirically explore the pattern of intersectionality in bureaucratic active representation. The most recent study by Fay et al. (2020) seeks to assess how matched intersectionality across race/ethnicity and sex of both representatives and the represented impact outcomes in higher education. It, however, does not directly get at individual intersectionality due to the use of aggregate data at group level.

**Intersectionality: Race versus Gender or Race and Gender?**

The theory of intersectionality starts with the notion that individuals are situated in multiple systems of stratification, defined by social constructs such as race, ethnicity, gender,
religion, sexuality, class, profession, etc. Therefore, they constantly find themselves challenged to simultaneously respond to the numerous privileges and/or disadvantages that are bestowed on the various social roles they occupy (Collins 2000; Cho, Crenshaw, and McCall 2013; Crenshaw 1989; Hancock 2007b). As a result, multiple identities may inform and modify one another in ways that create many variations within a single stratum of people, so that “there are unique, non-additive effects of identifying with more than one social group” (Stewart and McDermott 2004).

Normatively, intersectionality discourse establishes that intersectional groups that have multiple disadvantaged statuses, such as black women and Latinas, are “doubly bound” (Gay and Tate 1998). They face discrimination on the basis of both their race/ethnicity and gender (Collins 2000; Crenshaw 1991). Due to the simultaneity of racism and sexism, two identities may work together to create a unique aggregate that differentiates them from other race/ethnicity-gender subgroups who share only part or neither of their identities. Put another way, women of color experience the world differently from black/Latino men or whites (Simien 2007; Jordan-Zachery 2007; Crenshaw 1991; Hancock 2007a). Despite the normative discourse, empirical literatures that aim to disentangle the relationship between racial and gender identifications present a somewhat mixed picture.

**Race versus Gender**

Rhetoric analysis of social movements, and identity politics more broadly, sometimes treats racial and gender identifications as competing forces to each other. For instance, gender equality movements may view fights for other forms of inequalities as “distractions” and implicitly require racial minority women to temporarily shift their focus away from racial
injustice (Giddings 1984; Davis 1999). In a similar fashion, civil rights movements may postpone gender related conversations intentionally, in order to prioritize resources for the fights over racial inequality (King 1988; Roth 2004; Engel and Calnon 2004; Gay and Tate 1998).

Under this race vs gender view, though rarely explicitly articulated as such, it is almost as if two identities exist in a zero-sum relationship. Individuals are assumed to centralize one identity at a given time, as the master status, over the other(s), and the commitment to that primary identity by default consumes the awareness of the other (Harnois 2014). Consequently, as Settles (2006) points out, black women may feel forced to choose between their dual identities, especially when they are faced with scenarios that pit interests/beliefs/aims/goals of the group representing black and that representing women against one another.

Some early quantitative studies find indicative evidence that racial identity takes precedence over gender in individual decision making. In studying the nomination of Supreme Court Justice Thomas, Mansbridge and Tate (1992) find that a majority of black women respondents in their survey showed disbelief in Anita Hill’s charges of sexual harassment against Thomas, despite high levels of expressed support for feminist causes among them. Gay and Tate (1998) similarly find that black women identify more strongly with their race than they do on the basis of gender, when asked about their policy attitudes about six social welfare programs, three of which are race-salient and the other three with general purposes. Levin et al. (2002) find that expectations concerning discrimination, among black women and Latinas, are informed more by their perceptions of ethnic discrimination, rather than by those of gender discrimination. While acknowledging the possibility of intersectional effects, this study ultimately positions race/ethnicity as a competing force to gender.
Race and Gender

The intersectional framework to understanding discriminatory experience sees race and gender as reinforcing forces to each other. As Crenshaw (1991) articulates, “… the experiences Black women face are not subsumed within the traditional boundaries of race or gender discrimination as these boundaries are currently understood… [T]he intersection of racism and sexism factors into Black women’s lives in ways that cannot be captured wholly by looking at the race or gender dimensions of those experiences separately.” In sharp contrast to previous view, intersectional approach posits that a person’s experience with one form of discrimination does not necessarily detract from his/her awareness of other categories of inequality. Instead, consciousness in one identity may serve to increase consciousness in the other. For example, women of color who show strong identification with their race/ethnicity are more likely to support feminist movements (and vice versa), because they are more readily recognizant of and are sympathetic with the doubly jeopardized situations faced by their unique group in the society. Wilcox (1990) refers to this as a “contagion effect.”

Past work has lent some empirical support to the assertion that race/ethnicity and gender work interactively to shape individual perceptions, attitudes, and behavior. To name a few, Baxter and Lansing (1983) draw from a survey on women liberation movements and find that black women, relative to white women, are much more likely to express supportive attitudes for the cause of gender equalities. With national survey data, Simien and Clawson (2004) similarly find a positive correlation between feminist identification and race identification among black respondents in terms of their attitudes about abortion rights and affirmative actions. More recently, Harnois (2014) finds that women of color are more likely to perceive multiple sources
of discrimination at work, including those based on race/ethnicity, gender, and age. Using General Social Survey data, Zhu and Wright (2016) show that neither race nor gender fully account for the variation in public opinion on the role of government in health care. Rather, intersections of race, gender and ideology jointly provide a more comprehensive understanding of sub-populations’ policy attitudes. Slightly different from studies aforementioned, Philpot and Walton (2007) adopt an intersectional framework and argue that higher degree of political candidates’ attributes resembling those of the voters yields greater support. They find that black women candidates find the strongest support from black women voters who match with them on both dimensions.

Intersectional framework is generally viewed as an important progress in understanding discrimination and inequalities because it considers the reality that multiple systems of disadvantages work with and through each other (Zinn and Dill 1996). Rather than one identity predominating over others, it is perhaps a more accurate capture of the reality that multiple identities work in synergy to define an individual’s experience with discrimination, worldviews, as well as decisions made and actions taken (Settles 2006; Simien and Clawson 2004).

**Intersectionality in Bureaucratic Decision Making: Some Expectations**

This section develops some theoretical expectations by bringing research traditions on intersectionality and representative bureaucracy together. First, intersectionality literature suggests that bureaucrats, as *individual persons*, undergo a decision-making process whereby two competing possibilities may occur. On one hand, one identity enjoys primacy over the other, and thus has a single main effect on decision making; on the other hand, multiplicity of identities
works with and through each other to inform individual decisions in a more sophisticated way that goes beyond simple main effect.

**Hypothesis 1a** (single main effect): Either race/ethnicity or gender of bureaucrats will significantly predict their decision making.

**Hypothesis 1b** (intersectional effect): Race/ethnicity and gender will jointly shape bureaucratic decision making. In other words, decision-making patterns will vary across bureaucrats of different race/ethnicity-gender groups.

Second, representative bureaucracy theory reminds us that decision making of bureaucrats are different from that process of individual persons, because it happens in public administrative contexts where dual processes of service provision and receiving occur simultaneously. As a result, not only bureaucrats’ identities matter, characteristics of those on the service receiving end are also important parameters in the function of administrative actions, because the degree to which identities match between two ends likely impact the bureaucrat-client interactions. One may theorize that identity congruence, especially intersectional congruence, would lead to improved outcomes:

**Hypothesis 2**: Administrative outcomes will be improved when clients are treated by bureaucrats of same identities. The interactions in which both race/ethnicity and gender match will produce the best outcome.

One may also reasonably expect that, however, H2 is likely to hold particularly strong among *racial and gender minorities*, given the identity salience. Some of the working mechanisms underlying representative bureaucracy are grounded in intergroup theories that have
well established that individuals tend to evaluate others categorically as either “ingroup” (i.e., those of same identities) or “outgroup” (Tajfel et al. 1971; Turner 1982; Macrae and Bodenhausen 2000). They are far more likely to show empathy for, cooperate with, and take action to benefit ingroups (e.g., Brewer 1979; 1998; Bowles and Gintis 2004; Mifune, Hashimoto, and Yamagishi 2010; Batson and Ahmad 2001). However, this ingroup serving tendency is *asymmetrical* across social groups that possess different power status. For example, whites, who occupy the racial majority social location, are found to be less group-oriented and are far less likely to identify with their racial ingroups than racial minorities do (e.g., Mathur et al. 2010). Minorities tend to adhere strongly to their racial groups, partially due to their relatively smaller size (Brewer 1991) and/or perceptions of common fate due to shared experiences of discrimination (Branscombe, Schmitt, and Harvey 1999; Sellers et al. 1998). In parallel, representative bureaucracy literature has focused almost exclusively on the behavior of racial minority and female bureaucrats, sometimes suggesting explicitly that the representative role is most likely to be adopted by those from historically underserved groups, such as Kranz (1974) argues that “minority and female ‘representatives’ as a group will more closely mirror the needs and wishes of their group, whether overtly or subconsciously, than non-minorities do.” For these reasons, one can expect a more noticeable pattern, predicted by H2, to emerge in those interactions between minority/female bureaucrats and their ingroup clients.

**An Empirical Test**

Hypotheses stated above are tested in a series of analyses of police search decision during traffic stops. The setting of traffic law enforcement provides two advantages at least. First, it is an ideal context for theory testing because in making decision to search or not, officers have low
information but have high discretion, and their decision is heavily informed by demographic identities, of both drivers and themselves. The following parts provide further explanations. Second, the availability of large-N administrative data with rich information on traffic stops provides great empirical traction because it allows for an individual-level examination to unpack each scenario of police-civilian encounters, which past research generally lacks.

**Traffic Policing: Decision Making with Low Information and High Discretion**

Traffic stop creates a decision making environment with limited information (Baumgartner et al. 2020) – after stopping a vehicle, the officer usually has only a brief interaction with the motorist to make a quick judgement about the level of suspicion and if that warrants a search. The officer tries to assess the entirety of the context in a stop in order to estimate the probability that a crime is being committed, for example, s/he may consider situational factors such as hour of the day (i.e., rush hour vs midnight), location (i.e., white vs minority concentrated neighborhood), condition of the car (which may signal poverty that is often perceived to be associated with criminality), in- vs out-of-state vehicle, and/or the driver’s behavior both prior to and during the stop (Baumgartner, Epp, and Shoub 2018; C. R. Epp, Maynard-Moody, and Haider-Markel 2017; Fagan and Geller 2015).

That said, police estimate the suspicion level only with information available to them at the time (Christiani 2020) and thus likely turn to surface-level attributes about drivers, at least partially and subconsciously, to make evaluations. Indeed, identity-based heuristics are found to be commonly used in policing, and biases against people of color are unfortunately shown to be widely held among officers (e.g., Correll, Urland, and Ito 2006; Correll et al. 2007; Eberhardt et al. 2004; Plant and Peruche 2005; Plant, Peruche, and Butz 2005).
Another important feature of police search in traffic stops concerns the high degree of discretion. Despite protocols to follow, officers have a good deal of autonomy when interpreting and implementing traffic laws on the ground (Baumgartner, Epp, and Shoub 2018). This is especially true in “investigatory stops” where stops are made not necessarily for the aim to enforce traffic laws but to check drivers who seem to be “suspicious” and of greater interests to police (C. R. Epp, Maynard-Moody, and Haider-Markel 2017). In these encounters, police can decide, at their own discretion, to prolong the interactions, for example, by conducting search, so long as it is deemed necessary to scrutinize the driver (C. R. Epp, Maynard-Moody, and Haider-Markel 2014).

