Intersectional Encounters

Representative Bureaucracy and the Routine Traffic Stop

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Abstract

We evaluate the factors associated with an officer's decision to search a driver or vehicle after a routine traffic stop, and we compare the accuracy of these searches by looking at the share leading to arrest. Racial disparities in search rates by race of driver are similar for all types of officers; all tend to search Black male drivers at higher rates than any other demographic. White male officers have higher search rates for all types of drivers. Further, they conducted the greatest share of "fruitless searches" (those not leading to arrest), and these searches are particularly targeted on those drivers with the greatest number of cumulative disadvantages.

Keywords: racial profiling, policing, traffic stops, "driving while Black", representative bureaucracy

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Introduction

Somewhere in Charlotte, North Carolina, a young Black man is driving to work; a White male police officer observes. Within the next few blocks, the officer finds a reason to pull the driver over—perhaps a broken tail light, or maybe an expired tag. After pulling the driver over, and based on little information other than a short conversation and computer search, the officer must decide whether or not to conduct a search. Meanwhile, across town, a different officer sees a car run a red light. When this officer pulls the car over, he or she finds that the driver is an older White female. The officer must make the same quick decision based on available information—is the driver likely engaged in some criminal activity that warrants a search? Officers make thousands of such decisions every day. The vast majority of drivers are not subjected to search, but a few are. This study examines the determinants of those quick and routine decisions related to the odds of search following a routine traffic stop.

In Charlotte, North Carolina, during 2016 and 2017, an incident like the first occurred 6,977 times, of which 1,158, or 17 percent, led to a search. The second situation occurred 1,117 times, of which only four, or 0.36 percent, led to a search. A young Black male stopped by a White male officer for a non-moving violation had over 40 times the likelihood of being searched compared to a White female pulled over for a moving violation by an officer who was not a White male.[1] We make use of a comprehensive database that includes two years of traffic stops in Charlotte, NC and shows White male officers to be considerably more likely to search the drivers they pull over than officers of any other demographic group. Officers of all identities share a tendency to search young Black male drivers at higher rates than other drivers. These

[1] Arrest resulted 332 times, or in 29 percent of the searches of Black male drivers, but in 2 of 4 cases for the White females. Clearly, the difference in search rates was not fully justified by the different rates of arrest-worthy behaviors uncovered by the searches.

rates are lower, however, when the officer is Black or female than when the officer is a White male. We find that other characteristics of the driver, the officer, the location, and the purpose of the traffic stop also predict whether a search will occur. Further, we assess the accuracy of these searches by comparing rates of search, arrest, and "fruitless search" (those not leading to arrest). The comparisons show that demographic targeting subjects disadvantaged groups to higher rates of fruitless search than arrests rates suggest are warranted. This is particularly true for White male officers. Our findings have important implications for the question of equal representation in public employment, particularly law enforcement. What are the promises, and limitations, of a "representative bureaucracy"? Can we expect a more diverse police force to produce better and more equitable outcomes? Our findings suggest it could.

Representative Bureaucracy

Representative bureaucracy is the idea that agents of the state should reflect the citizens they serve. When J. Donald Kingsley (1944) first wrote about the concept, his concern was whether a nation's bureaucracy reflected the values of the "ruling elite." Looking at the British civil service, he was reassured that high civil servants did indeed reflect these values, as they generally came from elite social backgrounds. Since the original formulation, Kingsley's question has been democratized. Scholars—since at least Subramaniam (1967—have assessed the degree that public bureaucracies reflect the demographic characteristics of the citizenry. Subramaniam noted that origins do not determine values, particularly in an environment of upward mobility (1967, 1014). Frederick Mosher (1968) clarified the distinction between passive and active representation. Kenneth Meier wrote: "A bureaucracy is representative in the passive sense if the bureaucrats share the same demographic origins (race, sex, education, religion, etc.) as the general population…A bureaucracy is an active representative if it produces policy outputs

that benefit the individuals who are passively represented" (1993, 393, quoted in Kennedy 2012, 400).

Many elements stand between citizens and the government agents who serve them: Organizational mission, training, and culture, for example (see Meier and Nigro 1976). Many scholars have noted the distinction between "traditional" and "representative" roles within a bureaucracy. Jessica Sowa and Sally Selden (2003) looked at the use of discretion in awarding home mortgages in the Rural Housing Loan Program of the US Department of Agriculture's Farmer's Home Agency, where there had traditionally been little concern for serving minority constituents, but where civil servants in regional offices have significant personal discretion in making loan decisions. They found that a "minority role" orientation was a significant predictor of loans for minority borrowers when compared to a "traditional role" orientation. Sowa and Selden emphasize an agent's minority role orientation as well as discretion. In a low-discretion setting, neither passive representation nor a minority role orientation would make a difference. Many other scholars have emphasized this combination as well (see for example Meier 1975, Meier and Nigro 1976, Selden 1997, Saidel and Loscocco 2005). Within agencies such as the postal service, unemployment or welfare offices, or the IRS, individual street-level bureaucrats may have little discretion. In these cases, the value of descriptive representation is to ensure equal access to public employment, and little more. However, discretion is much higher among the farm loan administrators that Selden (1997) and Sowa and Selden (2003) studied, among teachers (see for example Grissom et al. 2009, Meier et al. 1999), or among police officers (for example, Close and Mason 2006). In high discretion situations, it matters. Other scholars (see particularly Sabramaniam 1967 and Meier 1975) have emphasized the importance of diversity in

top levels of the administrative apparatus of the state, where decision-makers are directly involved in making policy, not just implementing it.

Judith Saidel and Karyn Loscocco (2005), summarizing previous literature, suggest that ascribed characteristics may lead to certain values, which may cause behaviors that then generate policy outputs of a bureaucracy. But, they argue, this entire process may be embedded in a "gendered institutional context" where male and female administrators differ. Specifically, they find female agency heads prioritize different issues than their male counterparts.

Meier and colleagues (1999) assessed another issue: perhaps a representative bureaucracy makes decisions that benefit all citizens, no matter what their background. Looking at educational outcomes, they demonstrated that school districts with greater racial diversity among teachers boasted higher scores which benefitted Black and White students alike. Scott Page (2008) has also written about the value of diversity in the decision-making process, arguing that it may generate better decisions, not only more equitable ones.

Our study focuses on the routine traffic stop. Police officers certainly reflect the conditions reviewed above: they have a great deal of discretion; they work in a highly gendered environment; there is significant demographic diversity both among the employees and in the constituents with whom they interact; there is a clear distinction between a traditional role orientation (sometimes referred to in the literature as the "blue culture"; see Pegues 2017) and a more reformist, community-oriented, bias-free policing orientation (see Fridell et al. 2001). In sum, a police department represents a valuable setting for understanding important questions in representational bureaucracy.

Intersectionality and the Traffic Stop Encounter

Kimberle Crenshaw (1989) drew attention to the concept of intersectionality with the observation that Black women were denied legal protections on the basis of their combined status of being both Black and female when the discrimination against them was indeed related to that intersectional identity. If all Blacks did not suffer, or all women did not suffer, there was no redress. Since her initial formulation, intersectionality has become a foundational element in the analysis of social disparities of many kinds. At its core, the concept conveys that a combination of disadvantaging traits such as being poor, a member of a racial minority, homosexual, a recent immigrant, or having special physical needs should not be viewed or treated as a lump sum. Crenshaw (1991) focused on the women seeking help in battered women's shelters who were often poor, minority, immigrant, and possessed other disadvantaging characteristics. Her analysis suggested that without addressing these multiple overlapping disadvantages we could not understand nor respond to the situation at hand. (For foundational studies on this topic, see Collins 1990, Hancock 2004, Strolovitch 2007, Harris-Perry 2011.) Rather than assuming an additive impact of each of these identities, analysists must pay attention to their specific combinations.

Traffic stops certainly involve a number of different characteristics, so our analysis is strengthened by an intersectional perspective. The literature on representative bureaucracy would suggest a focus on the identity of the officer, or the combined identities of the officer and the driver, but in the analysis that follows, we go beyond this to consider factors related to the officer, the driver, the location of the stop, the characteristics of the stop itself, and the combinations of these factors.

Previous studies have typically focused on the identity (age, race, gender) of the driver with controls for the purpose of the stop (see for example Baumgartner et al. 2018; Epp et al.

