

Race-of-Officer Effects in Traffic Stop Outcomes

Representative Bureaucracy and the Routine Traffic Stop

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Abstract

We evaluate the factors associated with an officer's decision to search the driver or vehicle after a routine traffic stop. 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, but White male officers have higher search rates for all types of drivers. We discuss the implications of these findings both in terms of racial disparities in policing as well as with regard to theories of bureaucratic representation. Demographic representation in the police force has powerful implications not only for the satisfaction of citizens in their interactions with police, a finding others have previously noted, but for the outcomes of these interactions. Search rates are reduced by increased diversity on the force, but racial differences in those searches may not be.

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

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Introduction

Somewhere in Charlotte, North Carolina, a young Black male 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 there is a sufficient level of suspicion of criminal activity 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 engaged in some criminal activity that warrants a search, or was the public safety enhanced simply by catching them in their violation? Officers make thousands of such decisions every day across America, and they are in fact quite predictable. The vast majority of drivers are not subjected to search, but a few are. Here we look at the determinants of those quick, routine, decisions related to the odds of search following a routine traffic stop.

In Charlotte, North Carolina, during calendar years 2016 and 2017, an incident like the first scenario 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. The young Black male stopped by a White male officer for an equipment or other non-moving violation had over 40 times the likelihood of being searched compared to the White female pulled over for a moving violation by an officer from a different demographic group. Most previous studies of racial disparities in the outcomes of traffic stops have focused on the characteristics of the driver and the nature of the stop itself, such as its location or the alleged violation. Here, we focus to the characteristics of the officer who made the stop. We make use of a comprehensive database including two years of traffic stops in Charlotte, NC and show that White male officers are

considerably more likely to search the drivers they pull over than officers of any other demographic group. Officers of all backgrounds share common tendencies to search Black male drivers at much higher rates than other drivers. However, these rates are much lower when the officer is Black or female than when the officer is a White male.

Most studies of racial disparities of outcomes of traffic-stop or other police-citizen interactions have focused on the characteristics of the citizen: their race, gender, age, or other identities. We do so as well. But by adding officer characteristics to the mix, we gain a greater understanding of the importance of demographic representation and diversity in the nation's police forces.

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 (Langton and Durose 2013). 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—barely 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, 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 (e.g., see the analysis in the majority opinion in *Terry v. Ohio*, 392 US 1 (1968), holding 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, and, the Justices seemed to think, no one would rightly be upset by the momentary inconvenience. The key missing element in the Justice’s thinking was that the same group of people would not be routinely targeted by these police procedures. 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 them with suspicion. It can be frustrating, humiliating, and dangerous. For most Americans, the logic that the Justices held seems valid. For many others, it simply does not hold.

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. Variation among officers is also an important driving force: officers from different demographic groups may behave quite differently during a traffic stop; some search more drivers than others. 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 the outcome of an officer’s “fishing expedition” based on a hunch or a suspicion. 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) use the Epp et al. distinction to classify the North Carolina traffic stop purposes into safety and investigatory groups. Traffic safety stops are less

likely to lead to search, and the searches that result from them show lower rates of racial disparity. Investigatory stops, on the other hand, show higher racial disparity in the resulting searches. We build on their work here, classifying the 10 traffic stop purposes identified in the Charlotte traffic stops data collection 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.¹

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

¹ 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 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

Many studies of racial diversity in police departments revolve around the question of 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 (Dowlet 2005; Moskos 2008; Woods 2014, Morin et al. 2017). This idea of “Black v. blue” derives in part from studies of “tokenism,” first proposed by Kanter (1977), who studied women in traditionally male professions. Tokens are members of groups that make up less than 15 percent of their work category. Kanter identifies three prominent characteristics of tokens: visibility, polarization, and assimilation. Kanter and others following up on her ground-breaking work found that female police officers are more visible, subjecting them to negative stereotypes fueling social isolation, reduced peer acceptance (Yoder 1991), and high levels of hostility. This, in turn, causes minority (female) officers to overcompensate by aligning themselves with their non-minority (male) counterparts (Hassel and Brandl 2009). Lundman (2009) also found that minorities tend to adopt the norms of the majority group, Whites. Black officers, in sum, are often found to be more “blue than Black” (Rowe 2012, Van Maanen 1975, Wilkins and Williams 2008).

In a similar study but with contrasting results, Wilkins and Williams (2008) investigate 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. This suggests that the increase in racial disparity is due to the high levels of organization socialization (e.g., the “Black to blue” phenomenon) (Wilkins and Williams 2008). Wilkins and Williams (2009) conducted a similar study regarding Latino rather than Black officers and had similar results.

Woods (2014) analyzed data from 27 semi-structured interviews with police officers to understand how diversity affects police departments, finding that White officers are more assertive when it comes to stops in order to “punish a person” and “move to the next issue,” instead of assessing each situation (Woods 2014, 162). However, Black officers “try to head off unintended escalations” and are less assertive in these situations (Woods 2014, 161). Woods finds these differences are related to the fact that the Black officers can relate with the stereotypical driver pulled over, a Black young male.