**Identity-Based Stereotypes and Profiling**

The role of stereotypes might be blown out of proportion in a decision-making environment where low information is accompanied by high discretion (Fiske 1993; 1998), such as traffic stops. As a result, one may reasonably expect that implicit biases held by individual officers likely manifest in traffic policing. Among all heuristics, race, ethnicity, and gender are perhaps the most visible attributes and the most readily available information in the eyes of police (e.g., Devine 1989; Brewer and Lui 1989).

Germane to the topic of this article, multiple identities may accumulate when an officer calculates the suspicion level. Drivers who present a profile of more than one “suspicious” identity, relative to those who do not, may experience enhanced scrutiny and targeting. For example, race/ethnicity has been repeatedly found to be a significant predictor to the disproportion in numerous policing outcomes (e.g., Fryer 2018; Pierson et al. 2017; Headley and Wright 2020). On top of that, there is considerable evidence in criminal justice literatures
showing that “black” and “man” is the combination of characteristics that yields the strongest stereotypical association with crime, violence and weapon (Eberhardt et al. 2004; Welch 2007; Muhammad 2010; Nosek et al. 2007), which subsequently leads to a higher level of force used on them (Kahn and Martin 2020; Goff et al. 2016) and even “shooter bias” against them in fatal encounters (Correll et al. 2002). Similar effects are found among Latinos as well (Sadler et al. 2012). Even within communities of color, there is also subtle difference between profiling blacks vs Hispanics because of recent increases in immigration enforcement, which likely lead to a heightened scrutiny of the latter (e.g., Armenta 2017; Baumgartner, Epp, and Shoub 2018).

On the other extreme of the spectrum, whites are often seen with a positive image of wealth and legitimacy. They are assumed to be more peaceful and thus pose a lower level of threat (e.g., Winter 2006). Pro-white bias, as it is in many other aspects of societal systems, benefits them in police encounters such as less force during arrest, more leeway and more lenient treatment (Kahn et al. 2016). This is particularly true for white women, which is a group often deemed to be less culpable and more capable of reform (Bond-Maupin 1998; Brennan and Vandenberg 2009; Farr 1997), and thus deserve empathy and redemption instead of punishment (Dirks, Heldman, and Zack 2015). Women of color, on the other hand, are targeted by law enforcement with more suspicion and are incarcerated disproportionally high, compared to their white counterparts (e.g., Lawston 2008).4

As individual citizens’ characteristics compound, suspicion might be amplified or downsized, depending on the specific combination of identities. A handful of scholars have begun to examine the intersectional impacts of driver’s attributes on police actions during the
course of traffic stops and their findings are mostly consistent with patterns discussed above (e.g., Christiani 2020; Baumgartner et al. 2020).

**Police Characteristics Matter for Policing Outcomes**

As reviewed before, intergroup theories have provided many reasons to predict that police decision making will be impacted by their identities. Grounded in those theories, representative bureaucracy scholars regularly hypothesize that racial minority/female officers may engage in different forms of policing than their white/male counterparts because they likely view their ingroups with fewer implicit biases based on shared understanding of lived experience and thus interact with them in a communitively and respectful manner (Wilkins and Williams 2008; 2009; Hong 2017).

Empirical literatures have documented some differences in policing behavior along racial and gender lines. For example, Brown and Frank (2006) find that, in a study of Cincinnati police, white officer are more likely to arrest suspects than black officers do. Close and Mason (2006; 2007) find that minority drivers receive more favorable treatments from officers of same race/ethnicity, compared to their interactions with white police. Woods (2014) find that black and white officers approach policing differently, with the former having more concerns about escalating situations unintendedly and the latter being more aggressive. Most recently, Hoekstra and Sloan (2020) find that white officers use force 60 percent more on average than black officers and use force with a gun twice as often. This pattern holds particularly true when they are dispatched to minority neighborhoods. Shoub, Stauffer, and Song (2021) find that female officers search drivers in traffic stops with lower rate and at no cost to the efficiency of finding contraband. Another study by Ba et al. (2021) demonstrates that, with records of millions of
daily patrol assignments in Chicago Police Department, black and Hispanic officers make far fewer stops and arrests and use force less often. Female officers also use less force than do male counterparts, regardless of racial groups.

Police have intersectional characteristics. Depending on their race/ethnicity-gender subgroup, officers likely process and handle intersectional stereotyping in intersectional manners. Those differences in police decision making, however subtle, have important bearings on eventual outcomes that citizens experience in traffic encounters and may go a long way to shape their view of law enforcement, criminal justice, even the government more broadly speaking. The omission of intersectionality in previous work may have biased our understanding of the nuances in policing behavior and their implications.

Combined, to put H1 and H2 in context, first, officer’s race/ethnicity and gender will impact search decision. The empirical pattern is, however, a priori unknown. It is plausible that one of them is a stronger predictor than the other (H1a). Alternatively, both collectively shape search decision (H1b). Second, even when facing the same driver, officers may response differently, contingent on demographic match. H2 indicates that search probabilities of congruent encounters would be lower than mismatched cases. In those intersectionally matched encounters, search probabilities are expected to be the lowest. To be even more specific, for reasons discussed above about asymmetrical effects of ingroup serving, one may see that search rate is lower in stops where 1) black/Hispanic drivers encounter same-race officers, relative to when they encounter white police; 2) female drivers are stopped by same-gender officers, relative to male police; 3) black/Hispanic female drivers encounter officers who are also black/Hispanic females.
Data

This article uses traffic stop records from the states of Washington (WA) and Florida (FL), originally collected by Stanford Open Policing Project. Despite enhanced transparency efforts among police recently, data availability and degree of details come eventually down to individual agencies’ recording and reporting policies. To implement the test of this study, two pieces of information are needed simultaneously, at least: 1) race/ethnicity and gender, of both the officer and the driver; 2) if a search was performed in a stop. Of traffic law enforcement data publicly available, only WA and FL reported these and thus serve as the best available places at this point to explore the topic of interest.

These data document the population of traffic stops made by State Police over multiple years. The analytic window for WA is between January 2009 and March 2016 and is from January 2010 to 2018 in FL with July to December missing for year 2015. Each entry of the data is a stop record. In addition to the needed information previously mentioned, it reports other characteristics of the stop, such as stop time (year, month, and the hour of the day), location (county) and reasons.

Methods

Estimator 1

The first estimator, specified in the following Equation (1), treats identities as additive, rather than interactive. $i$ indexes traffic stop, $j$ indicates the officer and $t$ represents the time when the stop occurred. This model serves to test the single main effect stated in H1a, by including separate indicators of officer’s race/ethnicity ($R_j$) and gender ($G_j$). Driver’s identity
indicators are included as well ($R_{ijt}$ and $G_{ijt}$). Race/ethnicity has four categories of white, black, Hispanics and other races. Gender has two categories of male and female.

$$S_{ijt} = \alpha_1 R_j + \alpha_2 G_j + \beta_1 R_{ijt} + \beta_2 G_{ijt} + X_{ijt} + \theta_t + \tau_c + \sigma_d + \epsilon_{ijt} \quad (1)$$

Model above, and all the following estimators, use time fixed-effects (FEs) $\theta_t$ that include year, month, and stop-hour of the day. County FEs $\tau_c$ are also included to account for unobserved heterogeneities in location. Police unit FEs $\sigma_d$ are used as well in consideration of the differences, such as in policies and cultures, across organizational units (i.e., district/troop).

$X_{ijt}$ includes a set of covariates such as officer’s and driver’s age and stop types that are typically included in traffic stop analysis. In addition, first, workforce makeup variables, including the proportion of black, Hispanic, and female officers in each jurisdiction, are included to account for the effects of force diversity, as suggested by previous police representation studies. Second, the inclusion of minority population variables – black and Hispanic shares of local populations – considers the possibility proposed by social control and racial threat theories, which indicate that rising minority populations in local communities may lead to aggressive policing by white-dominated institutions and thus result in larger racial disparities. Third, political culture/ideology may correspond to different incentives for or reliance on racial profiling, for example, republicans are more likely to promote “law and order” whereas Democrats may place more emphasis on equality. Therefore, democratic share of presidential votes in the jurisdiction is added. When estimating Equation (1) and all following equations, both logit model and ordinary least squares model are fitted.
**Estimator 2**

Estimator 2 uses identity categorical variables that exhaust every race/ethnicity-gender combinations. There are eight categories in total in officer group indicator, as a product of four racial/ethnic categories and two sex groups ($R_G_j$). Group indicator for drivers is coded in the same way ($R_G_{ijt}$). Estimator 2 does not assume that one identity has a uniform effect, as Estimator 1 does. Instead, it allows for the impacts of one identity to vary based on the value of the other, and thus is suited to test intersectional hypothesis H1b.

\[
S_{ijt} = \alpha R_G_j + \beta R_G_{ijt} + \gamma (R_G_j \times R_G_{ijt}) + X_{ijt} + \theta_t + \tau_c + \sigma_d + \epsilon_{ijt} \quad (2)
\]

**Estimator 3**

Next, to test H2 – the extent to which police using race, ethnicity, and gender as cues to inform their search decision may differ across group and condition on identity match – Estimator 3 builds upon Estimator 2 but fully interacts group indicators of the officer and the driver. The goal is to identify each scenario of encounters and to compare side by side how each officer group responds to each type of drivers that may match with them on neither, one or both of race/ethnicity and gender.

\[
S_{ijt} = \alpha R_G_j + \beta R_G_{ijt} + \gamma (R_G_j \times R_G_{ijt}) + X_{ijt} + \theta_t + \tau_c + \sigma_d + \epsilon_{ijt} \quad (3)
\]
Findings

Descriptive Statistics

Before presenting main findings, table 1 as below describes the proportion of search performed, by officer and driver group, in two states. It serves as a baseline understanding of police search behavior in encounters with different types of drivers. Descriptive data show some relatively clear trends about the impacts of driver’s characteristics: 1) men of color are subject to the highest search rate among all; 2) female drivers are searched less than males are; 3) but women of color, compared to their white counterparts, are searched more frequently. The pattern of officer’s behavior across groups, however, is far more complex and subtle. It constitutes the major focus of this article and following analyses.

[See Table 1]

Race or Gender: Which Predicts Police Search?

Table 2 as below presents results of Estimator 1 that examines the main effect of a single identity on police search. Results are reported as odds ratio. Findings for WA and FL are exhibited in column 1 and 2, respectively. OLS results are included in appendix table A3-2.1. As a reminder, H1a builds upon the argument that race and gender are competing and separate forces. Therefore, it predicts that either one will be a significant predictor to the outcome, independent of the presence of the other, and if one identity takes precedence over the other, that primary identity is expected to be significant whereas the other is not.
In WA (column 1), search behavior does not vary significantly across officer’s race/ethnic group. It does differ between female and male police, at an unconventional level of .1 though. Female officers are 9.2 percent less likely to perform a search than males. Different from mostly null results in WA, FL findings (column 2) show that both race/ethnicity and gender of the officers significantly predict their search decision. First, officers of color search significantly less than white police do. For example, black officers are 53.3 percent less likely to search (p<.1) and the corresponding number for Hispanic officers is 50 percent (p<.001). Second, relative to males, female officers are significantly less likely to conduct search by 61.6 percent (p<.001). Combined, H1a that predicts the dominance of one single identity is not supported by current results in two states. Rather, it appears that both identities concurrently shape police search decision, at least suggested by the case of FL.