2014); the combined identities of the officer and the driver (e.g., Close and Mason 2006); or the characteristics of the officer. Many studies of racial diversity in police departments question whether the organizational culture of the police profession ("blue") supersedes a more generalized racial identity (e.g., "Black"). These studies have pinpointed both ideological and behavioral differences among Black and White officers (Moskos 2008; Woods 2014, Morin et al. 2017). Drawing from a long literature on "tokenism" (e.g., the behavior of members of small minority groups within predominantly homogeneous professions, such as all-male or all-White organizations; see Kanter 1977, Yoder 1991), but consistent with the idea of organizational culture or mission overriding one's social background, the idea here is that Black officers may not behave differently than their White counterparts: they may become more "blue than Black" (Rowe 2012, Van Maanen 1975, Wilkins and Williams 2008). These, of course, are empirical questions, not ones to be assumed. The literature on tokenism may no longer be relevant to large urban police departments (tokenism was typically defined in the literature as relevant to situations where the minority group represented less than 15 percent of the total; in today's police forces this number is often vastly exceeded), but certainly the question of organizational culture must be taken seriously. Within the law enforcement community, common stereotypes of the "criminal profile" of the young minority male may be widespread.

Theories of Disparate Treatment

Nationally, more than 20 million Americans are pulled over for a routine traffic stop each year; in fact, 86 percent of Americans cite a traffic stop as their most recent interaction with a law enforcement officer (Eith and Durose 2011). Traffic stops are low-information situations: the officer has just a few minutes, a short conversation with the driver, and a quick computer search of the license tags or operating license to determine whether to conduct a search. In the vast

majority of cases, of course, no search is conducted—just over four percent in our dataset. When a search occurs, drivers immediately understand that the officer views them with suspicion. Thus, our collective experiences with traffic stops, the most common citizen-police interactions, tell us a lot about how the police view us. For most Americans, a traffic stop is unwelcome, frustrating, perhaps costly, but generally rare and trivial; a minor inconvenience easily outweighed by the state's interest in public safety and police investigations. The US Supreme Court has made clear that the police have the authority to detain someone temporarily based on this logic. The analysis in the majority opinion in *Terry v. Ohio*, 392 US 1 (1968), held that the "scheme is justified in part upon the notion that a 'stop' and a 'frisk' amount to a mere minor inconvenience and petty indignity, which can properly be imposed upon the citizen in the interest of effective law enforcement on the basis of a police officer's suspicion" (pp. 10-11). This case dealt with a pedestrian stop; in *Whren v. United States*, 417 US 806 (1996), the Justices made clear that an officer could use the traffic code in order to create a "temporary detention of a motorist" … "even if a reasonable officer would not have stopped the motorist absent some additional law enforcement objective" (p. 806). That is, a technical violation of the traffic code that would otherwise not merit attention may be used as a mechanism to conduct a criminal investigation. If the quick investigation yields no probable cause, then the motorist may be sent on his or her way with no further action.

A key element in the combined logics of the *Terry* and *Whren* decisions is the idea that such encounters with the police should be rare. And for White middle-class Americans, they are likely to be so. But for those Americans who fit a particular stereotype in their appearance and live in certain neighborhoods, it can be a common and powerful signal that officers view their demographic with suspicion. It can be frustrating, humiliating, and dangerous. The simple fact

that police often choose to show greater visibility in "high crime" areas means that those individuals who live in those neighborhoods are likely to be exposed to much greater chances of being stopped by an officer than those who live in wealthier areas with less police presence. Philando Castile, who was killed after a traffic stop in St. Paul Minnesota in 2016, had been pulled over 46 times between receiving his driver's permit in 2002 and his death fourteen years later. The police paid particularly close attention to Castile when he was a new driver, stopping him on July 15 2002, a day before his 19th birthday, then again on December 2, 2002, January 8, February 3, February 12, February 13, February 16, March 4, and March 22, 2003; eight times in just three months (see Peralta and Corley 2016). The Justices' logic about willingly submitting to a minor, momentary, and rare inconvenience for the sake of public safety might look very different if that inconvenience were common, repeated, unjustified, and potentially fatal, as it was for Castile.

Many scholars have noted that in a low-information environment such as a traffic stop, stereotypes and profiles may play an outsized role in police decision-making. Because officers unquestionably have the legal authority to detain a driver temporarily, and can use any element of the traffic or the vehicle code as a reason to justify a traffic stop, these decisions are not only characterized by low information, but also by high discretion. Virtually every moving car is breaking some law, even if we consider only speeding (where the flow of traffic is routinely faster than the speed limit) or "obstructing traffic" (where an officer has discretion to interpret the law, including driving below the speed limit). So, with low information and high discretion, it is important to assess the factors that may drive the outcomes of a routine traffic stop.

Characteristics of the Traffic Stop

In their major study of citizen response to traffic stops, based on a survey of 2,329 drivers in Kansas City metropolitan area, Epp, Moody, and Haider-Markel (2014, see also 2016) make a crucial distinction: Drivers can tell when they were pulled over for a reasonable traffic safety purpose, and when the stop was a pretext for a conversation based on the officer's apparent suspicion of the driver. Police practices since the 1970s have made clear that any violation of the traffic or vehicle code may be used as a legally enforceable excuse to take a closer look at a driver. Any technical violation of the law, even a slight crack on a reflective light, or a shadow extending over the license plate, may be enforced, at the officer's sole discretion. If that discretion is used simply as a pretext to investigate a driver, then the driver might well feel that they were being racially profiled. Epp, Moody, and Haider-Markel (2016) refer to "safety" and "investigatory" stops to make this distinction, and they note that Blacks are more than twice as likely as Whites to be the subjects of these investigatory stops. It is important to note that pretextual use of the law has consistently been found to be legally acceptable by the courts, but drivers may understand that it is not fair (see Epp et al. 2016; Meares et al. 2016; Baumgartner et al. 2018).

Baumgartner, Epp, and Shoub (2018) used the Epp et al. distinction to classify the North Carolina traffic stop purposes into safety and investigatory groups. Safety stops are less likely to lead to search, and the searches that result from them show lower rates of racial disparity. We build on their work here, classifying traffic stops into two groups, safety and investigatory. Investigatory stops may result in searches more often because they could be associated with poverty indicators (e.g., cars in poorer physical condition, resulting in more equipment problems; expired registration tags because the car may be unable to pass the required inspection or the driver may not have the funds to pay the registration fee), or they might simply be excuses for

the officer to conduct a legally justified stop, when the driver is breaking no traffic law or even moving.[2] The outcome of a traffic stop is highly discretionary as well. Drivers pulled over for the same reason see different outcomes. In order to assess these outcomes while holding other factors constant, Baumgartner, Epp, and Shoub (2018, 130) looked at over 9,000 officers across North Carolina who had pulled over at least 100 drivers for speeding, and compared, for each officer, the percent of those drivers receiving a citation (rather than another outcome, typically a warning). The results showed that the full range from 0 to 100 percent was observed: some officers always gave a ticket, some never did, and there were officers at every point in between. Their analysis of safe movement violations, DWI stops, and seat belt stops showed similar findings. Clearly, a police officer has a lot of discretion.

An important characteristic of the traffic stop is where it occurs. Police leaders often point out that their officers need to be more aggressive in those areas where they respond more often to citizen calls for help. For example, the Charlotte-Mecklenburg Police Department (CMPD) provides this explanation in the introduction to the traffic stops database used here:

> CMPD is committed to deploying traffic officers to areas where we experience high crime and victimization. Our focus is also in the geographical areas where concerns are reported by community members. We as a police department have a responsibility to those communities, to address their concerns and take appropriate enforcement action in an effort to keep their neighborhoods safe. Additionally, we are not only reacting to crime but proactively engaging in strategies that are intended to prevent criminal activity from

[2] We define "traffic safety" stops as any of these: driving while impaired, safe movement, speeding, stop light / stop sign. All other stop types are referred to as "investigatory." These include: checkpoint, investigation, other, seat belt, equipment, and regulatory. Almost 40 percent of Charlotte traffic stops are regulatory; 26 percent speeding; 11 percent equipment; 10 percent stop light / sign; and the remaining types have fewer than five percent each. See our on-line Appendix for robustness tests where we eliminate DWI and "investigation" stops, which may involve little discretion on the part of the officer. Results remain similar.

occurring by placing officers in areas with a greater statistical history of crime (Charlotte Open Data Portal, N.d.).

Clearly, official strategy includes using traffic stops as a means of disrupting crime and letting potential criminals know that the police are watching. We, therefore, must be aware of location in any assessment of traffic stops outcomes. The CMPD statement also delineates a clear official policy of using traffic stops for crime prevention, not only to keep the roads safe. The *Whren* decision is a firm legal basis for such a policy.