Brown and Frank (2005) examined outcomes of traffic stops, finding that that White officers were more likely to make an arrest than Black officers, and Black citizens were 13 percent more likely to be arrested instead of receiving citations than White drivers in similar situations. In a follow-up study also in Cincinnati, Brown and Frank (2006) found that White officers were more inclined to arrest suspects than Black officers. Similarly, Brown et al. (2009) looked at differences in police treatment of adults and juveniles by the Cincinnati Police Department between 1997 and 1998, finding that White officers were more likely to both assert

authority in an encounter with a juvenile, and to make an arrest. In a study of Florida Highway Patrol data on traffic stops from 2000 to 2002, Close and Mason (2006) analyze police interactions based on the demographics of the officers and the drivers, finding 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 or aggressive behaviors; this is directly applicable to our analysis of searching.

Klahm and Tillyer (2015) analyze the relationship between officer experience and behavioral choices in discretionary situations. The authors studied the search rates of officers in a large police department in the Southwestern United States across two consecutive six-month periods, examining how exposure to certain groups (specifically young, Black, males, or those with criminal history), past behavior, and past performance influenced officer behavior. Their findings indicated that all three variables influenced an officer's decision to initiate a search during a traffic stop. 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, apparently.

Alex Vitale (2017) has given a vivid and powerful description of a new development in policing: The development of the "warrior mentality" (see also Balko 2014). This is the view that the police are an occupying force, and the role of the police officer is to assert and maintain control. In Vitale's analysis, this view has been adopted by many police departments in the period since the attacks of September 11, 2001, shifting from the long-held ideology of

Guardianship (see Rahr and Rice 2015). Neither police departments nor police officers are monolithic; however, these authors point to shifts in police culture normalizing the use of authority to assert control. In this view, police have focused less on using their presence to help foster positive and safe community relations and more on asserting control. From the studies above we might expect this mentality, and the assertive behavior that goes along with it, to be strongest among the White male members of the force, and among those who have not yet learned through long experience, the costs of such behaviors. Minority and female officers may well adopt the same views of criminality as their White male counterparts, but we can expect them to be less assertive in their dealings with the public. This may be because they are accustomed to using different methods to deal with conflicts, an expectation that citizens may be less likely to accept their authority, or less confidence that fellow officers and superiors will take their side in the case of dispute. Any of these three reasons is consistent with our expectations, and our data do not allow us to distinguish among them.

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.

Hypotheses

Overall, and considering the literature reviewed above, we can expect a number of clear patterns to emerge. Regarding officer-level effects, White male officers and officers with fewer years of service will be more assertive; female and minority officers will be more likely to find alternative means of resolving conflicts; all officers will show similar rates of racial disparity in their interactions with members of the public. Regarding driver effects, we can formulate the “criminal stereotype” or “criminal profile” hypothesis: young men of color will be targeted. We can also note, however, that the interactions of age, race, and gender need not be linear. A young minority male is at a greater disadvantage compared to a young White male than a young minority female is, compared to a young White female: the race effect is stronger among men. Regarding the characteristics of the stop, we expect significant differences by the type and location of the stop. Investigatory stops may be targeted at individuals more likely to fit the “criminal stereotype”, and policing patterns will differ substantially by location. Beyond only gender and race, we expect that those with multiple disadvantages will be particularly targeted, with the targeting accelerating with the accumulation of disadvantage. In all, this leads to the following testable hypotheses, with a person or vehicle search as the signal of suspicion.

H1. White male officers will have higher search rates than other racial and gender groups.

H2. Officers with less experience will have higher search rates than officers with more experience.

H3. Officers of different racial and gender groups will show similar disparities in the rates at which they search drivers of different demographic profiles.

H4. Young minority males will be searched more frequently than drivers of other age, race, and gender combinations.

H5. Race effects will be stronger among male drivers than female drivers.

- H6. Officers will conduct more searches during investigatory stops than safety stops.
- H7. Search rates will be higher in areas of the city with more poverty.
- H8. Search rates will increase in an accelerating manner as the combination of driver, officer, and stop characteristics includes more “targeted” elements.

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 full 2016 and 2017 data, consisting of 88,056 traffic stops.² We use the occurrence of a search as our outcome variable of interest. A search is a powerful indicator that the officer views the driver with suspicion, so it is an appropriate test.

Note that the Charlotte database does not indicate the reason for the search, the type of search, or if the search yielded contraband. 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. That study also found that about 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).

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

² http://clt-charlotte.opendata.arcgis.com/datasets/c458bca429b542bbb31130c23510628a_7, downloaded September 18, 2018

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 stop 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 by various characteristics of the drivers and officers.

Table 1. Variation in Search Rates in Charlotte Traffic Stops, 2016–17.

	Traffic Stops	Searches	Percent Searched
Overall	88,056	3,881	4.41
Driver Characteristics			
White	27,161	470	1.73
Black	48,615	3,055	6.28
Hispanic	8,893	321	3.61
Other	3,387	35	1.03
Male	51,679	3,225	6.24
Female	36,377	656	1.80
Less than 35 years old	46,975	2,874	6.12
35 years old or older	41,081	1,007	2.45
Investigatory stop	50,183	2,992	5.96
Safety stop	37,873	889	2.35
Officer Characteristics			
White	62,712	3,141	5.01
Black	14,809	365	2.46
Hispanic	3,685	170	4.41
Asian-American	5,174	132	2.55
Other or unknown race	1,506	72	4.78
Male	80,500	3,642	4.52
Female	7,556	239	3.16
White male	56,813	2,951	5.19
Black male	13,847	337	2.43
White female	5,899	190	3.22
Black female	962	28	2.91
Other or unknown race	10,535	375	3.56
Less than 5 years of service	27,620	1,683	6.09
Five to 13 years of service	30,689	1,816	5.92
14 or more years of service	29,747	382	1.28
Officer-Driver Combinations			
White officer, White driver	19,440	376	1.93
White officer, Black driver	34,741	2,507	7.22
White officer, Other race driver	8,531	258	3.02
Black officer, White driver	4,594	41	0.89
Black officer, Black driver	8,250	287	3.48