Before moving onto test the intersectional effects of race/ethnicity and gender (H1b), it is helpful to look at the impacts of other characteristics of the stop. First, two states find consistent empirical patterns on driver’s demographics and the effect sizes are very similar. Specifically, men of color and younger drivers are more likely to experience search in stops. Second, consistent with previous literature, searches are significantly more likely to happen in those stops made for investigatory rather than safety purposes.

[See Table 2]

What about Intersectional Identities?

Table 3 demonstrates results of Estimator 2 that removes the uniform effect restriction. See OLS results presented in appendix table A3-3.1. H1b indicates that a certain combination of
identities will impact police decision making in a way that distinguishes that group of officers from others. As such, the goal is to compare search behavior across officer group. To that end, coefficient plots in figure 1, displayed in odds ratio, list each group side by side. Two panels present findings in two states, respectively. Red lines of 1 in the middle represent the baseline category of white male police.

Figure 1 panel 1 shows that, in many cases, officers in WA search in a way that is statistically indistinguishable from each other, as indicated by the overlapping confidence intervals. There are, however, some exceptions. First, relative to white male police, White female and Hispanic male police search significantly less (p<.05), by 13.5 percent and 19.9 percent, respectively. Another significant between-group difference is found among Hispanic policewomen – they are 1.6 times more likely to search, than white women (F=4.17, p=.04), and 1.7 times more likely to search than their male counterparts (F=4.52, p=.03).

In FL (panel 2), the behavioral difference across officer group seems to be more notable. First, almost all other officer groups search significantly less than white males, with one exception of black male police (substantively less but not significant). Second, among non-white-male police, they mostly search in a statistically indistinguishable fashion. One exception though is that Hispanic female officers’ search behavior significantly differs from their men counterparts (F=5.6, p=.02), with the former 61.1 percent less likely to search than the latter.7

[See Figure 1]

Taken together, what H1b predicts finds some support in foregoing analyses. First, the group that presents the most distinct search pattern is white male police and they tend to have the
highest search propensity. Relative to them, all other officer groups on average show lower tendency to conduct search in encounters. Second, search behavior of racial and gender minority officers in general cannot be statistically differentiated from one another. The only identity combination that makes it somewhat distinctive from others is Hispanic female. The directions of their behavior in two states, however, are opposite. The anomaly is further discussed in the end section.

Prior to next analysis, it is helpful to look at the driver’s side of story because their intersectional characteristics may impact stop outcomes due to varying levels of suspicion that identity combinations raise. Corroborating existing literatures, table 3 finds that, first, white female drivers experience lowest search rate among all, potentially because they present the lowest level of threat. Second, minority women are searched more than white females are, possibly due to their racial/ethnic identity that raises the suspicion level in the eyes of police, but they are searched less than white males are because their gender may pose less threat. Third, male drivers of color are searched the most. These results hold consistent across two states.

[See Table 3]

When Intersectional Officers Encounter Intersectional Drivers

Results presented so far have demonstrated that an officer’s search decision, at least in some cases, varies along both racial/ethnic- and gender- axes, in an average situation. More interestingly, as a reminder, H2 predicts that the extent of identity congruence may work to alter the degree of stereotype-based profiling and thus moderates police response. Results of Estimator 3 that fully interacts officer’s and driver’s group indicators are shown in table A3-4 in
appendix. For the ease of interpretation, those estimations are graphed as predicted search probabilities in following figure 2 for WA and figure 3 for FL. Each figure has six panels. Each panel represents a group of drivers. In each plot, the X-axis lists the officer group. In doing so, it allows for a direct comparison across officers holding drivers’ characteristics constant.

To begin with results in WA (figure 2), in stops of male drivers of three races (panel 1, 3 and 5), search decision patterns look alike, regardless of officer’s demographics. In searches of black and Hispanic male drivers, remember that H2 would indicate a lower search rate when race/ethnicity matches between officer and driver, but it does not find support in present results. [See Figure 2]

When stopping female drivers (panel 2, 4 and 6), there are some circumstances where officers with certain characteristics behave significantly differently from others. For example, in panel 6, during stops of Hispanic female drivers, Hispanic male police exhibit lowest search probability among all, significantly lower than most non-Hispanic colleagues (except black female officers). As a reminder, previous estimation in figure 1 panel 1 suggests that Hispanic male officers have an on average lower search tendency than white police, but when stopping different types of drivers (figure 2 panel 1-5), they are not necessarily always the group with the lowest search probability. Therefore, one may draw guarded conclusion here that ethnic congruence may change police actions to some degree, which is consistent with H2.

Prediction about gender match in H2 is not supported by these results – within racial group, gender congruence is not associated with low search rate. Hypothesis about intersectional identity match is not supported either. Some other differentiable search behavior is found during
stops of white female drivers (panel 2), black female and Hispanic male police search significant less than white police (p<.05).

Moving onto FL (figure 3) and again starting with male drivers, consistent with findings in WA, police search men of color in a way that is statistically undistinguishable from each other (panel 3 and 5) and thus hypothesis about racial/ethnicity congruence in H2 is again not supported among male drivers. One significant difference finds that white male police show significantly higher search probability than others – the highest among all – in stops of white male drivers (panel 1). It is likely due to their general high search level at baseline (figure 1 panel 2).

[See Figure 3]

In stops of black female drivers (panel 4), first, impacts about racial congruence in H2 is not substantiated because black officers do not present significant lower search probabilities than their non-black colleagues. Second, female police, regardless of race, show lower search tendency relative to their male counterparts. This gender difference, however, is most evident and is only significant when compared to white male police. Thus, it does not serve to support the gender match hypothesis but only upholds what is observed earlier that white male police stand out in search behavior. Interestingly, this gendered pattern seems to be a general trend that holds in each panel, sometimes with statistical significance sometimes without. It largely corroborates recent research that finds gender difference in policing, possibly because women approach policing in a more community-orientated and de-escalating manner (Ba et al. 2021; Shoub, Stauffer, and Song 2021). These indicate that officer gender, not the gender match with the driver’s, impact traffic policing outcome.
Third, in intersectional encounters between black female drivers and black female police, as H2 would suggest, the search likelihood is reduced to the lowest. Like the case of Hispanic male police in WA presented above, black female police on average have a lower search rate relative to white males (figure 1 panel 2), but their behavior does vary with driver’s characteristics, and they are not always the ones least likely to search (see other panels in figure 2 except panel 4). However, one should be again cautious when interpreting these results because first, black female police’s baseline search behavior might constitute a source of fewer searches of their doubly ingroup drivers. Second, note that, in searches of black female drivers, white female police exhibit an almost identical behavioral pattern to black female officers. It is suggestive that gender might play a bigger role in this case. For the other group of minority women drivers – Hispanic females (panel 6) – neither racialized nor gendered patterns are found across officer group.

To sum up, H2 is supported on some level by analyses above. First, racial/ethnic congruence effects find some support among Hispanic male police in WA when stopping same-ethnicity female drivers. The search probability is lower than alternative scenarios where different-ethnicity officers make the stop. Similar racial match effects are found among black female police in FL. Second, gender congruence hypothesis is not substantiated in present results. Third, there is limited supporting evidence for the intersectional congruence expectation that when encountering black female drivers in FL, same-race-same-gender officers exhibit lowest search rate among all.
Further Discussions

*Situational Intersectionality: High vs Low Threat in Traffic Stops*

An interesting pattern shown in foregoing analyses is that most of the significant police behavioral differences happen in the right panels of figure 2 and 3, in other words, in stops of female drivers. This may concern the threat level perceived by police in stop encounters. It is plausible that, in response to situations with possibly high threat and danger (i.e., with male drivers, especially men of color), officers are inclined to adopt the “working personality” that requires them to take a series of standardized actions that have been prescribed in advance and ingrained in them through processes like academy training, informal learning and organizational culture and rituals. Under these circumstances, officers likely to command respect, appear professional and efficient, and impose strong punishment in order to deter law-breaking (Nhan 2013). As a result, it will manifest in search behavior as a high degree of homogeneity, regardless of officer’s personal characteristics.

This aligns with what intersectionality literature suggests as the contextual manifestation of identities. In other words, some situational factors may make certain identities more salient than others and thus move to the forefront of self-concept (e.g., Shelton and Sellers 2000). In this article, the identities under examination are personal attributes of race/ethnicity and gender, but police hold another identity that is heavily defined by their work and profession – being a “cop.” Current data do not allow to quantitively explore the intersections of professional and personal identities, and the conditions under which one may overpower the other, but situational intersectionality certainly merits further theorizing and empirical investigation.
Closely related to previous discussion on work personality of police, empirical results presented above show that in many cases police indeed exhibit homogenous search behavior. Null finding is not a particularly surprising result because while some argue that identities matters in bureaucratic behavior, others suggest otherwise – theories on organizational/occupational socialization contend that the expression of individual identities may be muted by the force of socialization and professionalization (Feldman 1984; Hackman 1992). These forces are heightened in occupations like police (Colvin 2009; 2017; Oberfield 2014a; 2014b). Thus, one would not expect officers of different groups to approach policing in fundamentally different ways, hence there should be very limited, if any, observable discrepancies in their behavior. The power of socialization has been suggested by scholars as a plausible reason why the passive-active representation translation among police sometimes fails (e.g., Wilkins and Williams 2008; S. Nicholson-Crotty, Nicholson-Crotty, and Fernandez 2017).

It is well documented in past work that law enforcement is particularly effective at socializing its members into adopting a uniformed set of values and stripping officers of personal identities, throughout their career (e.g., Van Maanen 1974; Conti 2006; Chappell and Lanza-Kaduce 2010). Explicit and implicit message about how police work ought to be performed are heavily defined by the dominant group of white males (Oberfield 2010; 2014a). Women and racial minorities are largely underrepresented and continue to face acceptance and integration issues despite the progress they have made in police profession in the past few decades (Skolnick 2008). To prove that they belong and gain access to crucial resources and opportunities for career advancement, they are less likely to act upon minority roles that may mark them a “deviant”
from the dominant professional culture, since unconformity may lead to repercussions. That being said, police profession should provide a conservative and stringent test against theoretical expectations in this article.

**Conclusions, Limitations and Contributions**

This article sets out to explore the intricacies in bureaucratic decision making by considering the reality of intersectionality. It questions if and how a bureaucrat responds to the client in terms of race, ethnicity and/or gender. While past work has well established the role of identities in shaping bureaucratic behavior, far less is known about the intersections of cross-cutting identities and the implications for studying public administration. To address that omission, this article tests a series of theoretical expectations in traffic law enforcement, a setting where public service provision and receiving occur simultaneously and bureaucratic decision making is heavily informed by demographic identities.