Officer Characteristics

We referred above to the "Black v. blue" dichotomy in the policing literature: minority officers, like female officers, may fully adopt the stereotypes and practices of the dominant culture, or they may not. Wilkins and Williams (2008) investigated the impact of Black police officers on the racial disparity of vehicle stops. They compared the percentage of Black officers per police division with the number of vehicle stops of Black drivers as a portion of the eligible Black residents in the patrol area, finding that increases in Black police officers coincided with increases in the racial disparity of vehicle stops. Wilkins and Williams (2009) conducted a similar study regarding Latino rather than Black officers and had similar results. Correll and colleagues (2002) looked at the "shoot / don't shoot" decision, using a video-game situation with Black and White targets, and both Black and White subjects. They found that the decision to "shoot" was quicker with Black targets, and that this was unrelated to the race of the subject. These studies suggest that increased diversity on the force may have limited impact on racial disparities in outcomes.

Other studies have reported more significant differences among White and Black officers. Woods (2014, 161–2) found that White officers are more assertive, whereas Black officers are

more concerned with heading off "unintended escalations." Brown and Frank (2005, 2006) found that that White officers were more likely to make an arrest than Black officers, and Black citizens were more likely to be arrested instead of receiving citations than White drivers in similar situations. Brown et al. (2009) found that White officers were more likely to both assert authority in an encounter with a juvenile, and to make an arrest. Close and Mason (2006) found White officers to have a higher search rate but a lower contraband hit rate, while Black and Latino officers conducted fewer searches and had higher hit rates. Combined, these studies suggest that while disparities based on driver characteristics may be high no matter the officer, Black and White officers may have different rates of assertive behaviors; this is directly applicable to our analysis of searching. Morin et al. (2017) found that officer support for the use of force, or assertive police tactics, was stronger among officers with fewer years of experience. We will therefore also pay attention to officer years of experience. Attitudes may soften with experience.

Driver Characteristics

Many authors have looked at driver characteristics as predictors of search. Most recently and pertinent for this study is Baumgartner et al. (2018), who reviewed over 20 million traffic stops from every agency in North Carolina from 2002 through 2016 and showed powerful race- age- and gender-of-driver effects, robust to statistical controls for possible confounding factors. Epp et al. (2014) have provided the most complete study, along with Baumgartner et al. (2018), and we will not review the entire literature here. Suffice it to say that race-of-driver effects, especially among males, are well founded.

Theory and Hypotheses

Previous studies have clearly provided a number of expectations. But if we think of a traffic stop as a low-information encounter, then it should be ripe for the workings of implicit bias and stereotypes. It is also a high-discretion situation for an officer: whether to pull the car over in the first place, what enforcement action to take, and whether or not to search the vehicle are all highly discretionary actions. Both the officer and the driver bring identities and attitudes to the traffic stop encounter; we can measure their identities. We test a theory based on cumulative disadvantages associated with the driver, the officer, the purpose of the traffic stop, and its location. We expect none of these factors to work solely in isolation, but rather in conjunction with the others.

We are particularly interested in unwarranted suspicion. Accurate police targeting of actual criminals is not our concern; this is simply good policing. Rather, we are concerned with the use of stereotypes, other heuristic rules, or differences in police behavior toward disparate types of drivers which are not justified by differential rates of criminal behavior. Therefore, we compare search rates with arrests and with "fruitless" searches. We define a fruitless search as a search followed by the decision not to arrest.[3] If one group has twice the rate of criminal behavior, and is targeted in that proportion as well, the ratio of fruitless searches will be identical to the other two ratios (search rates and arrest rates). If there is unjustified over-targeting, the differences in arrest rates will be lower and the difference in fruitless searches will be higher than

[3] The data made available by CMPD do not include contraband hit rates, but do include the outcome of the search, including arrest. Baumgartner et al. 2018, looking at state-wide data, found that 25 to 30 percent of searches yielded contraband of some type, but that the contraband hits were typically very small, resulting in arrest just one-third of the time (Baumgartner et al. 2018, 114). Arrest following a search is perhaps a better indicator of a significant contraband "hit" because of the high percentage of apparently small amounts of contraband sometimes discovered, which do not lead to arrest.

the difference in the search rates. Comparing the search rates, arrest rates, and fruitless search rates is therefore an empirical strategy to identify unwarranted suspicion.

Regarding the officers, we expect White male officers to be more likely to adopt a "traditional" or "blue" role orientation; similarly for officers with less experience. Regarding the drivers, we expect young, minority, and male drivers to be targeted for more assertive enforcement actions by officers of all types. Overall, we expect more assertive police targeting, including higher search rates and even higher fruitless search rates (indicating that the targeting is not fully justified by arrest rates) to be associated with the following characteristics:

H1. White male officers.

H2. Officers with less experience.

H3. Younger drivers.

H4. Minority drivers.

H5. Male drivers.

H6. Investigatory stops rather than safety stops.

H7. Areas of the city with more poverty.

Finally, we expect that:

H8. Assertive police behavior will increase in an accelerating manner as the number of intersectional disadvantages from the list above increases.

Data and Research Approach

Charlotte, NC is the state's largest city with a 2010 population of approximately 800,000, of which 45 percent are White, 35 percent Black, and 13 percent Hispanic. The Charlotte-Mecklenburg Police Department (CMPD) provides two years of data on traffic stops at the city's

open data portal, and we retrieved the 2016 and 2017 data, consisting of 88,056 traffic stops.[4] As in most large US cities, Charlotte's police department does not reflect the diversity of the city's population. According to a 2015 study based on US Department of Justice statistics, the CMPD had 22.8 percent minority representation among officers, putting it 33 percentage points below statistical parity with its community. Black, Hispanic, and Asian-American representation on the force were 16.5 percent, 3.7 percent, and 2.1 percent respectively, leaving each group significantly under-represented on the force compared to its share of the community (Maciag 2015, 7). In this way, Charlotte is typical of many cities. These features are captured in our data, where 64.5 percent of the traffic stops were made by White male officers; 15.7 percent by Black male officers; 6.7 percent by White female officers; 1.09 percent by Black female officers; and 11.96 percent were made by officers of other racial groups (of which 5.88 percent were by Asian-American and 4.38 were from officers listed as "Hispanic / Latino"). Across the different "patrol districts" in the city, the percentage of stops made by White male officers ranges from 55 to 87 percent; Black male officers conducted from 8 to 36 percent of the stops across these neighborhoods. Across racial groups of drivers, the percent of stops made by White male officers ranges from 71 to 76. So, while there is some apparent tendency for White male officers to be deployed differentially in different parts of the city, they always represent a majority of all traffic stops, no matter the area. And when considering drivers of different racial and gender groups, their odds of encountering a particular type of officer are almost identical.

We are interested in officer assertiveness, in particular that which is not justified by actual criminal behavior. A search is a powerful indicator that the officer views the driver with

[4] http://clt-charlotte.opendata.arcgis.com/datasets/c458bca429b542bbb31130c23510628a_7, downloaded September 18, 2018.

suspicion, and is typically based on the discretion of the officer.[5] As discussed above, some searches (about 30 percent in our dataset) are followed by arrest. We recognize that an officer has some discretion about whether or not to arrest an individual for a given behavior, and there could be identity-based disparities in those decisions; the threshold to arrest might be higher or lower depending on the individual. However, this decision certainly is subject to more constraints than the decision to search. Therefore, we look at differential rates of "fruitless searches" (those not followed by an arrest) to understand the relative degree to which police target different individuals in a way that is, in retrospect once the search is completed, not justified by observed criminal behavior, even in the eyes of the officer.

Note that the Charlotte database does not indicate the reason for the search, the type of search (that is, its legal basis), or if the search yielded contraband, even though these elements are part of the required information collected by all North Carolina police departments following any traffic stop. In a larger analysis of all North Carolina traffic stops from 2002 through 2016, Baumgartner et al. (2018, 59) found that 3.36 percent of stops lead to search, with most of these being based on: a) consent; b) incident to arrest; and c) probable cause. Many fewer searches were conducted based on: d) protective frisk; or e) search warrant. Search followed by arrest is a better indicator of revealed criminal behavior than contraband hits because officers often record contraband as being found, but nonetheless decide not to arrest; presumably this is because the "contraband" is in fact not illegal or because only trace amounts were discovered.

Baumgartner et al. (2018) also found significant effects on search rates by time of day. The morning rush hour clearly differs dramatically from other times of day; search rates are low

[5] Search warrants, searches incident to arrest, and protective frisk searches would be exceptions to this rule; in a larger state-wide analysis, Baumgartner et al. found these to represent 33 percent of all searches (2018, 59) but the type of search is not indicated in the dataset made available by the CMPD.

during the rush hour but much higher in the wee hours of the morning. Similarly, they found that different police agencies differed dramatically from one-another in such basic characteristics of the number of traffic stops per population, and the baseline search rates. We do not address the time-of-day hypothesis here because the data made public by the Charlotte police department does not include that variable. We do not assess the second variable here because the present study is limited to just one police department.