Patrol Districts			
Central	4,187	172	4.11
Eastway	9,144	332	3.63
Freedom	4,090	260	6.36
Hickory Grove	7,446	454	6.10
Independence	5,475	275	5.02
Metro	4,085	500	12.24
North	7,250	152	2.10
North Tryon	7,037	530	7.53
Providence	10,266	181	1.76
South	9,356	111	1.19
Steele Creek	6,063	250	4.12
University City	5,585	161	2.88
Westover	6,847	456	6.66
Missing	1,225	46	3.76

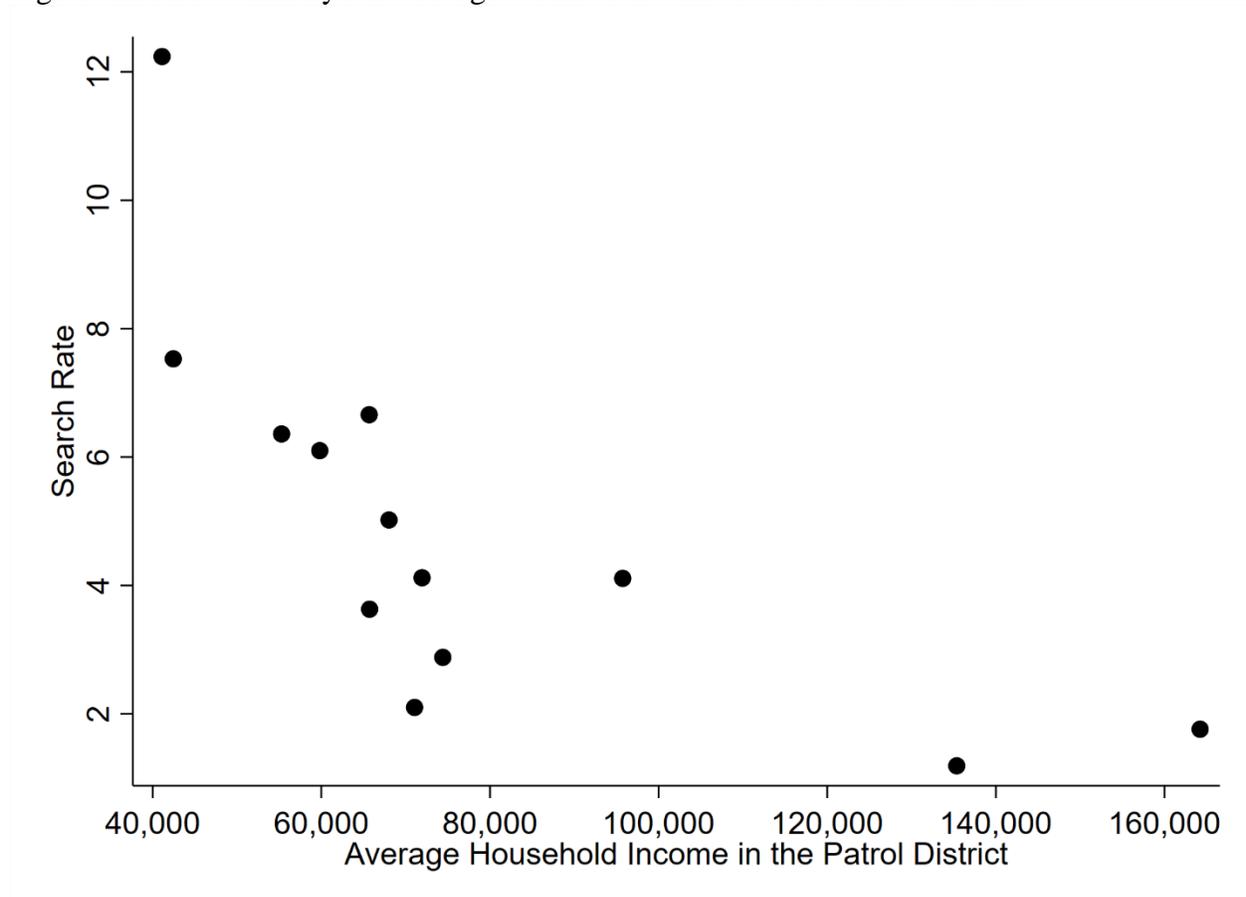
Overall, just over four percent of traffic stops result in a search. Searches are more common among: Black drivers, male drivers, younger drivers, and drivers stopped for investigatory rather than traffic safety reasons. Black drivers compared to Whites have 3.6 times the odds of search (6.28 search 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.