Micro-level data over years on stop records in two states offers the opportunity to dissect each scenario of police-civilian encounters, and analyses find that, first, both office race/ethnicity and gender concurrently shape search decision. The identity combinations that differentiate that group of officers from others are white male police and Hispanic policewomen, with the former having the most distinctive search pattern and consistency across two states. Second, there is some supporting evidence found among Hispanic male police in WA and black female police in FL, for the hypothesis that racial/ethnic congruence reduces search probability. For the latter group of officers, it also finds that intersectional congruence in identities between police and drivers decreases search rate to the lowest.
This research is of course not without limitations. It is important to acknowledge some shortcomings before concluding, some of which have been briefly mentioned above, and they inform directions for future inquiries. First, current theorization treats minority group as if monolithic. However, results find some anomaly among Hispanic policewomen in two states – they show opposite search behavior. One plausible explanation concerns the descriptor of “Hispanic.” It cautions that this general and pre-determined categorization encompasses a wide range of cultures and national origins that current data are not able to parse. Those may correspond to important heterogeneity in police behavior. More fine-grained data on “Hispanic” identity are certainly needed to keep exploring on this topic. Given that historical backgrounds and societal factors that marginalize a particular social group differ (Gershon et al. 2019), intersectionality in interactions between that particular group and public institutions may correspondingly manifest in vastly different ways.

Second, this research aims to explore the quantitative pattern of intersectional identities in bureaucratic decision making, but there are questions remained to be answered that will require different research approaches and methods. As one example and as mentioned above, whether and how an officer’s professional identity intersects with personal attributes cannot be investigated quantitatively with current data and design. Recent work by Headley (2022) innovatively explores this topic qualitatively, but more future research is certainly needed to further identify the mediators and moderators of identity intersections. Third, related to development of work personality, note that traffic stop records used in this article come from State Police, highway patrol to be more specific. It is unknown if and how socialization power varies across various types of police organizations such as metropolitan police department and Sheriff’s office. Subcultures of law enforcement agencies, of different kinds and in different
geographic locations, may complicate the impacts of socialization power on professional identity development and its conflict with personal identities, which constitute a topic that future inquiries can further pursue.

This article makes contributions to the existing literatures in following several ways. First and foremost, it fills in an understudied yet very important area in the theory of representative bureaucracy. It advances our understanding of the intersectional nature of representation processes that combined and intersecting identities likely produce various sources of representation. Meanwhile, methodologically, it makes uses of individual-level data that avoid the issue of ecological fallacy, which has been pervasive in previous work on representation (Bradbury and Kellough 2011). It develops an analytical framework which may serve as a starting point for future inquires that are also interested in quantitative examinations of intersectionality.

Despite the long running research tradition on intersectionality, it has rarely been applied in the context of administrative actions with explicit focus on the administrators. By introducing representative bureaucracy literature into the conversation, this article highlights how “interacting” nature of public administration can expand the scholarship on intersectionality. Processes of service provision and receiving occur parallelly in public administration. As such, intersectionality of both bureaucrats and citizens should be considered simultaneously, for a better understanding of how cross-cutting identities, as well as interactions of those intersectional identities, impact administrative actions and outcomes that may follow. This contribution differs this research from work to date.
Last, it communicates with research on disparities in policing. The study of traffic policing is an enduring research interest among criminologists and sociologists. With a growing number of political scientists and public administration scholars sharing similar interest recently, new variations in perspectives and approaches have been added to that long-running research tradition. A handful of scholars, such as Christiani (2020) and Baumgartner et al. (2020), have recently examined the impacts of intersectional characteristics, of the drivers, on stop outcomes. Though the latter introduces the theory of representative bureaucracy into the conversation and pays additional attention to officers’ attributes, it is not laser-focused on the “bureacracy” (i.e. the officer). Following those research, this article adds to the literature uniquely focusing on the ways in which intersections of identities, of the officer, impact the function of police decision making and more importantly, the interactions of intersectionality on both ends.

While a traffic stop in many cases is merely a short interaction with police that lasts for a few minutes, it is one of the most common avenues through which citizens encounter law enforcement. Concerns over racial inequity in traffic policing are pronounced because the burden of it falling unequally on communities of color. Moreover, these seemingly small encounters may escalate and spin out of control quickly, resulting in use of force, violent and even fatal outcomes eventually. Contact with law enforcement, at the front end of criminal justice system, may have substantial and oftentimes accumulative effects at later stages on the individual citizens being pulled over. This is particularly true for people of color (J. Nicholson-Crotty and Nicholson-Crotty 2020). Frequent and injustice contacts with police have been shown to demobilize political participation and negatively impact other aspects of citizens’ involvement in civic life (White 2019; Weaver and Lerman 2010). At the same time, police encounters, especially those deemed unfair, decrease perceived legitimacy of law enforcement and criminal
justice system, and go a long way to shape citizens’ view of government more broadly speaking
(Gibson and Nelson 2018; Mondak et al. 2017).

Findings in this research indicate that improving representation of officers with certain
attributes has the potential to reduce use of search and thus lead to fewer negative police-civilian
interactions and downstream consequences. More importantly, as Crenshaw (1989) argues, the
failure in considering intersectionality misses the opportunity for systematic changes. A better
understanding of intersectionality in bureaucratic decision making would suggest a more
accurate direction for changes and reforms that may redistribute opportunities to those clients
that face unique challenges and disadvantages.

Notes

1. Note that there is another working mechanism that underlies the translation from passive to
active representation – the change of majority bureaucrats’ behavior due to the effects of
minority representation (see Lim 2006 for a review and see Li 2021 for empirical evidence).
Germane to this article, however, the literature review in main text only emphasizes the “direct”
impacts of identities on administrative actions.

2. During several recent interviews with different police organizations, the author learned that on
average, a routine traffic stop typically lasts no more than ten minutes. Some can be even shorter
depending on the location where it occurs, time of the day, and other factors such as officer’s
experience.

3. Again, interviews with police officers on traffic law enforcement procedures concur with this
point.
4. There are stereotypes associated with other minority groups, such as Asian Americans, a group viewed as “model minority” and does not evoke high levels of police suspicion, and Native Americans, who are often overlooked and far less examined in current literature. This research does not perform tests for these groups due to the unavailability of corresponding information in the data, and thus does not include them in main texts for a literature review.

5. See https://openpolicing.stanford.edu/ for more information.

6. First, officer age was not reported in WA stop records; second, investigatory and safety stops are differentiated in the analysis, using definitions that are commonly used by traffic stops analysis (e.g., Baumgartner et al. 2020; D. A. Epp and Erhardt 2020; C. R. Epp, Maynard-Moody, and Haider-Markel 2014).

7. Odds ratio (to white male police) for Hispanic female and Hispanic male police is .194 and .499, respectively. Then the ratio of Hispanic females to male counterpart is .389, .194 divided by .499, meaning that they are .389 times likely (equal to 1-.389 = .611) to perform search than Hispanic male police do.

8. There is a recent qualitative study though by Headley (2022) that examine how personal and work identities may impact frontline officers and how they approach their job responsibilities.
References


https://doi.org/10.7916/D8JW8DZH.


Kahn, Kimberly Barsamian, Phillip Atiba Goff, J. Katherine Lee, and Diane Motamed. 2016. “Protecting Whiteness: White Phenotypic Racial Stereotypicality Reduces Police Use of


Meier, Kenneth J., and Jill Nicholson-Crotty. 2006. “Gender, Representative Bureaucracy, and


Table 1. Search Rate, by Officer and Driver Group, in WA and FL

<table>
<thead>
<tr>
<th>Officer Group</th>
<th>White Male</th>
<th>White Female</th>
<th>Black Male</th>
<th>Black Female</th>
<th>Hispanic Male</th>
<th>Hispanic Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>White Male</td>
<td>3.26%</td>
<td>2.24%</td>
<td>6.96%</td>
<td>3.99%</td>
<td>5.77%</td>
<td>2.40%</td>
</tr>
<tr>
<td>White Female</td>
<td>3.05%</td>
<td>2.51%</td>
<td>6.72%</td>
<td>3.68%</td>
<td>5.27%</td>
<td>2.14%</td>
</tr>
<tr>
<td>Black Male</td>
<td>2.44%</td>
<td>1.64%</td>
<td>5.37%</td>
<td>3.00%</td>
<td>4.68%</td>
<td>2.15%</td>
</tr>
<tr>
<td>Black Female</td>
<td>2.79%</td>
<td>2.19%</td>
<td>6.03%</td>
<td>5.23%</td>
<td>3.80%</td>
<td>4.00%</td>
</tr>
<tr>
<td>Hispanic Male</td>
<td>2.62%</td>
<td>1.84%</td>
<td>5.40%</td>
<td>3.38%</td>
<td>4.54%</td>
<td>1.88%</td>
</tr>
<tr>
<td>Hispanic Female</td>
<td>4.91%</td>
<td>3.16%</td>
<td>12.68%</td>
<td>6.78%</td>
<td>10.01%</td>
<td>3.85%</td>
</tr>
<tr>
<td>Total</td>
<td>3.20%</td>
<td>2.22%</td>
<td>6.75%</td>
<td>3.87%</td>
<td>5.66%</td>
<td>2.36%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Officer Group</th>
<th>White Male</th>
<th>White Female</th>
<th>Black Male</th>
<th>Black Female</th>
<th>Hispanic Male</th>
<th>Hispanic Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>White Male</td>
<td>0.76%</td>
<td>0.40%</td>
<td>1.95%</td>
<td>0.63%</td>
<td>1.15%</td>
<td>0.44%</td>
</tr>
<tr>
<td>White Female</td>
<td>0.33%</td>
<td>0.18%</td>
<td>0.50%</td>
<td>0.19%</td>
<td>0.35%</td>
<td>0.11%</td>
</tr>
<tr>
<td>Black Male</td>
<td>0.23%</td>
<td>0.13%</td>
<td>0.42%</td>
<td>0.16%</td>
<td>0.27%</td>
<td>0.14%</td>
</tr>
<tr>
<td>Black Female</td>
<td>0.12%</td>
<td>0.09%</td>
<td>0.19%</td>
<td>0.13%</td>
<td>0.07%</td>
<td>0.03%</td>
</tr>
<tr>
<td>Hispanic Male</td>
<td>0.46%</td>
<td>0.19%</td>
<td>1.21%</td>
<td>0.43%</td>
<td>0.58%</td>
<td>0.20%</td>
</tr>
<tr>
<td>Hispanic Female</td>
<td>0.12%</td>
<td>0.11%</td>
<td>0.25%</td>
<td>0.14%</td>
<td>0.19%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Total</td>
<td>0.62%</td>
<td>0.33%</td>
<td>1.47%</td>
<td>0.49%</td>
<td>0.79%</td>
<td>0.29%</td>
</tr>
</tbody>
</table>
Table 2. Single Identity Main Effects on Police Search Decision (Estimator 1; Odds Ratio)