We provide a set of robustness tests in our on-line Appendix. Some traffic stops, for example those resulting from a police "investigation" (e.g, a request that officers look for a driver fitting a certain physical description or driving a certain model car, as a criminal suspect) have high search rates, and these traffic stops might not fit the logic that we describe here. Similarly, DWI traffic stops have high search rates, also following a different logic involving less officer discretion. We replicate our analyses while excluding all DWI and Investigation stops in the appendix. Similarly, some searches are conducted incident to arrest, following a search warrant, or as "protective frisk"; these also involve less officer discretion. The 2016-17 CMPD database we use does not distinguish among search types, so we cannot easily replicate this analysis. However, we make use of the 2002-2016 data from Baumgartner et al. (2018) to show the robustness of a similar search model while including only consent and probable cause searches. No substantive conclusions change as a result of any of these robustness tests.

Results

Table 1 gives a summary of search rates, arrest rates, and fruitless search rates, by various characteristics of the drivers and officers.

Table 1. Variation in Search, Arrest, and Fruitless Search Rates.

	Traffic Stops	Percent Searched	Percent Arrested	Percent Fruitlessly Searched
Overall	88,056	4.41	2.04	3.04
Driver Characteristics				
Black	48,615	6.28	2.63	4.46
Hispanic	8,893	3.61	2.05	2.26
White	27,161	1.73	1.14	1.04
Other	3,387	1.03	0.86	0.68
Male	51,679	6.24	2.76	4.29
Female	36,377	1.80	1.02	1.27
Less than 35 years old	46,975	6.12	2.65	4.30
35 years old or older	41,081	2.45	1.35	1.59
Investigatory stop	50,183	5.96	2.54	4.23
Safety stop	37,873	2.35	1.38	1.46
Officer Characteristics				
White	62,712	5.01	2.24	3.47
Hispanic	3,685	4.41	2.20	2.98
Black	14,809	2.46	1.35	1.74
Asian-American	5,174	2.55	1.55	1.35
Other or unknown race	1,506	4.78	1.79	3.91
Male	80,500	4.52	2.08	3.13
Female	7,556	3.16	1.67	2.12
White male	56,813	5.19	2.30	3.61
White female	5,899	3.22	1.71	2.14
Other or unknown race	10,535	3.56	1.82	2.31
Black female	962	2.91	1.56	1.87
Black male	13,847	2.43	1.34	1.73
Less than 5 years of service	27,620	6.09	2.57	4.42
Five to 13 years of service	30,689	5.92	2.55	4.06
14 or more years of service	29,747	1.28	1.03	0.70
Officer-Driver Combinations				
White officer, Black driver	34,741	7.22	2.89	5.13
Black officer, Black driver	8,250	3.48	1.95	2.44
White officer, Other race driver	8,531	3.02	1.77	1.97
White officer, White driver	19,440	1.93	1.29	1.17

Black officer, White driver	4,594	0.89	0.39	0.70
Patrol Districts				
Metro	4,085	12.24	3.72	9.52
North Tryon	7,037	7.53	3.10	5.36
Westover	6,847	6.66	3.55	4.29
Freedom	4,090	6.36	3.06	4.16
Hickory Grove	7,446	6.10	2.77	4.08
Independence	5,475	5.02	2.74	3.34
Central	4,187	4.11	1.77	3.10
Steele Creek	6,063	4.12	2.03	2.62
Eastway	9,144	3.63	1.79	2.44
University City	5,585	2.88	1.45	2.06
North	7,250	2.10	1.19	1.50
Providence	10,266	1.76	0.91	1.17
South	9,356	1.19	0.71	0.75
Missing	1,225	3.76	1.39	2.69

Overall, just over four percent of traffic stops result in a search, two percent in arrest, and three percent in dry or fruitless searches.[6] Searches, like arrests and fruitless searches, are more common among: Black drivers, male drivers, younger drivers, and drivers stopped for investigatory rather than traffic safety reasons. Black drivers compared to Whites have 3.6 times the odds of search (6.28 search rate for Black drivers / 1.73 for White drivers = 3.6). Baumgartner et al. (2018, 86) showed that, across 20 million traffic stops in North Carolina from 2002 through 2016, this Black-White search rate ratio was 5.05 / 2.35, or 2.15. Thus, on the face of it, the racial disparity in search rates is much higher in Charlotte during 2016 and 2017 than was found in this statewide study. Note, however that the arrest rate for Black drivers is 2.3 times higher than that for Whites (2.63 percent as compared to 1.14 percent). And, as discussed above, this reveals that the disparity in fruitless searches is even greater than that in searches: 4.46 for Black drivers / 1.04 for White drivers = 4.29. Black drivers are more than 4 times as likely to be subjected to a fruitless search as White drivers. This pattern, 2.3 for arrest, but 4.29 for fruitless

[6] The three indicators are not fully mathematically determined, as some arrests occur without a search.

search, suggests over-targeting beyond what the observed arrest rates would justify. (And note that arrest rates draw from the same officer behavior as the other factors we measure here, so may be subject to various racial disparities as well.)

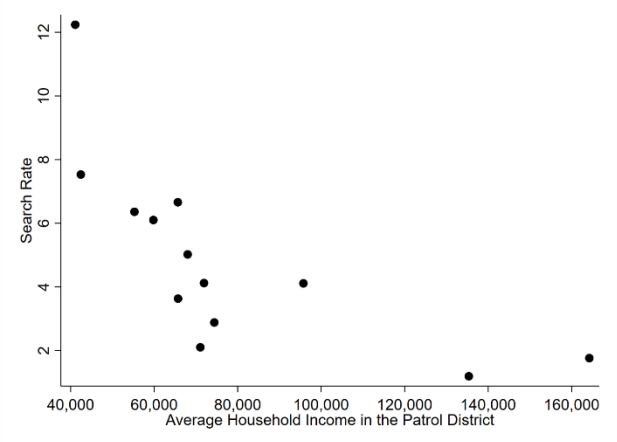
Officer characteristics associated with higher search rates include: White males and those with fewer years of service. White officers encountering Black drivers have more than a 7 percent search rate (and almost a 3 percent arrest rate), more than double any other officer-driver combination. White officers search Black drivers 3.7 times more than they search White drivers (7.22 / 1.93 = 3.7). White officers are 2.2 times more likely to arrest a Black driver, but 4.4 times more likely to subject a Black driver to a fruitless search than a White driver. Black officers search drivers less than half as often as White officers do, and are particularly unlikely to search White drivers. However, just like the White officers, the Black officers search Black drivers more than 3 times as often as they search White drivers (3.48 / 0.89 = 3.9). Their pattern of success in finding people worthy of arrest is less targeted against innocent Black drivers, however: their ratio is 5 for arrest and just 3.5 for fruitless search. So, while the Black officers target Black drivers just as White officers do, they search fewer drivers of all types, and their targeting of the Black drivers appears to be more accurate.

Search rates vary by patrol districts, with most of the areas within the range of approximately 3 to 7 percent. However, three districts (North, Providence, and South) show remarkably low search rates (2.1 percent or lower), and one district (Metro) with a much higher search rate than the others, at over 12 percent. Arrest rates do not vary as widely as search rates, which leads to the situation where the range of fruitless search rates, 0.75 to 9.52 (a ratio of 12.7), is much higher than what is justified by the range in arrests that follow searches: 0.71 to 3.72 (5.2). Targeting apparently follows crime, but the targeting is over-done.

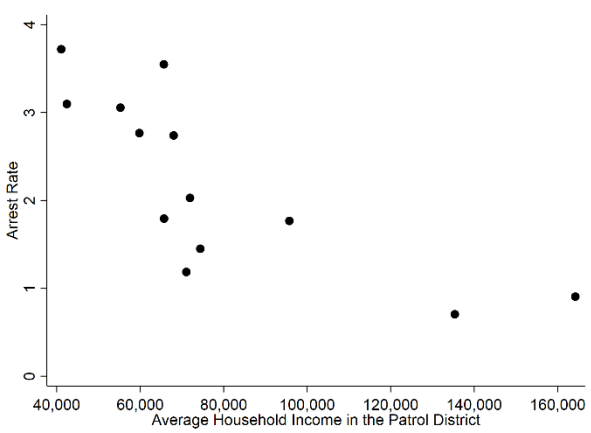
What can explain these differences? One factor might be social class. In Figure 1 we compare the search rates with the average household income in the 13 patrol districts listed.

Figure 1. Search and Arrest Rates by the Average Household Income in the Patrol District.