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, 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). Black officers search drivers less than half as often as White officers do, and are particularly unlikely to search White drivers. In fact, Black officers search drivers of either race less than half as often as White

officers do. However, just like the White officers, the Black officers search Black drivers more than 3 times as often as they search White drivers ($3.48 / 0.89 = 3.9$). This pattern suggests a complicated interaction: Black officers search less, but when they do, they show almost precisely the same rate of increased likelihood to search a Black driver. We will come back to this finding below.

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. 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 Rates by the Average Household Income in the Patrol District.



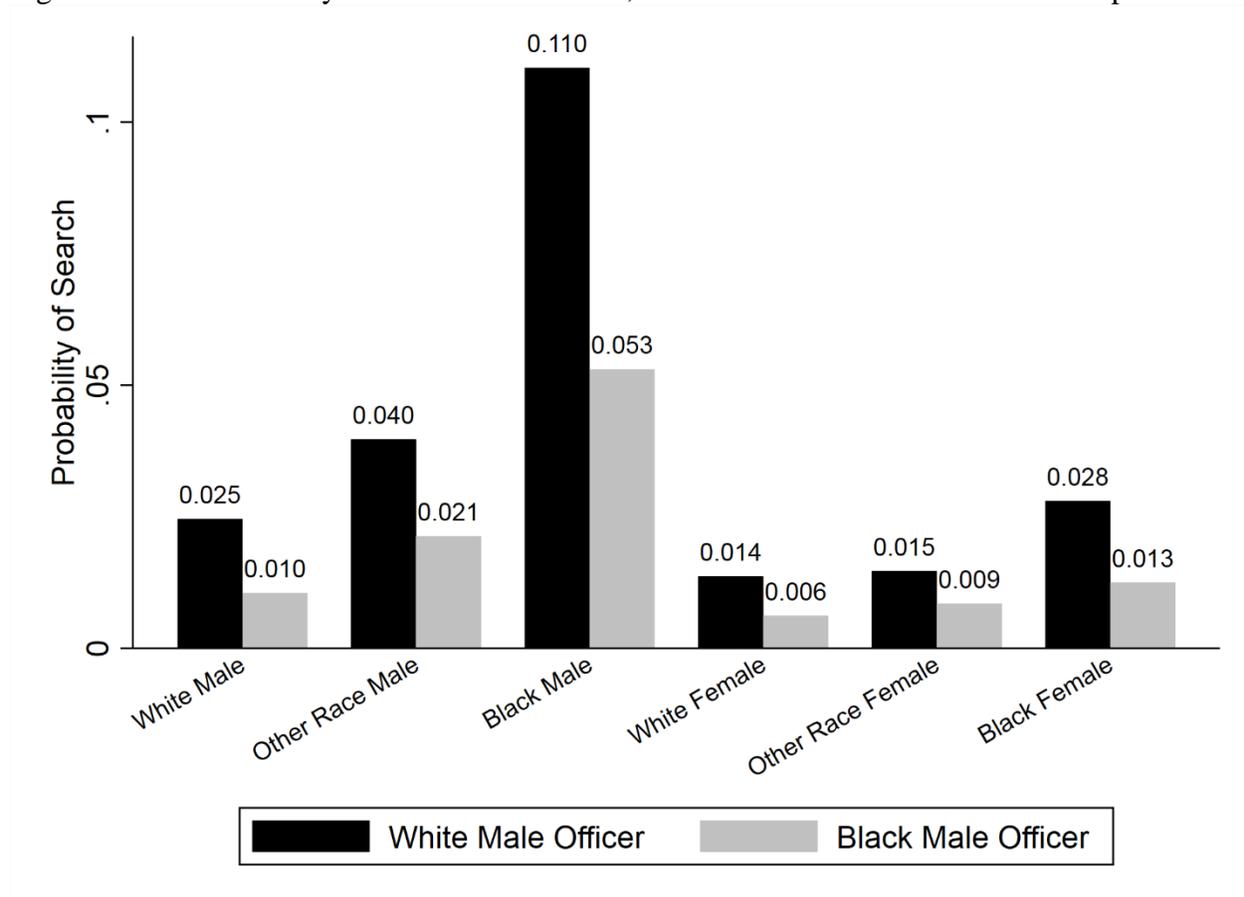
Source for household income: Calculated from the US Census based on Social Explorer Tables: SE 2016 Tract Estimates (SE), SE 2016 Tract Estimates.

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. 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 Rates by Driver Characteristics, Black and White Male Officers Compared.



In every case, the White male officers are substantially more likely to search than the Black male officers. White male officers are more than twice as likely to search drivers, across all demographic groups. Looking first at the male drivers, the White male officers consistently

search more than twice as often as the Black male officers, but the two sets of bars move in perfect parallel. 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). Looking at the rates of search for female drivers, we see a similar pattern but with lower search rates and less racial difference.

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 occurring, controlling for the different elements in the model. If the location effects explain the racial disparities, then the analysis should show significant coefficients for the various patrol districts but smaller coefficients for the driver and officer characteristics. Table 2 shows the results of three different logistic regression models.

Table 2. Predicting the Likelihood of Search.