<table>
<thead>
<tr>
<th></th>
<th>WA</th>
<th>FL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Officer Demographics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>0.848 (0.183)</td>
<td>0.467^ (0.212)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.849 (0.0873)</td>
<td>0.500*** (0.0311)</td>
</tr>
<tr>
<td>Other</td>
<td>0.983 (0.113)</td>
<td>0.139** (0.0912)</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>0.908^ (0.0475)</td>
<td>0.384*** (0.0581)</td>
</tr>
<tr>
<td><strong>Driver Demographics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>1.575*** (0.0822)</td>
<td>2.068*** (0.163)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1.447*** (0.0621)</td>
<td>1.476*** (0.126)</td>
</tr>
<tr>
<td>Other</td>
<td>0.897 (0.151)</td>
<td>0.778*** (0.0469)</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>0.643*** (0.0140)</td>
<td>0.420*** (0.0163)</td>
</tr>
<tr>
<td><strong>Controls</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Officer Age</td>
<td>0.982*** (0.00111)</td>
<td>0.992 (0.0138)</td>
</tr>
<tr>
<td>Driver Age</td>
<td>0.982*** (0.00111)</td>
<td>0.968*** (0.00295)</td>
</tr>
<tr>
<td>Black Representation</td>
<td>0.995 (0.0107)</td>
<td>0.970 (0.0249)</td>
</tr>
<tr>
<td>Hispanic Representation</td>
<td>1.004 (0.0184)</td>
<td>0.970 (0.0357)</td>
</tr>
<tr>
<td>Female Representation</td>
<td>0.999 (0.00445)</td>
<td>1.003 (0.0186)</td>
</tr>
<tr>
<td>Black Population Share</td>
<td>2.209** (0.541)</td>
<td>0.920 (0.0835)</td>
</tr>
<tr>
<td>Hispanic Population Share</td>
<td>1.042 (0.0447)</td>
<td>1.128 (0.119)</td>
</tr>
<tr>
<td>Democratic Presidential Vote Share</td>
<td>1.011 (0.0113)</td>
<td>0.980 (0.0529)</td>
</tr>
<tr>
<td>Investigatory Stop</td>
<td>1.484*** (0.106)</td>
<td>3.117*** (0.302)</td>
</tr>
</tbody>
</table>

Observations: 4,139,075, 2,143,423

Note: ^ p<.1  * p<.05  ** p<.01  *** p<.001; Standard errors clustered at district/troop level; Year, month, hour, location and unit fixed-effects are included.
Figure 1. Search Behavior Across Officer Group, Relative to White Male Police
Table 3. Identity Interactive Effects on Police Search Decision (Estimator 2; Odds Ratio)

<table>
<thead>
<tr>
<th>Officer Group</th>
<th>WA</th>
<th>FL</th>
</tr>
</thead>
<tbody>
<tr>
<td>White-Female</td>
<td>0.865** (0.0444)</td>
<td>0.365*** (0.0633)</td>
</tr>
<tr>
<td>Black-Male</td>
<td>0.835 (0.173)</td>
<td>0.456^ (0.214)</td>
</tr>
<tr>
<td>Black-Female</td>
<td>0.856 (0.293)</td>
<td>0.325* (0.151)</td>
</tr>
<tr>
<td>Hispanic -Male</td>
<td>0.801* (0.0876)</td>
<td>0.499*** (0.0283)</td>
</tr>
<tr>
<td>Hispanic-Female</td>
<td>1.397 (0.299)</td>
<td>0.194*** (0.0821)</td>
</tr>
<tr>
<td>Other-Male</td>
<td>0.983 (0.125)</td>
<td>0.140** (0.0916)</td>
</tr>
<tr>
<td>Other-Female</td>
<td>0.852 (0.170)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Driver Group</th>
<th>WA</th>
<th>FL</th>
</tr>
</thead>
<tbody>
<tr>
<td>White-Female</td>
<td>0.669*** (0.0157)</td>
<td>0.517*** (0.0250)</td>
</tr>
<tr>
<td>Black-Male</td>
<td>1.611*** (0.0767)</td>
<td>2.270*** (0.192)</td>
</tr>
<tr>
<td>Black-Female</td>
<td>0.974 (0.0709)</td>
<td>0.729*** (0.0624)</td>
</tr>
<tr>
<td>Hispanic -Male</td>
<td>1.553*** (0.0747)</td>
<td>1.574*** (0.148)</td>
</tr>
<tr>
<td>Hispanic-Female</td>
<td>0.668*** (0.0344)</td>
<td>0.569*** (0.0430)</td>
</tr>
<tr>
<td>Other-Male</td>
<td>0.867 (0.131)</td>
<td>0.813*** (0.0479)</td>
</tr>
<tr>
<td>Other-Female</td>
<td>0.670* (0.135)</td>
<td>0.342*** (0.0456)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Controls</th>
<th>WA</th>
<th>FL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Officer Age</td>
<td>0.992 (0.0138)</td>
<td></td>
</tr>
<tr>
<td>Driver Age</td>
<td>0.982*** (0.00111)</td>
<td>0.968*** (0.00296)</td>
</tr>
<tr>
<td>Black Representation</td>
<td>0.995 (0.0105)</td>
<td>0.970 (0.0248)</td>
</tr>
<tr>
<td>Hispanic Representation</td>
<td>1.003 (0.0182)</td>
<td>0.971 (0.0356)</td>
</tr>
<tr>
<td>Female Representation</td>
<td>0.999 (0.00435)</td>
<td>1.003 (0.0186)</td>
</tr>
<tr>
<td>Black Population Share</td>
<td>2.220** (0.543)</td>
<td>0.920 (0.0831)</td>
</tr>
<tr>
<td>Hispanic Population Share</td>
<td>1.039 (0.0430)</td>
<td>1.127 (0.119)</td>
</tr>
<tr>
<td>Democratic Presidential Vote Share</td>
<td>1.010 (0.0114)</td>
<td>0.981 (0.0529)</td>
</tr>
<tr>
<td>Investigatory Stop</td>
<td>1.485*** (0.106)</td>
<td>3.121*** (0.301)</td>
</tr>
</tbody>
</table>

Observations 4,139,075 2,143,423

Note: ^ p<.1 * p<.05 ** p<.01 *** p<.001; Standard errors clustered at district/troop level; Year, month, hour, location and unit fixed-effects are included.
Figure 2 WA Predicted Search Probability, by Driver Group and Officer Group
Figure 3 FL Predicted Search Probability, by Driver Group and Officer Group
Figure A1-6. Distribution of Racial Minority Representation on State Police Force (WA and SC)
Table A1-2.1. Within Officer Estimation –
Driver's Race, Representation and Policing by White Officers (Baseline Model Full Table)

<table>
<thead>
<tr>
<th>Panel A: WA</th>
<th>White Officer</th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Search</td>
<td>Hit</td>
<td>Hit</td>
</tr>
<tr>
<td>Driver Black</td>
<td>0.0165***</td>
<td>-0.0169**</td>
<td>(0.00117)</td>
</tr>
<tr>
<td>Driver Hispanic</td>
<td>0.00818***</td>
<td>-0.0759***</td>
<td>(0.000731)</td>
</tr>
<tr>
<td>Driver Other-Race</td>
<td>-0.00237**</td>
<td>-0.0430***</td>
<td>(0.000799)</td>
</tr>
<tr>
<td>Driver Female</td>
<td>-0.00840***</td>
<td>-0.0230***</td>
<td>(0.000379)</td>
</tr>
<tr>
<td>Black Representation</td>
<td>-0.000286</td>
<td>-0.00212</td>
<td>(0.000271)</td>
</tr>
<tr>
<td>Hispanic Representation</td>
<td>-0.000127</td>
<td>0.00411</td>
<td>(0.000233)</td>
</tr>
<tr>
<td>Other-Race Representation</td>
<td>-0.0000868</td>
<td>-0.000678</td>
<td>(0.000220)</td>
</tr>
<tr>
<td>Female Representation</td>
<td>0.0000465</td>
<td>0.000543</td>
<td>(0.000122)</td>
</tr>
<tr>
<td>Driver Age</td>
<td>-0.000334***</td>
<td>-0.00363***</td>
<td>(0.0000176)</td>
</tr>
<tr>
<td>% Black in Local Population</td>
<td>0.00800^</td>
<td>-0.0186</td>
<td>(0.00456)</td>
</tr>
<tr>
<td>% Hispanic in Local Population</td>
<td>-0.000541</td>
<td>-0.0408*</td>
<td>(0.000884)</td>
</tr>
<tr>
<td>% Democratic Votes in Presidential Elections</td>
<td>-0.0000906</td>
<td>0.00275</td>
<td>(0.0000375)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.0309</td>
<td>0.627*</td>
<td>(0.0222)</td>
</tr>
</tbody>
</table>

Reference Rate
White-on-White | .022 | .172 |
N | 2,876,792 | 58,619 |

Panel B: SC

| Driver Black | 0.00662*** | 0.00548 | (0.000498) | (0.00464) |
| Driver Hispanic| 0.0485*** | -0.118*** | (0.00302) | (0.00847) |
| Driver Other-Race | -0.00658*** | -0.0897*** | (0.000970) | (0.0205) |
| Driver Female | -0.0194*** | -0.0284*** | (0.000703) | (0.00477) |
| Black Representation | 0.000365 | 0.00167 | (0.000230) | (0.00196) |
| Hispanic Representation | 0.00198** | 0.00407 | (0.000658) | (0.00707) |
| Other-Race Representation | 0.00222** | -0.0101 | (0.000859) | (0.00890) |
| Driver Age | -0.000276*** | -0.00274*** | (0.0000144) | (0.00178) |
| Officer Age | -0.000138 | 0.00378 | (0.000233) | (0.00259) |
| % Black in Local Population | 0.00455** | -0.00742 | (0.00147) | (0.0126) |
| % Hispanic in Local Population | -0.00129 | 0.00997 | (0.00435) | (0.0383) |
| % Democratic Votes in Presidential Elections | -0.00281** | 0.0170^ | (0.00103) | (0.00906) |
| Constant | 0.0229 | -0.366 | (0.0533) | (0.468) |

Reference Rate
White-on-White | .020 | .279 |
N | 5,466,748 | 135,969 |

Note: (1) ^ p<.1  * p<.05  ** p<.01  *** p<.001; Standard errors clustered at officer level; (2) Estimations from baseline models; (3) A full set of fixed-effects, including year, month, stop hour and county, are included for WA; SC did not report stop hour and thus that fixed-effect is missing.
### Table A1.3. Within Officer Estimation –
Driver’s Race, Representation and Policing by White Officers (Interactive Model Full Table)