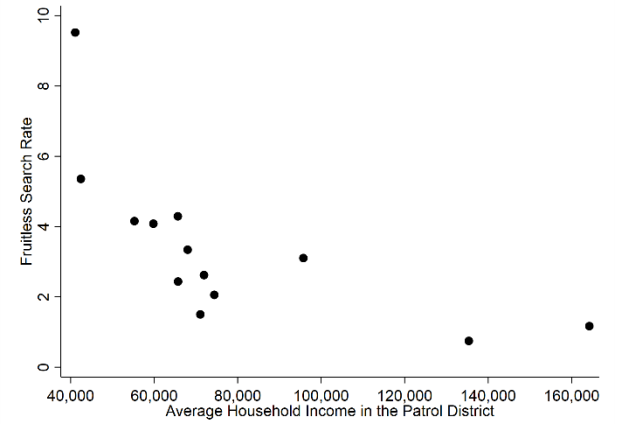
A. Search



B. Arrest



C. Fruitless Search



Source for household income: Calculated from the US Census based on Social Explorer Tables: SE 2016 Tract Estimates (SE), SE 2016 Tract Estimates. Correlations: Search rates and arrest rates: 0.92; search rates and income: -.71; arrest rates and income: -.77; fruitless search and income: -.67.

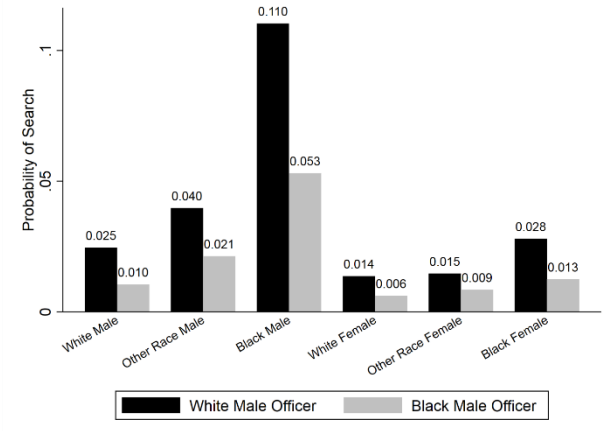
Table 1 showed dramatic differences in search rates. Here we see that those living in the wealthiest areas of Charlotte rarely face assertive action by a police officer; search rates are regularly lower than half the city-wide average in the two wealthiest areas. By contrast, the two districts with the lowest average income have rates of 8 and 12 percent, double and triple the city-wide average. Arrest rates are low in the wealthier areas, but the high disparity in searches is not borne out by correspondingly high arrest rates in the poorer areas. Those who live in those areas are particularly exposed to higher probabilities of fruitless search, considerably more than

the differences in arrests would appear to justify. Note that arrest rates range from approximately one to four percent, but fruitless searches vary from one to ten. As social class, crime rates, and racial composition can all be correlated, we must be careful in interpreting any bi-variate relationships. Figure 1 makes clear that location matters, and that location is about something more than just place. Officers in different patrol districts are dealing with different mixes of the population in terms of race, income, and crime. This is why it is essential to control for patrol district in a multiple regression framework, as we do below.

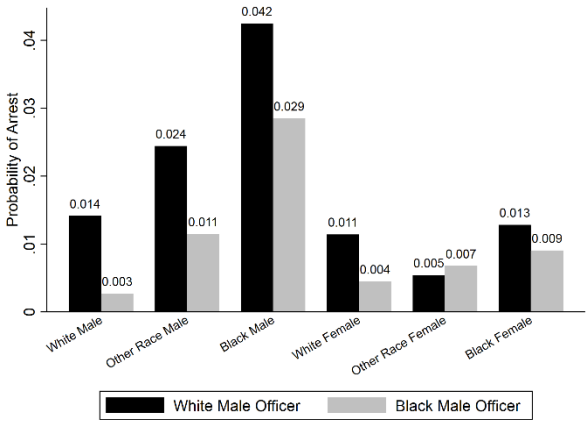
Table 1 showed clearly that officer characteristics matter, and they interact in important ways with driver characteristics. In Figure 2, we compare the search rates for drivers of different types for White and Black male officers. As Table 1 makes clear, these are the only two demographic groups among officers with enough observations to support a substantial analysis. The Black and grey bars represent the search rates for White and Black male police officers, respectively, and the labels indicate the characteristics of the driver.

Figure 2. Search and Arrest Rates by Driver Characteristics, Black and White Male Officers Compared.

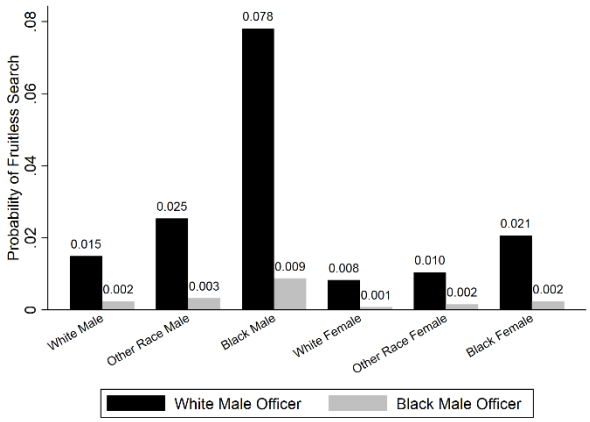
A. Search



B. Arrest



C. Fruitless Search



In every case, the White male officers are substantially more likely to search and arrest than the Black male officers. White male officers are more than twice as likely to search drivers, across all demographic groups. Their arrest rates, however, show lower (but still large) disparities. Their fruitless search rates are extremely large compared to Black officers, and more highly disparate between White and Black male drivers. Compared to how often they search White male drivers, both sets of officers are much more likely to search Black male drivers (11 percent v. 2.5 percent for White officers; 5 percent v. one percent for Black officers). Concerning fruitless searches, the White male officers are in a completely different class than the Black male officers, consistently eight times more likely to conduct such searches. Looking at the rates of search for female drivers, we see a similar pattern but with lower search rates and less racial difference. The White male officers show ten times higher rates of fruitless search of Black female drivers than do Black male officers.

Of course, univariate statistics such as those just described can be misleading. The different patrol districts have vastly different search rates and different racial compositions as well. Population statistics, drivers, and officer deployments differ substantially across the 13 patrol districts, and these location differences could potentially explain some parts of the racial disparity we see in Table 1. To evaluate the impact of demographics, location, and officer

characteristics, we turn to logistic regression. The analysis provides an assessment of the likelihood of a search, an arrest, or a fruitless search, controlling for the different elements in the model. If the location, stop purpose, or other factors explain the racial disparities, then the analysis should show significant coefficients for those variables but smaller coefficients for the driver and officer characteristics.

Table 2. Predicting the Likelihood of Search, Arrest, and Fruitless Search.

	Search		Arrest		Fruitless Search	
	Odds-Ratio (SE)	Prob.	Odds-Ratio (SE)	Prob.	Odds-Ratio (SE)	Prob.
Officer is White Male	1.89	.000	1.49	.000	1.93	.000
	(.075)		(.08)		(.09)	
Officer years of service	0.94	.000	0.96	.000	0.93	.000
	(.003)		(.00)		(.00)	
Investigatory stop purpose	1.62	.000	1.27	.000	1.78	.000
	(.067)		(.07)		(.09)	
Driver is less than 35 years old	2.33	.000	1.77	.000	2.46	.000
	(.089)		(.09)		(.11)	
Driver is Black female	1.21	.054	0.81	.072	1.46	.003
	(.123)		(.10)		(.19)	
Driver is Hispanic female	.77	.168	0.40	.001	0.98	.942
	(.147)		(.11)		(.22)	
Driver is female of another race	.77	.421	0.73	.394	0.91	.823
	(.253)		(.27)		(.36)	
Driver is White male	1.84	0.00	1.28	.037	1.88	.000
	(.192)		(.15)		(.25)	
Driver is Black male	4.91	0.00	2.53	.000	5.47	.000
	(.454)		(.26)		(.65)	
Driver is Hispanic male	2.65	0.00	1.98	.000	2.67	.000
	(.289)		(.25)		(.37)	
Driver is male of another race	.85	.465	0.87	.573	0.92	.762
	(.188)		(.21)		(.25)	
Patrol Districts						
Central	0.66	.017	0.94	.821	0.66	.039
	(.115)		(.26)		(.13)	
Eastway	0.67	.014	1.05	.838	0.59	.007
	(.110)		(.27)		(.11)	
Freedom	1.10	.556	1.72	.039	0.92	.693
	(.186)		(.45)		(.18)	