Variable	Model 1		Model 2		Model 3	
	Odds-Ratio (SE)	Prob.	Odds-Ratio (SE)	Prob.	Odds-Ratio (SE)	Prob.
Officer is White Male	1.89 (.074)	.000	1.89 (.074)	.000	1.89 (.075)	.000
Officer years of service	0.94 (.003)	.000	0.94 (.003)	.000	0.94 (.003)	.000
Investigatory stop purpose	1.82 (.073)	.000	1.82 (.074)	.000	1.62 (.067)	.000
Driver is less than 35 years old	2.31 (.088)	.000	2.30 (.088)	.000	2.33 (.089)	.000
Driver is male	3.57 (.157)	.000				
Driver is Black	2.82 (.144)	.000				
Driver is Hispanic	1.52 (.113)	.000				
Driver is of another race	0.52 (.093)	.000				
Driver is Black female			1.55 (.154)	.000	1.21 (.123)	.054
Driver is Hispanic female			.93 (.177)	.720	.77 (.147)	.168
Driver is female of another race			.78 (.259)	.461	.77 (.253)	.421
Driver is White male			1.91 (.199)	0.00	1.84 (.192)	0.00
Driver is Black male			6.36 (.577)	0.00	4.91 (.454)	0.00
Driver is Hispanic male			3.34 (.359)	0.00	2.65 (.289)	0.00
Driver is male of another race			.93 (.205)	.743	.85 (.188)	.465
Patrol Districts						
Central					0.66 (.115)	.017
Eastway					0.67 (.110)	.014
Freedom					1.10 (.186)	.556
Hickory Grove					0.97 (.157)	.833
Independence					1.04	.807

					(.174)	
Metro					1.90	.000
					(.310)	
North					0.38	.000
					(.067)	
North Tryon					1.03	.855
					(.167)	
Providence					0.50	.000
					(.085)	
South					0.36	.000
					(.066)	
Steele Creek					0.93	.689
					(.157)	
University City					0.44	.000
					(.078)	
Westover					1.13	.466
					(.183)	
Constant	0.004	.000	0.006	.000	0.010	.000
	(.0003)		(.0007)		(.0019)	
N		88,056		88,056		88,056
Log Likelihood		-13826		-13802		-13478
LR Chi-2	(8)	4169	(11)	4217	(24)	4865
Pseudo-R2		.1310		.1325		.1529

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

We present three models because we want to show the complicated interactions of race and gender, and to show the impact of controlling for patrol district. In Model 1, we assess the odds of search based on the officer being White male, the officer’s years of service, the driver being pulled over for a safety v. an investigatory stop purpose, and characteristics of the driver: age, race, and gender. In Model 2, rather than including a single variable for gender, we include each race-gender combination individually. This allows us to see whether the effect of race is similar among male and female drivers. It is not. Finally, in Model 3, we add the patrol districts.

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, 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 significantly 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. We confirm Hypothesis 2.

Hypothesis 3 related to the “Black to blue” phenomenon: whether officers of diverse racial backgrounds adopt the stereotypical criminal profile, and in Table 1 we confirmed this. Officers of different demographic backgrounds differ dramatically in their search rates, but not in the racial disparities in the decision of whom to search.

Drivers under the age of 35 are more than twice as likely to be searched compared to older drivers, consistently across all three models, confirming the age element of Hypothesis 4. Similarly, 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. Note that the coefficient declines slightly in Model 3, from 1.82 to 1.62 when we incorporate patrol districts in the analysis. This would indicate that certain patrol districts, with higher search rates, may also see more investigatory traffic stops. Still, Model 3 shows that such drivers are over 60 percent more likely to be searched, when controlling for patrol district. Thus, we confirm Hypothesis 6.

In Model 1 we show a powerful effect for gender: The odds are 3.57 times higher that male drivers would be searched compared to female drivers. However, in Models 2 and 3 we document that gender and race interact in powerful ways. In these models, the reference (excluded) category is the White female driver, so the odds-ratios can be interpreted with respect to such a driver. Black female drivers are slightly more likely to be searched (55 percent more

likely in Model 2, but just 21 percent more likely in Model 3, a coefficient which is not quite statistically significant at the .05 level), and Hispanic and other race drivers are less likely to be searched than White female drivers (though these results are not statistically significant).