#### Panel A: WA

<table>
<thead>
<tr>
<th></th>
<th>(1) Search</th>
<th>(2) Hit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver Black</td>
<td>0.0152***  (0.00140)</td>
<td>-0.0228** (0.00852)</td>
</tr>
<tr>
<td>Driver Hispanic</td>
<td>0.00949*** (0.00107)</td>
<td>-0.0847*** (0.00860)</td>
</tr>
<tr>
<td>Driver Other-Race</td>
<td>0.00448*   (0.00224)</td>
<td>-0.0229 (0.0159)</td>
</tr>
<tr>
<td>Driver Female</td>
<td>-0.00735*** (0.000704)</td>
<td>-0.0194* (0.00777)</td>
</tr>
<tr>
<td>Black Representation</td>
<td>-0.000306 (0.000271)</td>
<td>-0.00248 (0.00318)</td>
</tr>
<tr>
<td>Hispanic Representation</td>
<td>-0.0000809 (0.000237)</td>
<td>0.00346 (0.00278)</td>
</tr>
<tr>
<td>Other-Race Representation</td>
<td>0.000177 (0.000224)</td>
<td>-0.000390 (0.00188)</td>
</tr>
<tr>
<td>Female Representation</td>
<td>0.000107 (0.000127)</td>
<td>0.000698 (0.00147)</td>
</tr>
<tr>
<td>Driver Black#Black Representation</td>
<td>0.000271 (0.000246)</td>
<td>0.00129 (0.00110)</td>
</tr>
<tr>
<td>Driver Hispanic#Hispanic Representation</td>
<td>-0.000342^ (0.000186)</td>
<td>0.00274^ (0.00150)</td>
</tr>
<tr>
<td>Driver Other-Race#Other-Race Representation</td>
<td>-0.00142*** (0.000397)</td>
<td>-0.00394 (0.00289)</td>
</tr>
<tr>
<td>Driver Female#Female Representation</td>
<td>-0.000172 (0.000105)</td>
<td>-0.000562 (0.000987)</td>
</tr>
<tr>
<td>Driver Age</td>
<td>-0.000334*** (0.000176)</td>
<td>-0.00363*** (0.000182)</td>
</tr>
<tr>
<td>% Black in Local Population</td>
<td>0.00776^ (0.00458)</td>
<td>-0.0186 (0.0446)</td>
</tr>
<tr>
<td>% Hispanic in Local Population</td>
<td>-0.000592 (0.000885)</td>
<td>-0.0407* (0.0160)</td>
</tr>
<tr>
<td>% Democratic Votes in Presidential Elections</td>
<td>-0.000804 (0.000375)</td>
<td>0.00280 (0.00270)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.0305 (0.0222)</td>
<td>0.624* (0.255)</td>
</tr>
</tbody>
</table>

**Reference Rate**

<table>
<thead>
<tr>
<th>White-on-White</th>
<th>.022</th>
<th>.172</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>2,876,792</td>
<td>58,619</td>
</tr>
</tbody>
</table>

#### Panel B: SC

<table>
<thead>
<tr>
<th></th>
<th>(1) Search</th>
<th>(2) Hit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver Black</td>
<td>0.00585*** (0.000825)</td>
<td>0.0155^ (0.00830)</td>
</tr>
<tr>
<td>Driver Hispanic</td>
<td>0.0451*** (0.00338)</td>
<td>-0.121*** (0.0114)</td>
</tr>
<tr>
<td>Driver Other-Race</td>
<td>-0.00754*** (0.00148)</td>
<td>-0.103*** (0.0311)</td>
</tr>
<tr>
<td>Driver Female</td>
<td>-0.0194*** (0.000703)</td>
<td>-0.0284*** (0.00477)</td>
</tr>
<tr>
<td>Black Representation</td>
<td>0.000341 (0.000228)</td>
<td>0.00206 (0.00195)</td>
</tr>
<tr>
<td>Hispanic Representation</td>
<td>0.00180** (0.000655)</td>
<td>0.00379 (0.00714)</td>
</tr>
<tr>
<td>Other-Race Representation</td>
<td>0.00223** (0.000858)</td>
<td>-0.0101 (0.00891)</td>
</tr>
<tr>
<td>Driver Black#Black Representation</td>
<td>0.000687 (0.0000647)</td>
<td>-0.00788 (0.000583)</td>
</tr>
<tr>
<td>Driver Hispanic#Hispanic Representation</td>
<td>0.00335^ (0.00173)</td>
<td>0.00264 (0.00671)</td>
</tr>
<tr>
<td>Driver Other-Race#Other-Race Representation</td>
<td>0.000817 (0.000921)</td>
<td>0.0104 (0.00176)</td>
</tr>
<tr>
<td>Driver Age</td>
<td>-0.000276*** (0.000144)</td>
<td>-0.00274*** (0.000178)</td>
</tr>
<tr>
<td>Officer Age</td>
<td>-0.000139 (0.000233)</td>
<td>0.00380 (0.00258)</td>
</tr>
<tr>
<td>% Black in Local Population</td>
<td>0.00454** (0.00147)</td>
<td>-0.00738 (0.0126)</td>
</tr>
<tr>
<td>% Hispanic in Local Population</td>
<td>-0.00125 (0.00435)</td>
<td>0.00960 (0.0383)</td>
</tr>
<tr>
<td>% Democratic Votes in Presidential Elections</td>
<td>-0.00282** (0.00103)</td>
<td>0.0172^ (0.00907)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.0237 (0.0533)</td>
<td>-0.378 (0.468)</td>
</tr>
</tbody>
</table>

**Reference Rate**

<table>
<thead>
<tr>
<th>White-on-White</th>
<th>.020</th>
<th>.279</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>5,466,748</td>
<td>135,969</td>
</tr>
</tbody>
</table>

Note: (1) ^ p<.1 * p<.05 ** p<.01 *** p<.001; Standard errors clustered at officer level; (2) Estimations from interactive models; (3) A full set of fixed-effects, including year, month, stop hour and county, are included for WA; SC did not report stop hour and thus that fixed-effect is missing.
Figure A1-1.1. Policing by White Officers on Black Drivers in WA, at Different Levels of Black Representation (allowing for nonlinearities using quadratic terms)
Figure A1-1.2. Policing by White Officers on Black Drivers in WA, at Different Levels of Black Representation (allowing for nonlinearities using quartiles)
Figure A1-2.1. Policing by White Officers on Black Drivers in SC, at Different Levels of Black Representation (allowing for nonlinearities using quadratic terms)
Figure A1-2.2. Policing by White Officers on Black Drivers in SC, at Different Levels of Black Representation (allowing for nonlinearities using quartiles)
Figure A1-3.1. Policing by White Officers on Hispanic Drivers in WA, at Different Levels of Hispanic Representation (allowing for nonlinearities using quadratic terms)
Figure A1-3.2. Policing by White Officers on Hispanic Drivers in WA, at Different Levels of Hispanic Representation (allowing for nonlinearities using quartiles)
Figure A1-4.1. Policing by White Officers on Hispanic Drivers in SC, at Different Levels of Hispanic Representation (allowing for nonlinearities using quadratic terms)
Figure A1-4.2. Policing by White Officers on Hispanic Drivers in SC, at Different Levels of Hispanic Representation (allowing for nonlinearities using quartiles)
Table A2-1.1. Linear Model of Effects of Minority Representation on White Police Behavior and Performance on Minority Drivers (Full Table)

<table>
<thead>
<tr>
<th></th>
<th>(1) Hit Rate</th>
<th>(2) Search Number</th>
<th>(3) Stop Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel A: WA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Black Officer</td>
<td>1.231 (1.136)</td>
<td>0.476 (0.561)</td>
<td>6.992 (8.635)</td>
</tr>
<tr>
<td>Controls</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Democratic Vote</td>
<td>0.340 (0.707)</td>
<td>-0.234^ (0.111)</td>
<td>-1.244 (0.998)</td>
</tr>
<tr>
<td>% Black Population</td>
<td>-2.285 (8.572)</td>
<td>0.536 (1.332)</td>
<td>2.489 (14.53)</td>
</tr>
<tr>
<td>% Hispanic Population</td>
<td>1.363 (3.288)</td>
<td>0.148 (0.265)</td>
<td>3.185* (1.322)</td>
</tr>
<tr>
<td>N</td>
<td>2,332</td>
<td>4,554</td>
<td>4,554</td>
</tr>
<tr>
<td>% Hispanic Officer</td>
<td>0.782 (0.441)</td>
<td>-1.026 (0.655)</td>
<td>-17.84 (10.90)</td>
</tr>
<tr>
<td>Controls</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Democratic Vote</td>
<td>0.469 (0.250)</td>
<td>-0.388^ (0.176)</td>
<td>-4.061 (3.563)</td>
</tr>
<tr>
<td>% Black Population</td>
<td>10.38 (6.790)</td>
<td>-1.033 (2.763)</td>
<td>-29.80 (65.05)</td>
</tr>
<tr>
<td>% Hispanic Population</td>
<td>-0.368 (1.419)</td>
<td>-0.368 (0.704)</td>
<td>-14.20 (7.964)</td>
</tr>
<tr>
<td>N</td>
<td>2,767</td>
<td>4,720</td>
<td>4,720</td>
</tr>
<tr>
<td>Panel B: SC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Black Officer</td>
<td>0.280 (0.479)</td>
<td>0.182 (0.158)</td>
<td>-0.120 (2.199)</td>
</tr>
<tr>
<td>Controls</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Democratic Vote</td>
<td>0.862 (2.041)</td>
<td>-0.00303 (0.656)</td>
<td>5.468 (14.29)</td>
</tr>
<tr>
<td>% Black Population</td>
<td>-4.704* (1.628)</td>
<td>0.160 (0.397)</td>
<td>-15.56 (14.57)</td>
</tr>
<tr>
<td>% Hispanic Population</td>
<td>6.919 (5.913)</td>
<td>2.457 (2.215)</td>
<td>69.25 (54.86)</td>
</tr>
<tr>
<td>N</td>
<td>3,848</td>
<td>6,627</td>
<td>6,627</td>
</tr>
<tr>
<td>% Hispanic Officer</td>
<td>-0.725 (1.172)</td>
<td>0.203 (0.406)</td>
<td>1.556 (1.979)</td>
</tr>
<tr>
<td>Controls</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Democratic Vote</td>
<td>0.333 (1.317)</td>
<td>-0.546 (0.323)</td>
<td>2.272 (1.351)</td>
</tr>
<tr>
<td>% Black Population</td>
<td>5.599* (2.151)</td>
<td>0.406 (0.523)</td>
<td>0.233 (1.626)</td>
</tr>
<tr>
<td>% Hispanic Population</td>
<td>2.162 (3.764)</td>
<td>0.418 (2.319)</td>
<td>7.820 (10.30)</td>
</tr>
<tr>
<td>N</td>
<td>2,443</td>
<td>5,780</td>
<td>5,780</td>
</tr>
<tr>
<td>Year Fixed Effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Individual Fixed Effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Note: ^ p<.1 * p<.05; standard errors in parentheses
Table A2-2. Linear Effects of Control Variables in Semiparametric Models