Hickory Grove	0.97	.833	1.46	.141	0.83	.319
	(.157)		(.37)		(.16)	
Independence	1.04	.807	1.72	.036	0.92	.666
	(.174)		(.45)		(.18)	
Metro	1.90	.000	1.82	.022	1.86	.001
	(.310)		(.47)		(.35)	
North	0.38	.000	0.71	.196	0.36	.000
	(.067)		(.19)		(.07)	
North Tryon	1.03	.855	1.47	.132	0.92	.666
	(.167)		(.38)		(.17)	
Providence	0.50	.000	0.71	.195	0.45	.000
	(.085)		(.18)		(.09)	
South	0.36	.000	0.56	.037	0.33	.000
	(.066)		(.16)		(.07)	
Steele Creek	0.93	.689	1.35	.247	0.79	.232
	(.157)		(.35)		(.16)	
University City	0.44	.000	0.77	.329	0.42	.000
	(.078)		(.21)		(.09)	
Westover	1.13	.466	1.98	.007	0.92	.645
	(.183)		(.50)		(.18)	
Constant	0.010	.000	0.007	.000	0.006	.000
	(.0019)		(0.0020)		(.001)	
N		88,056		88,056		88,056
Log Likelihood		-13478		-8127		-10120
LR Chi-2	(24)	4865	(24)	1298	(24)	3727
Pseudo-R2		.1529		.0740		.1555

Note: Omitted categories, or baselines, are: Officer Race, “other than White male”; Driver race-gender: “White female”; Patrol District, “missing”.

First, looking across the rows, we see that in all three models, the race and gender of the officer are important and consistent predictors of search: White male officers are 89 percent more likely to search, 93 percent more likely to conduct a fruitless search, and 49 percent more likely to make an arrest following a traffic stop, compared to other officers. We thus confirm Hypothesis 1.

We also find consistent and robust findings regarding years of service: Officers with greater experience on the force search less often, reducing their search rate by about six percentage points for each year of service. Thus, we would expect an officer with 10 years of

service, on average and other things held equal, to have less than half the search rate of an officer in their first year of service. Note also that the effect is less for arrests, and higher for fruitless searches. With experience, officers learn how to target their searches on those who deserve arrest. We confirm Hypothesis 2.

Drivers under the age of 35 are more than twice as likely to be searched compared to older drivers, 77 percent more likely to be arrested, and 2.46 times as likely to be subjected to a fruitless search, confirming Hypothesis 3.

Compared to the reference category of White female drivers, Black female drivers are more likely to be searched, less likely to be arrested, and considerably more likely to be subjected to a fruitless search. Hispanic females and women of other races are less likely to be searched or arrested. Thus, among females, we have mixed findings for Hypothesis 4, that minority drivers would be subjected to more assertive police behavior. Among males, we find that males of all races are subjected to higher rates of search, arrest, and fruitless search, providing clear evidence in support for Hypothesis 5. Black and Hispanic men are much more likely to be searched, particularly fruitlessly, thus confirming Hypothesis 4 among men. Black men see increased rates of fruitless search of 5.47; their increased rate of arrest, compared to the baseline, is 2.53.

Drivers pulled over for investigatory stop purposes rather than for safe driving violations (e.g., speeding, stop light / sign violations, etc.) are also consistently and significantly more likely to be searched. Again, as in the other cases, the coefficient for fruitless searches (1.78) is much higher than that for arrests (1.27). Thus, we confirm Hypothesis 6.

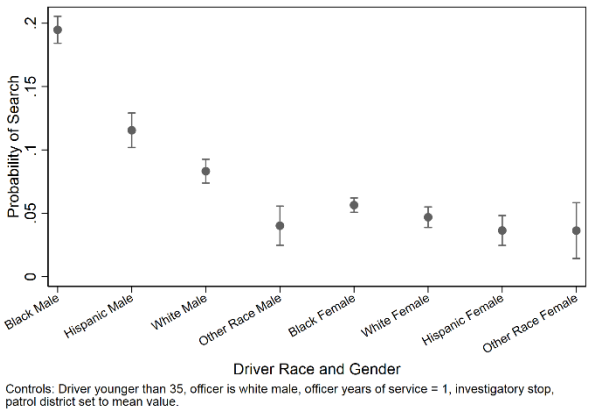
Controls for the patrol districts themselves produce just four statistical outliers, one of which is high (Metro, with 90 percent increased odds of search, other things equal), and four of

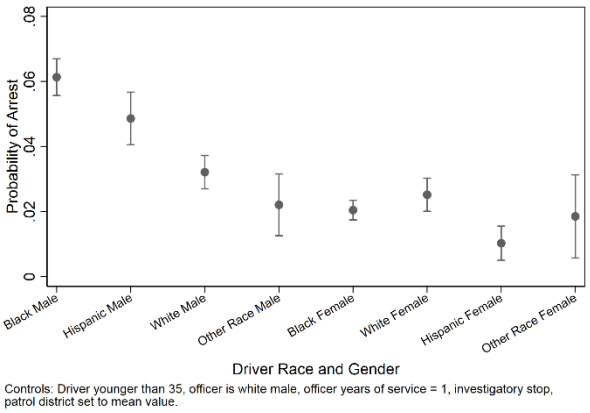
which are low. Table 1 showed the raw search rates by district. Most of the districts show rates between 3 and 8 percent, with Metro a high outlier (12.24 in Table 1), and North, Providence, South, and University City significant outliers at the low end (with rates of just 2.10, 1.76, 1.19, and 2.88 respectively). In sum, most neighborhoods of Charlotte are statistically within a narrow range, but one has a particularly high search rate, and 4 are notably less likely to see searches occur. We saw in Figure 1 that these search rates correlate strongly with household income. We therefore confirm significant location effects, consistent with Hypothesis 7. Wealthier neighborhoods see less assertive policing.

It can be difficult to interpret the results of a logistic regression, so we present graphical presentations in Figures 3 and 4. These show the predicted odds of search for drivers of different characteristics, drawing from the estimates presented in Model 3 of Table 2. Figure 3 presents the predicted odds of search, arrest, and fruitless search, by race and gender of the driver, for a driver younger than 35 years old, stopped for an investigatory stop by a White male officer new to the force, in the "average" patrol district. Figure 4 presents a similar comparison across officer demographics for a "typical" young driver stopped by an officer new to the force for an investigatory stop.

Figure 3. Predicted Search, Arrest, and Fruitless Search Rates by Characteristics of the Driver.

A. Search B. Arrest





C. Fruitless Search

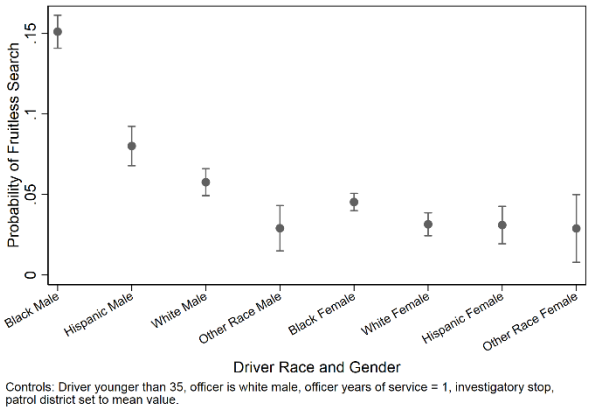
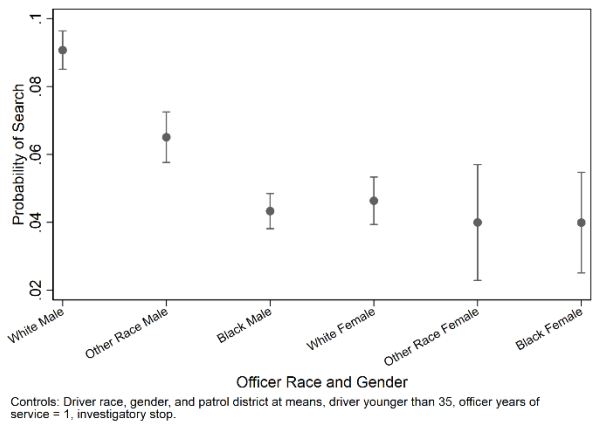
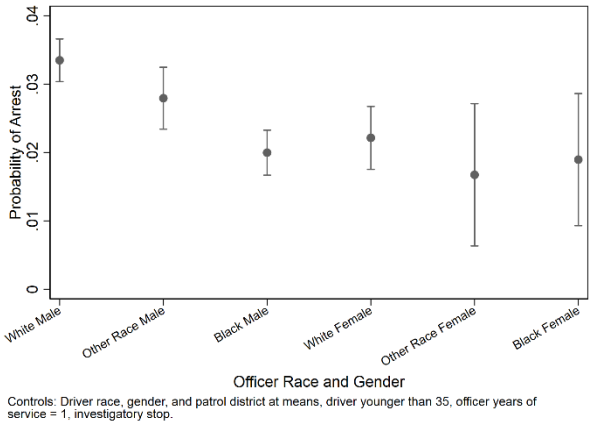


Figure 3 shows that the odds of search for a young Black male driver are close to 20 percent and that this number declines to about 12 percent for an Hispanic male, 8 percent for a White male, and that all other groups (including females of all racial groups) cluster around four percent. Comparing Panel A (searches) to Panel B (arrests) shows differences roughly in the same order, but much less pronounced. Panel C (fruitless searches) shows an exaggerated pattern of targeting. Black males show a coefficient roughly three times higher than White males in Panel C, compared to about two times higher in Panel B. This represents over-targeting.