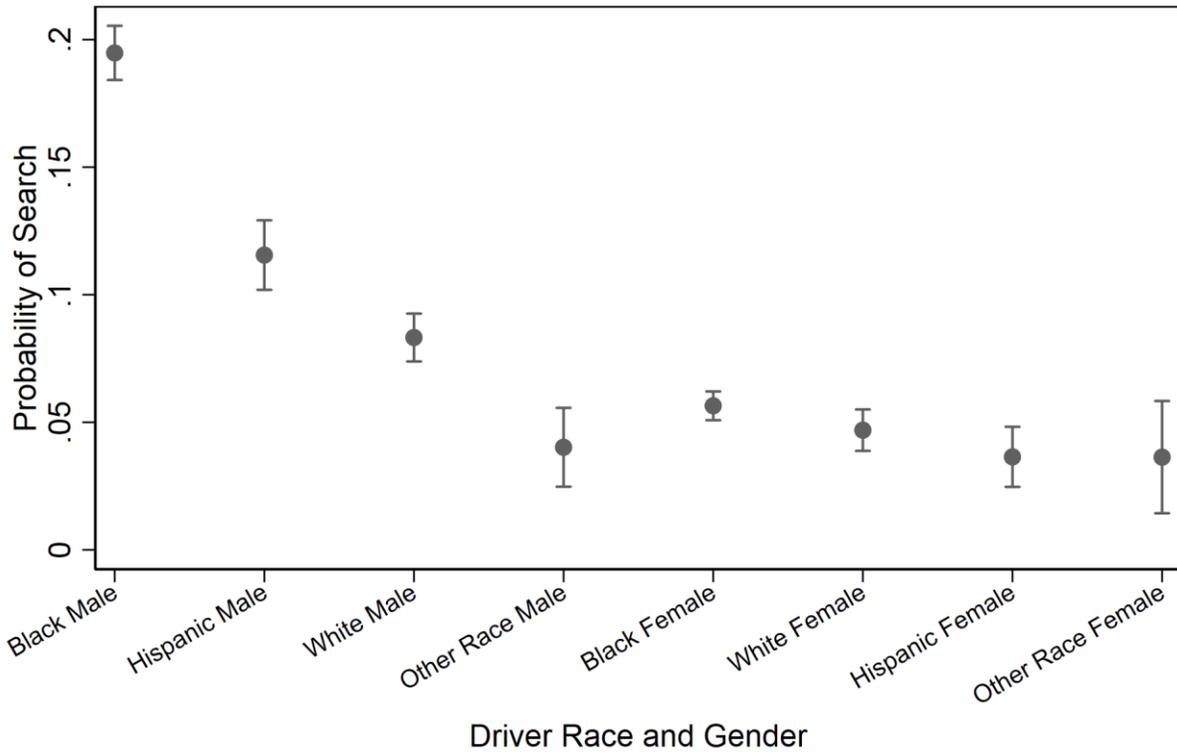
White male drivers are much more likely to be searched than White female drivers: 91 percent more so in Model 2, and 84 percent more so in Model 3. Note the big difference in this coefficient compared to the gender coefficient in Model 1. For Whites, the gender difference is less than two-to-one, whereas it was estimated as 3.57-to-1 in Model 1. The reason for this difference is that the Black male driver is in a category of his own. Estimating race and gender effects under the assumption that they are separate and uncorrelated is clearly an error. Model 2 shows an estimate of more than six times the odds of search for a Black male driver, compared to a White female (or more than 3 times higher than the rate for the White male driver), and this number remains above five when we control for patrol district in Model 3. The patrol district controls affect this coefficient so much because certain patrol districts are much more likely to feature both a high rate of search and a high percentage of Black male traffic stops. Model 3, then, is the take-home conclusion: controlling for patrol district, age, type of officer, years of service of the officer, and stop purpose, a Black male driver has more than five times the odds of being searched as compared to a White female driver.

Coefficients for Hispanic males fall close to those for Black males; male drivers of other races have slightly lower rates of search than White females, but these differences are statistically insignificant. We thus confirm both Hypothesis 4, that young minority males are targeted, and Hypothesis 5, that race and gender show strong interaction effects, with race a more powerful predictor of search among males than among females.

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.

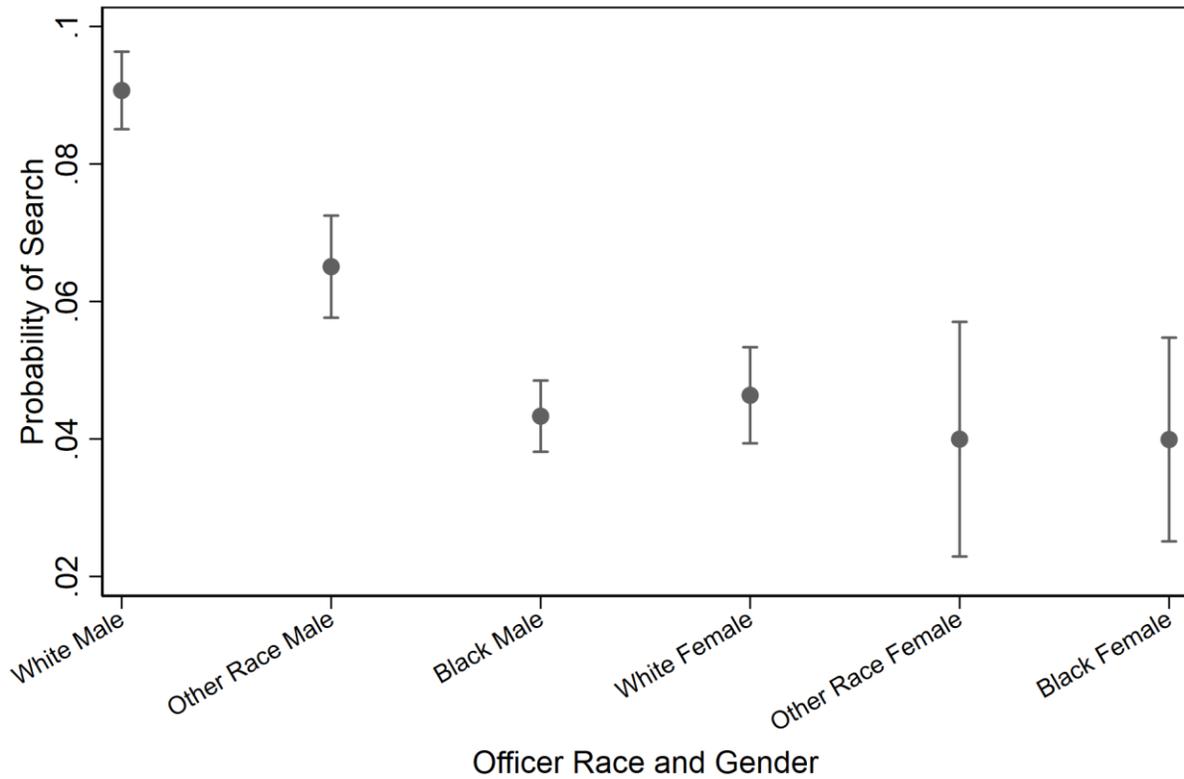
It can be difficult to interpret the results of a logistic regression, so we present graphical presentations in Figures 3 and 4. These show the predicted odds of search for drivers of different characteristics, drawing from the estimates presented in Model 3 of Table 2. Figure 3 presents the predicted odds of search 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 Rates by Characteristics of the Driver.