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hit Rate</td>
<td>Search Number</td>
<td>Stop Number</td>
</tr>
<tr>
<td>Panel A: WA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonparametric Component: %Black Officer (see Figure 1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linear Effects:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Democratic Vote</td>
<td>-0.836 (0.698)</td>
<td>-0.220 (0.142)</td>
<td>-0.256 (0.729)</td>
</tr>
<tr>
<td>% Black Population</td>
<td>1.127 (6.147)</td>
<td>2.049 (2.133)</td>
<td>0.974 (11.85)</td>
</tr>
<tr>
<td>% Hispanic Population</td>
<td>-0.236 (2.764)</td>
<td>-0.161 (0.190)</td>
<td>0.106 (1.676)</td>
</tr>
<tr>
<td>N</td>
<td>2,332</td>
<td>4,554</td>
<td>4,554</td>
</tr>
<tr>
<td>Nonparametric Component: %Hispanic Officer (see Figure 2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linear Effects:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Democratic Vote</td>
<td>-0.119 (0.0900)</td>
<td>0.140 (1.792)</td>
<td>-0.119 (0.0900)</td>
</tr>
<tr>
<td>% Black Population</td>
<td>0.590 (1.062)</td>
<td>-14.44 (20.24)</td>
<td>0.590 (1.062)</td>
</tr>
<tr>
<td>% Hispanic Population</td>
<td>-0.0756 (0.160)</td>
<td>5.068 (3.234)</td>
<td>-0.0756 (0.160)</td>
</tr>
<tr>
<td>N</td>
<td>2,767</td>
<td>4,720</td>
<td>4,720</td>
</tr>
<tr>
<td>Panel B: SC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonparametric Component: %Black Officer (see Figure 3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linear Effects:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Democratic Vote</td>
<td>-0.353 (0.715)</td>
<td>0.509^ (0.243)</td>
<td>26.41* (8.312)</td>
</tr>
<tr>
<td>% Black Population</td>
<td>-0.308 (0.457)</td>
<td>-0.0129 (0.144)</td>
<td>-3.488 (4.815)</td>
</tr>
<tr>
<td>% Hispanic Population</td>
<td>-0.612 (0.790)</td>
<td>1.370 (0.912)</td>
<td>44.02 (24.68)</td>
</tr>
<tr>
<td>N</td>
<td>3,848</td>
<td>6,627</td>
<td>6,627</td>
</tr>
<tr>
<td>Nonparametric Component: %Hispanic Officer (see Figure 4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linear Effects:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Democratic Vote</td>
<td>0.0474 (2.211)</td>
<td>-0.626 (0.439)</td>
<td>2.090 (1.135)</td>
</tr>
<tr>
<td>% Black Population</td>
<td>0.622 (1.882)</td>
<td>0.370 (0.308)</td>
<td>-2.613^ (1.305)</td>
</tr>
<tr>
<td>% Hispanic Population</td>
<td>-0.577 (8.371)</td>
<td>-2.309 (1.217)</td>
<td>7.134 (4.165)</td>
</tr>
<tr>
<td>N</td>
<td>2,443</td>
<td>5,780</td>
<td>5,780</td>
</tr>
<tr>
<td>Year Fixed Effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Individual Fixed Effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Note: ^ p<.1 * p<.05; standard errors in parentheses
Table A3-2.1. Single Identity Main Effects on Police Search Decision (Estimator 1; OLS)

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>WA</td>
<td>FL</td>
</tr>
<tr>
<td><strong>Officer Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>-0.00458 (0.00530)</td>
<td>-0.00371^ (0.00187)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>-0.00431^ (0.00209)</td>
<td>-0.00392*** (0.000603)</td>
</tr>
<tr>
<td>Other</td>
<td>0.000277 (0.00309)</td>
<td>-0.00723* (0.00230)</td>
</tr>
<tr>
<td><strong>Officer Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>-0.00286 (0.00155)</td>
<td>-0.00555*** (0.000787)</td>
</tr>
<tr>
<td><strong>Driver Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>0.0166*** (0.00189)</td>
<td>0.00651** (0.00134)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.0112*** (0.00166)</td>
<td>0.00257* (0.000942)</td>
</tr>
<tr>
<td>Other</td>
<td>-0.00383 (0.00415)</td>
<td>-0.00135** (0.000355)</td>
</tr>
<tr>
<td><strong>Driver Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>-0.00981*** (0.000524)</td>
<td>-0.00542*** (0.000825)</td>
</tr>
<tr>
<td><strong>Controls</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Officer Age</td>
<td></td>
<td>-0.0000502 (0.0000924)</td>
</tr>
<tr>
<td>Driver Age</td>
<td>-0.000373*** (0.0000373)</td>
<td>-0.000188*** (0.0000220)</td>
</tr>
<tr>
<td>Black Representation</td>
<td>-0.0000679 (0.000256)</td>
<td>-0.000274 (0.000202)</td>
</tr>
<tr>
<td>Hispanic Representation</td>
<td>0.000248 (0.000579)</td>
<td>-0.000256 (0.000274)</td>
</tr>
<tr>
<td>Female Representation</td>
<td>0.0000473 (0.000127)</td>
<td>0.0000646 (0.000154)</td>
</tr>
<tr>
<td>Black Population Share</td>
<td>0.0166* (0.00506)</td>
<td>-0.00107 (0.000907)</td>
</tr>
<tr>
<td>Hispanic Population Share</td>
<td>0.00104 (0.000994)</td>
<td>0.00137^ (0.000605)</td>
</tr>
<tr>
<td>Democratic Presidential Vote Share</td>
<td>0.0000225 (0.000246)</td>
<td>0.00000246 (0.000266)</td>
</tr>
<tr>
<td>Investigatory Stop</td>
<td>0.00965** (0.00198)</td>
<td>0.00991*** (0.00181)</td>
</tr>
<tr>
<td><strong>Observations</strong></td>
<td>4,139,075</td>
<td>2,143,423</td>
</tr>
</tbody>
</table>

Note: ^ p<.1  * p<.05  ** p<.01  *** p<.001; Standard errors clustered at district/troop level; Year, month, hour, location and unit fixed-effects are included
Table A3-3.1. Identity Interactive Effects on Police Search Decision (Estimator 2; OLS)

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>WA</td>
<td>FL</td>
</tr>
<tr>
<td><strong>Officer Group</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White-Female</td>
<td>-0.00383* (0.00155)</td>
<td>-0.00680*** (0.000764)</td>
</tr>
<tr>
<td>Black-Male</td>
<td>-0.00481 (0.00492)</td>
<td>-0.00403^ (0.00196)</td>
</tr>
<tr>
<td>Black-Female</td>
<td>-0.00615 (0.0101)</td>
<td>-0.00609** (0.00159)</td>
</tr>
<tr>
<td>Hispanic-Male</td>
<td>-0.00540* (0.00210)</td>
<td>-0.00424*** (0.000673)</td>
</tr>
<tr>
<td>Hispanic-Female</td>
<td>0.0117 (0.0113)</td>
<td>-0.00619*** (0.000667)</td>
</tr>
<tr>
<td>Other-Male</td>
<td>0.000319 (0.00347)</td>
<td>-0.00743* (0.00240)</td>
</tr>
<tr>
<td>Other-Female</td>
<td>-0.00385 (0.00373)</td>
<td>-0.00957*** (0.000952)</td>
</tr>
<tr>
<td><strong>Driver Group</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White-Female</td>
<td>-0.00811*** (0.000646)</td>
<td>-0.00338*** (0.000433)</td>
</tr>
<tr>
<td>Black-Male</td>
<td>0.0202*** (0.00193)</td>
<td>0.00986** (0.00209)</td>
</tr>
<tr>
<td>Black-Female</td>
<td>-0.000292 (0.00222)</td>
<td>-0.00247** (0.000524)</td>
</tr>
<tr>
<td>Hispanic-Male</td>
<td>0.0156*** (0.00203)</td>
<td>0.00341* (0.00139)</td>
</tr>
<tr>
<td>Hispanic-Female</td>
<td>-0.00991*** (0.00141)</td>
<td>-0.00234* (0.000736)</td>
</tr>
<tr>
<td>Other-Male</td>
<td>-0.00447 (0.00411)</td>
<td>-0.00140** (0.000398)</td>
</tr>
<tr>
<td>Other-Female</td>
<td>-0.0103^ (0.00454)</td>
<td>-0.00428*** (0.000562)</td>
</tr>
<tr>
<td><strong>Controls</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Officer Age</td>
<td>-0.0000487 (0.0000933)</td>
<td></td>
</tr>
<tr>
<td>Driver Age</td>
<td>-0.000373*** (0.0000374)</td>
<td>-0.000187*** (0.0000218)</td>
</tr>
<tr>
<td>Black Representation</td>
<td>-0.0000683 (0.000249)</td>
<td>-0.000276 (0.000201)</td>
</tr>
<tr>
<td>Hispanic Representation</td>
<td>0.000223 (0.000575)</td>
<td>-0.000256 (0.000272)</td>
</tr>
<tr>
<td>Female Representation</td>
<td>0.0000428 (0.000124)</td>
<td>0.0000642 (0.000154)</td>
</tr>
<tr>
<td>Black Population Share</td>
<td>0.0166* (0.00505)</td>
<td>-0.00110 (0.000911)</td>
</tr>
<tr>
<td>Hispanic Population Share</td>
<td>0.00101 (0.000972)</td>
<td>0.00134^ (0.000615)</td>
</tr>
<tr>
<td>Democratic Presidential Vote Share</td>
<td>0.0000159 (0.000241)</td>
<td>0.00000761 (0.000267)</td>
</tr>
<tr>
<td>Investigatory Stop</td>
<td>0.00966** (0.00198)</td>
<td>0.00993*** (0.00181)</td>
</tr>
</tbody>
</table>