Figure 4. Predicted Search, Arrest, and Fruitless Search Rates by Characteristics of the Officer.

A. Search B. Arrest





C. Fruitless Search

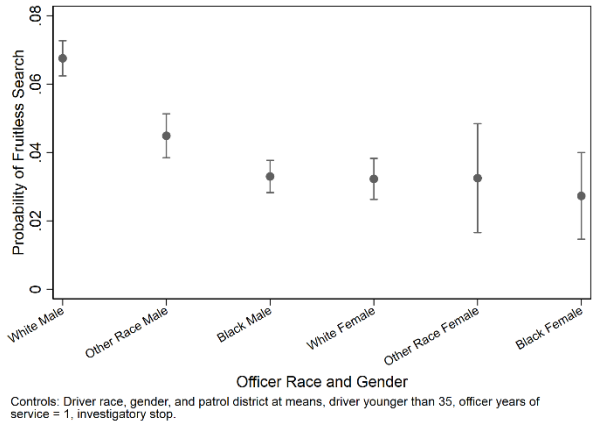


Figure 4 shows that White male officers have a significantly higher search rate, other things equal, than any other demographic group among officers. It shows a similar pattern with the differences in Panel B (arrests) being much less pronounced than those in Panel C (fruitless searches). Few substantively important differences in search or arrest rates distinguish Black or female officers. White males, however, stand sharply apart, particularly with regards to fruitless searches.

Our analysis so far makes clear that certain characteristics of a driver, an officer, and a traffic stop correspond to a higher likelihood of search. We identify eight such factors in Table 3.

For each characteristic, we distinguish between a "targeted" group and the other, non-targeted group. For race, Blacks are targeted and Whites are not; for gender, males are targeted

and females are not; for age, younger drivers are targeted and older ones are not; the table explains all eight comparisons. The table shows how the targeted group, in each case, sees a much higher search rate; typically about three times higher than the non-targeted group.

Table 3. Observed Rates of Search by Targeted v. Non-Targeted Characteristics.

Category			Search Rates		N
Driver Race	White	Black	1.73	6.28	75,776
Driver Sex	Female	Male	1.80	6.24	88,056
Driver Age	Old	Young	2.49	6.25	88,056
Officer is White Male	No	Yes	2.98	5.19	88,056
Officer Years of Service	High	Low	2.48	6.31	88,056
Safety v. Investigatory Stop	Safety	Investigatory	2.35	5.96	88,056
Low Search Neighborhood	Yes	No	1.65	5.62	88,056
High Search Neighborhood	No	Yes	4.03	12.24	88,056

Note: Figures show the observed percent of drivers searched. Age is split at its median: 33 years old and younger are "young"; those 34 and older are "old." Officer years of service is similarly split at its median: 8 years and less is "low"; 9 years and more is "high." Low search neighborhoods are the patrol districts of North, Providence, and South. Metro is the only high search neighborhood. See Appendix A for equivalent tables for arrest and fruitless search.

How do these disparities accumulate? Rather than go through every possible combination of eight dichotomous variable (which would be 512 combinations), we simply count them up and show the results in Table 4 and in Figure 5. A driver might have none of the targeted characteristics: an older White female stopped by a highly experienced female or minority officer for a safety violation in a low search neighborhood would have a score of zero. Perhaps surprisingly, we found 186 such individuals in our database; perhaps unsurprisingly, none of them were searched (though one such person was arrested). Table 4 shows the number of observations and Figure 5 displays the steadily increasing odds of search as one moves from fewer to more targeted characteristics. Here, our analysis clearly confirms Hypothesis 8, on intersectionality. Crucially, for our analysis, rates of arrest accumulate more slowly than rates of fruitless searching. That is, the accumulation of targeted characteristics generates more assertive police behavior than revealed arrest rates appear to justify.

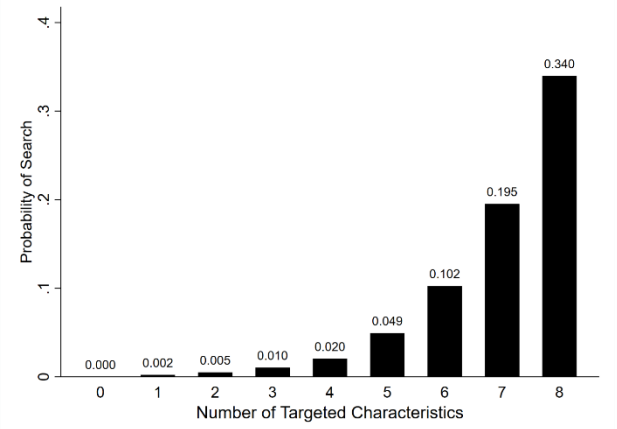
Table 4. Rates of Search by Number of Targeted Characteristics.

Number of Targeted Characteristics	N	Percent Searched	Percent Arrested	Percent Fruitlessly Searched
None	186	0.00	0.54	0.00
One	2,755	0.22	0.25	0.04
Two	8,512	0.48	0.52	0.20
Three	13,931	1.02	0.75	0.58
Four	17,367	2.04	1.32	1.29
Five	16,773	4.91	2.44	3.34
Six	11,502	10.24	4.09	7.36
Seven	4,382	19.51	6.69	14.17
Eight	368	33.97	7.34	27.72
Total	75,776	4.65	2.09	3.24

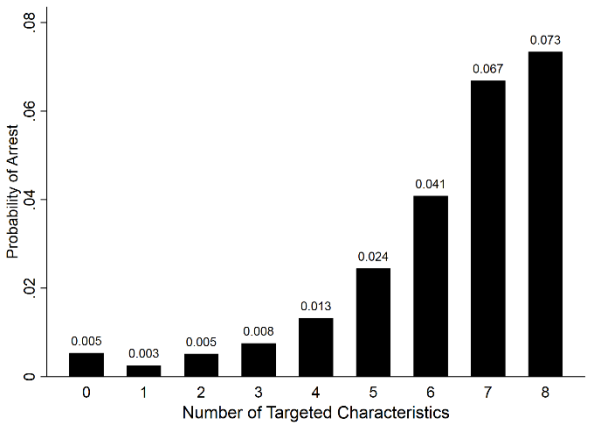
The number of targeted characteristics is the count of such characteristics from Table 3.

Figure 5. Probability of Search, Arrest, and Fruitless Search by Number of Targeted Characteristics.

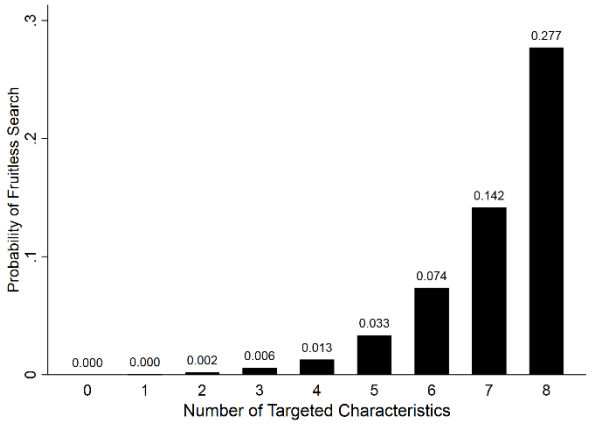
A. Search



B. Arrest



C. Fruitless Search



Note: See Table 3 for the list of "Targeted Characteristics."

Drivers with fewer than four targeted characteristics have just a one-percent search rate, an arrest rate of 0.75, and a fruitless search rate of 0.58. These odds of search more than double with the fifth overlapping disadvantage or unfortunate coincidence associated with that traffic stop, and the odds get worse and worse as the number of overlapping disadvantages increases. By the end, there is more than a 33 percent chance of search, quite substantial given that the baseline expectation across the city of Charlotte is just 4 percent. Fruitless searches accumulate even more quickly, compared to the very low rates at the low end of the scale. Arrests also increase, but more slowly with each accumulated disadvantage.