Controls: Driver younger than 35, officer is white male, officer years of service = 1, investigatory stop, patrol district set to mean value.

Figure 4. Predicted Search Rates by Characteristics of the Officer.



Controls: Driver race, gender, and patrol district at means, driver younger than 35, officer years of service = 1, investigatory stop.

Figure 3 shows that the odds of search for a young Black male driver are close to 20 percent and that his 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. Black female drivers have a slightly elevated rate of search, but the main effects of racial identify are clearly among men. Note that the odds are high for all groups, compared to the average of 4.41 percent overall, because the scenario presented includes a White male officer new to the force, a young driver, and an investigatory stop. Changing the assumptions on these other variables would not change the relative rankings of the race and gender groups displayed here, however.

Figure 4 shows that White male officers have a significantly higher search rate, other things equal, than any other demographic group among officers. In particular, there are no significant differences among White female, Black male, or Black female officers; their predicted search rates are less than half that of the White male officer. Officers of other race are slightly elevated compared to the three other categories, but White male officers stand alone in their high search rates. Again, these search rates are elevated because the scenario envisions a younger driver, an investigatory stop, and an officer new to the force. Changing those assumptions would not, however, change the relative rank of predicted search rates across officer demographics.

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.

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.

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.

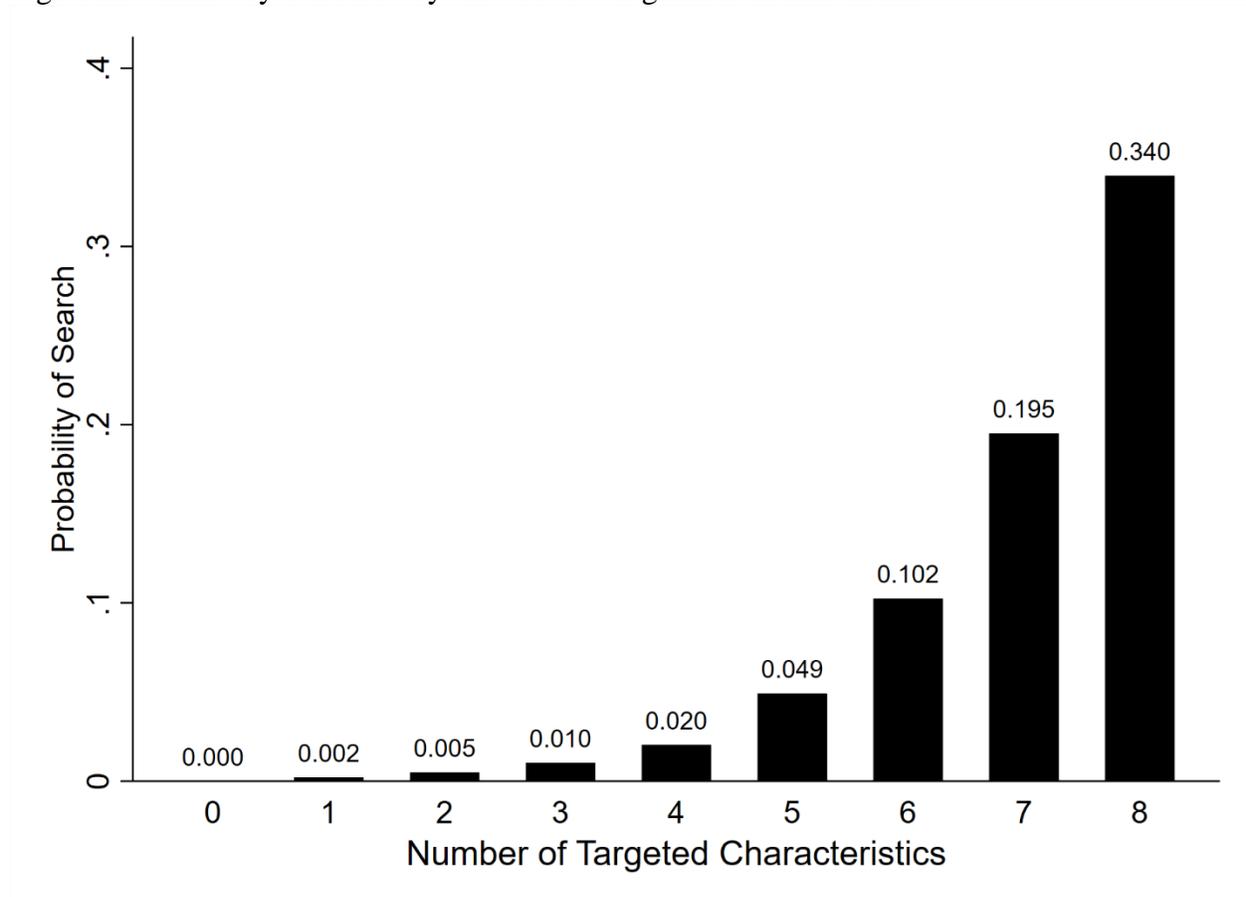
How do these disparities accumulate? Rather than go through every possible combination of eight dichotomous variable (which would be 512 combinations), we simply count them up and show the results in Table 4 and in Figure 5. A driver might have none of the targeted characteristics: an older White female 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. 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.