Observations: 4,139,075  2,143,423

Note: ^ p<.1  * p<.05  ** p<.01  *** p<.001; Standard errors clustered at district/troop level; Year, month, hour, location and unit fixed-effects are included.
<table>
<thead>
<tr>
<th>Officer Group</th>
<th>(1) WA</th>
<th>(2) FL</th>
</tr>
</thead>
<tbody>
<tr>
<td>White-Female</td>
<td>-0.00504* (0.00166)</td>
<td>-0.00532*** (0.000639)</td>
</tr>
<tr>
<td>Black-Male</td>
<td>-0.00479 (0.00564)</td>
<td>-0.00277 (0.00222)</td>
</tr>
<tr>
<td>Black-Female</td>
<td>-0.00588 (0.0132)</td>
<td>-0.00401** (0.000943)</td>
</tr>
<tr>
<td>Hispanic -Male</td>
<td>-0.00603* (0.00233)</td>
<td>-0.00312* (0.000901)</td>
</tr>
<tr>
<td>Hispanic-Female</td>
<td>0.0105 (0.0119)</td>
<td>-0.00498** (0.000946)</td>
</tr>
<tr>
<td>Other-Male</td>
<td>0.00147 (0.00373)</td>
<td>-0.00706* (0.00246)</td>
</tr>
<tr>
<td>Other-Female</td>
<td>-0.00570* (0.00277)</td>
<td>-0.00793*** (0.00107)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Driver Group</th>
<th>(1) WA</th>
<th>(2) FL</th>
</tr>
</thead>
<tbody>
<tr>
<td>White-Female</td>
<td>-0.00834*** (0.000694)</td>
<td>-0.00384*** (0.000488)</td>
</tr>
<tr>
<td>Black-Male</td>
<td>0.0213*** (0.00242)</td>
<td>0.0126** (0.00255)</td>
</tr>
<tr>
<td>Black-Female</td>
<td>-0.000186 (0.000199)</td>
<td>-0.00262** (0.000583)</td>
</tr>
<tr>
<td>Hispanic -Male</td>
<td>0.0157*** (0.00254)</td>
<td>0.00520* (0.00179)</td>
</tr>
<tr>
<td>Hispanic-Female</td>
<td>-0.0101*** (0.00162)</td>
<td>-0.00346** (0.000891)</td>
</tr>
<tr>
<td>Other-Male</td>
<td>-0.00455 (0.00433)</td>
<td>-0.00172** (0.000410)</td>
</tr>
<tr>
<td>Other-Female</td>
<td>0.0106^ (0.00463)</td>
<td>-0.00539*** (0.000609)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Police X Driver</th>
<th>(1) WA</th>
<th>(2) FL</th>
</tr>
</thead>
<tbody>
<tr>
<td>White-Female X White-Female</td>
<td>0.00486*** (0.000818)</td>
<td>0.00174* (0.000692)</td>
</tr>
<tr>
<td>X Black-Male</td>
<td>0.00233 (0.00342)</td>
<td>-0.000478 (0.00108)</td>
</tr>
<tr>
<td>X Black-Female</td>
<td>0.00065 (0.00239)</td>
<td>-0.000477 (0.000607)</td>
</tr>
<tr>
<td>X Hispanic-Male</td>
<td>-0.000421 (0.000219)</td>
<td>0.00211^ (0.000935)</td>
</tr>
<tr>
<td>X Hispanic-Female</td>
<td>0.00205 (0.00212)</td>
<td>0.00173 (0.00125)</td>
</tr>
<tr>
<td>X Other-Male</td>
<td>-0.00563 (0.00517)</td>
<td>-0.0106*** (0.00182)</td>
</tr>
<tr>
<td>X Other-Female</td>
<td>0.00147 (0.00168)</td>
<td>-0.000234 (0.00114)</td>
</tr>
</tbody>
</table>

| Black-Male X White-Female | -0.00165 (0.00238) | -0.00425* (0.00129) |
| X Black-Male   | -0.00000845 (0.000398) | 0.00156 (0.00163) |
| X Black-Female | -0.00113 (0.00412) | 0.00108 (0.000896) |
| X Hispanic-Male| -0.00164 (0.00477) | 0.00334* (0.00111) |
| X Hispanic-Female| 0.00368 (0.00552) | 0.00182 (0.00116) |
| X Other-Male   | -0.00104 (0.0149)    | -0.0113** (0.00288) |
| X Other-Female | 0.00524 (0.0105)     | 0.00128 (0.00183)   |

| Black-Female X White-Female | -0.0171 (0.00984) | -0.00839** (0.00222) |
| X Black-Male    | 0.00245 (0.00191) | -0.000597 (0.00125) |
| X Black-Female  | -0.00267 (0.0178) | -0.00221^ (0.00114) |
| X Hispanic-Male | 0.00164 (0.00628) | 0.00701 (0.00522)   |
| X Hispanic-Female| 0.00292* (0.000987) | 0.00206* (0.000628) |
| X Other-Male    | -0.00636 (0.00529) | -0.00728* (0.00062) |
| X Other-Female  | 0.00490 (0.00607)  | 0.000989 (0.000655) |

| Hispanic-Male X White-Female | -0.00454 (0.00290) | -0.00462* (0.00187) |
| X Black-Male    | 0.00143 (0.00280) | 0.00165 (0.000956) |
| X Black-Female  | 0.00402 (0.00478) | 0.000679 (0.000583) |
| X Hispanic-Male | 0.00974 (0.00562) | 0.00281** (0.000595) |
| X Hispanic-Female| -0.0107* (0.00381) | 0.00224^ (0.00118) |
| X Other-Male    | 0.0415*** (0.00701) | -0.0116** (0.00273) |
| X Other-Female  | 0.0141^ (0.00636)  | 0.00141 (0.00123)   |

| Hispanic-Female X White-Female | 0.0277 (0.0266) | -0.00403* (0.00139) |
| X Black-Male    | 0.00688 (0.00509) | 0.00255^ (0.00123) |
| X Black-Female  | 0.0119 (0.0118)  | 0.00123 (0.000860) |
X Hispanic-Male  0.0323 (0.0344)   0.00369** (0.000961)
X Hispanic-Female -0.00296 (0.00272)  0.00317* (0.000970)
    X Other-Male -0.00874 (0.00586)  -0.0102** (0.00289)
    X Other-Female -0.00467 (0.00384)  0.00146 (0.000920)

Other-Male X White-Female  0.00297 (0.0108)  -0.00499 (0.00304)
    X Black-Male -0.000396 (0.00412)  0.00483 (0.00299)
    X Black-Female -0.000558 (0.00316)  0.00128 (0.00163)
    X Hispanic-Male -0.00253 (0.00343)  0.00557* (0.00190)
    X Hispanic-Female 0.00631** (0.00150)  0.00255 (0.00147)
    X Other-Male -0.0105 (0.0123)  -0.0132*** (0.00231)
    X Other-Female 0.00534 (0.00726)  -0.000189 (0.00240)

Other-Female X White-Female  0.0170 (0.0120)  -0.00618** (0.00157)
    X Black-Male -0.00169 (0.0104)  0.00259* (0.000894)
    X Black-Female -0.00308 (0.00319)  0.00443** (0.00111)
    X Hispanic-Male 0.00700 (0.00986)  0.00317* (0.000927)
    X Hispanic-Female -0.00240 (0.00723)  -0.0116*** (0.00156)
    X Other-Male -0.00206 (0.00301)  -0.0000615 (0.00129)
    X Other-Female -0.00116 (0.00375)  -0.00538^ (0.00271)

Controls

  Officer Age -0.0000488 (0.0000929)
  Driver Age -0.000373*** (0.0000375)  -0.000188*** (0.0000218)
  Black Representation -0.0000748 (0.0000248)  -0.000268 (0.0000204)
  Hispanic Representation 0.000214 (0.000572)  -0.000266 (0.000273)
  Female Representation 0.0000392 (0.000122)  0.0000630 (0.000154)
  Black Population Share 0.0166* (0.00506)  -0.00108 (0.000904)
  Hispanic Population Share 0.000988 (0.000975)  0.00131^ (0.000626)
  Democratic Presidential Vote Share 0.0000160 (0.0000241)  0.0000212 (0.0000266)
  Investigatory Stop 0.00966** (0.00198)  0.00993*** (0.00180)

Observations  4,139,075  2,143,423

Note: ^ p<.1  * p<.05  ** p<.01  *** p<.001; Standard errors clustered at district/troop level; Year, month, hour, location and unit fixed-effects are included.
Curriculum Vitae

Danyao Li

Updated April 2022

Education:

Ph.D. Public Affairs, Indiana University, Bloomington, 2022

M.P.A. Fudan University, Shanghai, China, 2016

B.A. Public Administration. Fudan University, Shanghai, China, 2013

Peer-Reviewed Publications:


Manuscripts Under Review:

Li, D. “Race versus Gender” or “Race and Gender?” Identity, Intersectionality and Bureaucratic Decision Making in Traffic Law Enforcement.


Nicholson-Crotty, J., & Li, D. When Intragroup Conflict is A Good Thing: Team Diversity and Use of Force by Police. (Revise & Resubmit)

Works in Progress:

Li, D. Critical Mass Condition of Majority Behavioral Changes in Representative Bureaucracy: A Nonparametric Exploration.

Li, D., & Nicholson-Crotty, J. Gender across the Organization: The Interaction of Female Leaders and Subordinates in the Production of Organizational Policies.


Li, D., Richards, M., & Wing, C. Public Quality Reporting in the Absence of Market Forces: Evidence from the Veterans Health Administration.


Mughan, S. & Li, D. Cross Border Effects of Marijuana Legalization: An Application to Asset Forfeiture.

Conference Presentations:

“Critical Mass Condition of Majority Behavioral Change in Representative Bureaucracy: A Nonparametric Exploration.” Association for Public Policy Analysis & Management Fall Research Conference (APPAM), Austin, TX, November 2021.


“Race, Representation and Asset Forfeiture” with Sean Nicholson-Crotty and Jill Nicholson-Crotty. Midwest Political Science Association Annual Meeting (MPSA), Chicago, IL, April 2019.


“Private Roles in Enhancing Multi-Level Governance: China's "Internet +" National Strategy” with Yijia Jing. HKU-USC-IPPA Conference on Public Policy, Hong Kong, June 2016.


Additional Training and Research Skills:


Race, Ethnicity and Quantitative Methodology, ICPSR Summer Program, University of Michigan, Ann Arbor, 2020.


Introduction to the LaTeX Text Processing System, ICPSR Summer Program, University of Michigan, Ann Arbor, 2020.

Introduction to Python, ICPSR Summer Program, University of Michigan, Ann Arbor, 2020.


Grant Writing Experience:


Li, D. “Three Essays on Representation, Diversity and Bureaucratic Performance,” $10,000, APSA Doctoral Dissertation Research Improvement Grant (NSF Grant). Not funded.

Research Experience:

Research Assistant – Public Policy Institute Faculty Fellows Program (led by Sean Nicholson-Crotty and Jill Nicholson-Crotty), Indiana University, May 2018 – May 2019.


Research Assistant – Coady Wing, August 2016 – Present.

Research Associate – Emergency Response and Crisis Management Center, Fudan University, September 2011 – February 2012.

Research Associate & Grant Writer – Multiple National Social Science Funding Projects (led by Yijia Jing), Fudan University, December 2012 – May 2016.

Research Interests:

Public Administration, Representation and Diversity, Decision Making, Organization Behavior, Social Equity and Justice, Law Enforcement, Research Design and Quantitative Methods

Teaching Interests:


Teaching Experience:

O’Neill School of Public and Environmental Affairs, Indiana University Bloomington

Instructor – SPEA-V185 Management of Public Problems and Solutions, Fall 2018 – Spring 2022.


School of International Relations and Public Affairs, Fudan University

Teaching Assistant – Research Methodology in Public Administration, Fall 2013.
Honors and Awards:

*APPAM Equity & Inclusion Student Fellowship*, Association for Public Policy Analysis & Management, 2021

*Robert Agranoff Ph.D. Fellowship*, O’Neill School of Public and Environmental Affairs, Indiana University, 2020-2021

*China National Scholarship*, China, 2015-2016

*Fudan Education Foundation Oversea Scholarship*, Fudan University, 2014-2015

*Shanghai Municipal Government First-Class scholarship*, Shanghai, China, 2009-2016

Academic Service:

Department of Justice, Bureau of Justice Statistics, CLETA (Census of Law Enforcement Training Academies) expert review panel, March 9, 2022.


Assistant to Associate Editor – *Public Administration Review (PAR)*, 2014 – 2016.

Professional Memberships:

American Political Science Association

American Society for Public Administration

Association of Public Policy Analysis and Management

Midwest Political Science Association

Public Management Research Association