Discussion

At the beginning of this article, we presented two scenarios: one in which a White male police officer stopped a young Black male driver for an investigatory stop, and one in which a non-White male police officer stopped an older White female driver for a safety violation. Our data show that the massive discrepancies in search rates between these stops are significant and consistent across Charlotte.

Our findings are consistent with prior research on both officer and driver characteristics. No matter the race of the officer, the young Black male driver is searched at a higher rate. This

suggests that officers of all backgrounds, having accepted the police culture, share a common general stereotype of a "criminal suspect." Thus, our data provides empirical support for the idea that police officers of all types adopt the traditional or "blue" culture with the perceptions of criminal stereotypes that go along with that.

We introduced a key distinction: Perhaps some of that targeting is justified by criminal behavior. Indeed, criminal behavior (if we can assess this by arrest rates) differs substantially from group to group. Older women are arrested much less frequently, per 100 traffic stops, than young men. By looking at the difference between "fruitless searches" and arrests, however, we are able to see that the high degree of targeting of those with many disadvantaging characteristics is not fully justified by the rates of arrest that follow a routine traffic stop.

We showed the powerful effects of officer race and gender: White male officers are clearly more likely to search, and to search fruitlessly, than any other demographic group. Black male officers and female officers show much lower rates of search, and make relatively more arrests per 100 searches. These findings support prior research noting differences in the attitudes and behavior of White and minority officers (Dowlet 2005; Moskos 2008; Woods 2014, Morin et al. 2017; Brown and Frank 2005; Brown and Frank 2006; Brown et al. 2009), suggesting that increased diversity on the force would indeed be related to important changes in police behavior. However, our research goes beyond previous studies by combining the race and gender of the officer as opposed to treating them as separate variables. Our comparison of fruitless searches to arrest rates also allows us to assess the efficiency or accuracy of whatever demographic targeting the police may be doing. In all this, we find that White male officers are in a category of their own. Increased diversity would likely be associated with lower rates of wasteful and alienating fruitless searches of young men of color.

Considering the likelihood of experiencing a potentially alienating fruitless search, our findings regarding driver age, race, gender, location, stop purpose, and officer identity are even more powerful than for searches in general. No wonder there is a trust problem between members of the minority community and their police departments. Young men of color are not only targeted for search, as others have shown, but here we document clearly that this degree of targeting goes well beyond what might be justified by actuarial crime rates. This implies more fruitless searches.

Finally, we found a number of non-linearities in the relationships described here. There is no single race effect, as it differs dramatically by gender both for drivers and officers. In both cases, we found trivial to reduced race-based differences among women, but very powerful ones among men. When we looked at the number of targeting characteristics associated with a driver, the officer who pulled them over, and the location and purpose of the traffic stop, we found that disadvantages clearly accumulate, rendering an individual with a high number of disadvantages to be more than 50 times as likely to be searched compared with drivers with no or just a few disadvantaging characteristics. The cumulative effect of multiple disadvantages was even more striking when considering "fruitless" searches.

Conclusion

Our analysis has touched only on routine traffic stops in one community; however, our findings about the officer- and driver-related factors associated with policing decisions speak to larger issues. Many fatal encounters nationwide have started with a routine traffic stop, similar to the ones we have analyzed here. The deaths of Walter Scott, Samuel DuBose, and Philando Castile all followed from a routine traffic stop, as did that of Sandra Bland.

As the national media have given more attention to Black deaths at the hands of the police, a larger debate has sparked among members of all races about potential solutions. One proposed solution is to change the racial composition of the police force to better reflect the communities they serve. Our findings suggest that this strategy may have some merit. Although we find that officers of all demographic groups target young minority males, they start from very different baseline rates. Because White male officers are much more likely to search drivers than other officers, a more diverse force might well feature lower search rates and more positive outcomes for many citizens, including less anger and frustration. Previous research by Theobald and Haider-Markel (2009) has reported greater citizen satisfaction in police interactions, even searches, when they are conducted by officers of the same race. If Black officers search fewer drivers, and upset them less when they do, this could go a long way toward improving citizen trust.

Perhaps the most relevant study in the broader area of "representative bureaucracy" to our own is that of Meier and colleagues (1999). They asked the "hard question": If one side benefits from greater diversity in public employment, does another side lose? Looking at student performance in districts with greater diversity among teachers, they found that both Black and White students did better. Thus, the answer to the "hard question" was that both sides win, no one loses. Here, greater diversity on the police force would be associated with lower rates of search over all, particularly in fruitless searches. Scott Page (2008) similarly posits better outcomes for those organizations that have greater diversity. To the extent that police culture might better reflect the wishes of the community, with less reliance on stereotypes and unjustified assertive behaviors, our findings suggest real promise.

It is possible, of course, that less assertive police behavior would allow criminals too much freedom. If White male officers are more assertive than others, perhaps the others need to become more assertive. It is worth speculating why assertive behaviors appear to be particularly more common among that demographic group on the force, and why it fades away with many years of experience. We would suggest two possible reasons. One, drawing from years of experience and history, it could be that White male officers, representing a traditional "authority figure," simply expect citizens to comply with their commands, and therefore do not hesitate to make them. Minority or female officers, by contrast, might not expect automatic compliance and may have honed other methods of handling potentially confrontational situations. A second possible reason is the officer's potential concern about a citizen complaint. Compared to minority or female officers, the White male officer might be less likely to expect to see a complaint and more confident that his superior officers (also likely to be White men) will find the complaint to lack merit. Among female and minority officers, this expectation might be lower. It is hard to see how the public would suffer from increased diversity if these conjectures were true. De-escalation might be more likely with greater officer diversity, particularly gender diversity. The fact that assertive police behaviors decline with experience also suggests that they may not be as effective as relatively inexperienced officers assume.

Communities gain in two ways when traffic stops are used less often as a means of criminal investigation. First, traffic patrols can be put to their best purpose: keeping the roads safe. Diverting the traffic safety function of the traffic code, or using the vehicle code as a pretext to stop any driver who looks "suspicious" is a needle-in-the-haystack strategy unlikely to reduce crime as much as other possible police tactics more directly focused on crime reduction (see Baumgartner et al. 2018).

Second, for every fruitless traffic stop, we should recognize that a citizen, often a young man of color, was just reminded of his lack of full citizenship. Many previous scholars have noted the deleterious consequences for the fabric of democracy when agents of the state alienate citizens. For those who are routinely subjected to coercive action, or routine encounters that reinforce their positions as suspects, rather than citizens, of the state, we can expect alienation, disengagement, and anger. Those alienated by routine but unjustified interactions with the police may vote less, engage less in various interactions with the government, even to the extent of disengaging from their children's schools (see Lerman and Weaver 2014; Brunson 2007; Baumgartner et al. 2018). Several studies have shown that such distrust also engenders an unwillingness to trust or cooperate with the police even when violent crimes occur (see Epp et al. 2016; Pegues 2017; Desmond et al. 2016). Thus, our findings should give us pause as to whether we care about fairness and equity, public safety, or both. One cannot have one without the other. A more representative police force can help promote both.

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Appendix A.

Table 3-a. Observed Rates of Arrest by Targeted v. Non-Targeted Characteristics.

Category			Arrest Rates		N
Driver Race	White	Black	1.14	2.63	75,776
Driver Sex	Female	Male	1.02	2.76	88,056
Driver Age	Old	Young	1.37	2.69	88,056
Officer is White Male	No	Yes	1.58	2.30	88,056
Officer Years of Service	High	Low	1.44	2.64	88,056
Safety v. Investigatory Stop	Safety	Investigatory	1.38	2.54	88,056
Low Search Neighborhood	Yes	No	0.91	2.65	88,056
High Search Neighborhood	No	Yes	1.96	3.72	88,056

Note: See Table 3 in the main text.

Table 3-b. Observed Rates of Fruitless Search by Targeted v. Non-Targeted Characteristics.

Category			Fruitless Search Rates		N
Driver Race	White	Black	1.04	4.46	75,776
Driver Sex	Female	Male	1.27	4.29	88,056
Driver Age	Old	Young	1.61	4.40	88,056
Officer is White Male	No	Yes	2.00	3.61	88,056
Officer Years of Service	High	Low	1.50	4.56	88,056
Safety v. Investigatory Stop	Safety	Investigatory	1.46	4.23	88,056
Low Search Neighborhood	Yes	No	1.11	3.89	88,056
High Search Neighborhood	No	Yes	2.72	9.52	88,056

Note: See Table 3 in the main text.