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

Number of Targeted Characteristics	N	Percent Searched
None	186	0.00
One	2,749	0.22
Two	8,471	0.48
Three	13,789	1.02
Four	17,013	2.04
Five	15,949	4.91
Six	10,324	10.24
Seven	3,527	19.51
Eight	243	33.97
Total	72,251	4.65

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

Figure 5. Probability of Search by Number of Targeted Characteristics.



Note: See Table 3 for the list of “Targeted Characteristics.” The figure shows the probability of search for drivers with the indicated number of such characteristics, as in Table 4.

Drivers with fewer than five targeted characteristics have less than a two-percent search rate. These odds 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.

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 theories of tokenism and the idea that the “blue culture” supersedes an officer’s racial identity (Kanter 1977; Hassel and Brandl 2009; Lundman 2009; Ott 1989; Yoder 1991; Hassel and Brandl 2009; Rowe 2012; Van Maanen 1975; Wilkins and Williams 2008).

Of course, we also showed powerful effects of officer race and gender: White male officers are clearly more likely to search than any other demographic group on the force. Black male officers and female officers of any race show much lower rates of search. 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). However, our research goes beyond previous studies by combining the race and gender of the officer as opposed to treating them as separate variables. In doing so, we find that White male officers are in a category of their own. Thus, race by itself does not define how assertive a police officer will be; it is the combination of race and gender, with the White male officer being the most aggressive, most fitting the “warrior mentality” so profoundly affecting modern police culture according to Vitale (2017; see also Klahm and Tillyer 2015; McElvain and Kposawa 2004; Morin et al. 2017).

Jack Glaser (2006, 2015) has made the distinction between justified and unjustified targeting. If one group commits more crime than another, then it stands to reason that police will (and should) pay more attention to them (see also Hackney and Glaser 2013). The question is how accurately the police do this. In a series of simulations, he shows that if the police over-target one group, they will be arrested in greater proportion than their criminal behavior would warrant, making assertions of the greater criminal behavior within the group a self-fulfilling prophecy. But more importantly, he shows that if there is over-targeting of one group, then there must be under-targeting of another. Crime is reduced only when the targeting is accurate; under-policing one community is just as much a public safety problem as over-policing another, in other words. So, aside from concerns of equity and fairness, public safety concerns should drive us to want to avoid over-targeting based on stereotypes. James Gibson and Michael Nelson (2018) have recently document the enormous chasm between White and Black Americans in their views of the US legal system; Blacks distrust it. Tom Tyler and various colleagues (see for example Sunshine and Tyler 2013; Tyler et al. 2014; Tyler and Jackson 2014; Boeckmann and Tyler 2002; Meares et al. 2016; Meares 2009) have documented how feeling that an interaction with the criminal justice system was unfair has long-term consequences.

Turning from officers to drivers, our results support our theory that Black males are far more likely to be searched than other drivers, holding all else constant. This is consistent with prior research finding that harsher and more punitive outcomes are more likely for minority male drivers (Close and Mason 2006; Rojek et al. 2012; Rosenfeld et al. 2012; Tillyer, Klahm, and Engel 2012; Tillyer and Engel 2013). Our research expands to new territory, however, by finding that the race effect only exists for males. Though females of all races are searched at similar rates, Hispanic males are searched 1.4 times more often, and Black males 2.7 times more often,

than White males. So, race only has a statistically significant impact on the likelihood of a search if the driver is a male.

Regarding the traffic stop itself, we support previous research which found that location and stop purpose influence the likelihood that a search is conducted (Epp, Moody, and Haider-Markel 2014, 2016; Baumgartner, Epp, and Shoub 2018). The higher the percentage of minorities within an area, the higher the likelihood that drivers in that area will be searched. Traffic safety violations are much less likely to lead to search than investigatory stops. And, drivers in wealthy areas of town need have little fear of being searched after a stop. Aggressive police behavior is much more likely to occur in poor neighborhoods.

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.

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. While we looked at the odds of search, many fatal encounters nationwide have started with a routine traffic stop, similar to the ones we have analyzed here. After all, 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, it has sparked a larger debate 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. Although this idea seems logical, our study has shown that increasing diversity on a police force may not have the results one imagines. 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. However, given that other officers also target young men of color, it appears that the stereotypical concept of a criminal as a young Black male is apparent in the behaviors of officers of all races and genders. Of course, appearances matter, and previous by Theobald and Hider-Markel (2009) have 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.

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 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 whether we care about fairness and equity, public safety, or both. One cannot have one without the other.

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