Police Searches of Black and White Motorists

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Abstract

Based on over 250,000 traffic stops over 13 years in Durham, NC, we compare the rate at which White and Black Drivers are searched. Race, gender, and age are shown to have powerful effects in determining the likelihood of a search, and searches in turn are highly correlated with negative outcomes such as being arrested. These strong race effects persist when we institute statistical controls for the type of search, the purpose of the traffic stop, whether the individual officer had a pattern of racially disparate searching behaviors, and other factors. Our comprehensive review of official police statistics shows clearly that police behaviors differ dramatically based on race, gender, and age group, giving credence to fears of "driving while Black" but focusing particularly on the increased danger for young Black males. We conclude with suggestions of how police departments could use the data many are already collecting in order to monitor and assess the behaviors of individual police officers. Both system-level factors, such as agency decisions of where to assign officers to patrol, and individual-level factors related to particular officers contribute to the racial disparities we observe.

Keywords: racial profiling, driving while Black, traffic stops, race, gender, age, police, criminal justice.

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Driving while Black has never been a crime. But Black and White motorists are treated in dramatically different ways by the police in many cities. Racial profiling or driving while Black has of course been widely known in minority communities in the US through long periods of history, but it surged to the general public consciousness in the late-1990s. The *New York Times* published just three articles containing the term from 1960 through 1997, but 16 in 1998 and 528 in the three years from 1999 to 2001. Attention to the idea declined substantially after the 9/11 attacks; an average of just 33 articles appeared each year from 2004 through 2008. But while the phrase has declined somewhat, the practice has not, and official statistics in a number of states now allow scholars to assess its scope. Many scholars have investigated the causes of racial profiling and its apparent increase with the 1980s War on Drugs, including for example police training manuals including explicit mention of race and ethnicity as characteristics that might make a driver more likely to be involved in the drug trade (see Harris 1999).

In this article we make use of official statistics to explore racial disparities in the rates at which drivers are searched following a traffic stop. Our data come from analysis of over 250,000 traffic stops in Durham, NC, from January 1, 2002 through December 31, 2013, a complete census of all stops, based on forms filed by the officers involved and recorded with the North Carolina Department of Justice (NC DOJ), as North Carolina law requires. Our results show substantial disparities by race, gender, and age group, with young Black males searched at more than ten times the rate of white women, and more than double the rate for young White males. When we control for the reason for the stop, the pattern of racial stops by the officer involved, and other race-neutral factors such as the time of day, the discrepancies remain. Further, the racial gaps appear to be widening, not narrowing, over time. Our article brings

official statistics to bear on an important problem at the intersection of race, gender, and police behavior.

Background on North Carolina's Traffic Stop Legislation

North Carolina was the first state in the nation to mandate the collection of police-stop data, after public attention surged to this issue in the late-1990s. At least 15 states considered legislation during 1999 mandating the collection of police-stop information, and North Carolina was the first in the nation to pass such a law (GAO 2000, 15). Since Jan 1, 2002, the NC DOJ has collected information on every traffic stop from law enforcement agencies throughout the state.[1] Appendix A shows the "SBI-122 Form," the two-page paper form which the officers fill out after any traffic stop. Data are relayed to the state DOJ and made available to the public in an on-line searchable database: http://trafficstops.ncdoj.gov/. Though the underlying legislation required the state to collect the data, police departments to report it, and the Attorney General to analyze it and issue reports on a biennial basis (see Mance 2012, fn. 3), the state has never issued any official analysis of the trends and patterns associated with the data collected. In 2011, two of the authors of the present article served as unpaid consultants to a task force for the North Carolina Advocates for Justice and analyzed the state-wide data, issuing a report that led to significant media attention (see Baumgartner and Epp 2012, Mance 2012, Barksdale 2012; Wise 2013). In this article we focus on a single police agency; a detailed investigation of one police department holds constant many factors potentially of interest, such as department leadership, norms, and standards. Comparing rates of discrepancy across NC police agencies is the topic of another study, in progress.

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[1] The law exempts only police departments in towns with fewer than 10,000 population. The State Highway Patrol has been subject to the law since January 1, 2000, but it was phased in for other agencies in 2002.

Previous studies of Racial Disparities in Policing

Perceptions that minorities are treated differently than Whites in their interactions with police motivated many state legislatures to mandate the collection of traffic stop data, including information on the purpose of the stop, subsequent enforcement actions, and motorist demographics. A survey by the U.S. Department of Justice in 2004 (the most recent survey available) noted that 29 states required the collection of traffic stop data under at least some circumstances (Hickman 2005). Analysts, in turn, have used the growing abundance of data to investigate the extent and cause of racial disparities in the application of justice on America's roadways. In all, the results are mixed, but more often than not, minority drivers are shown to receive higher levels of attention and harsher outcomes than non-minorities. Table 1 provides a brief review of scholarship conducted within the last decade that published rate-of-search statistics for Black and White motorists. All of them found a higher likelihood of search for Blacks and four of the seven studies found that Blacks were at least twice as likely to be searched as Whites. Our subsequent analysis uncovers racial disparities of a similar magnitude.

Table 1. Review of Scholarship with Rate-of-Search Statistics for Black and White Motorists

Authors	Geographic Coverage	Time Period	%Whites Searched	% Blacks Searched
Barnes and Chang 2012	WA	11/2005 – 9/2006	3.0	6.0
Rosenfeld et al 2012*	St. Louis, MO	Jan. – Dec. 2007	7.0	11.4
Fallik and Novak 2011	Kansas City, MO	Jan. – Dec. 2009	10.2	12.8
Engel et al. 2009	AZ	Jan. – Dec. 2008	3.3	8.0
Pickerill et al. 2009	WA	Mar. – Oct. 2002	3.0	7.6
Roh and Robinson 2009	Houston, TX	Jan. – Dec. 2003	2.1	3.9
Schafer et al. 2004	Midwest	2/2001– 2/2002	5.9	13.4

* = Male drivers only

Studies investigating the extent of racial disparities in traffic stops often take one of two approaches. The first focuses on the occurrence of traffic stops and the second on the outcome of those stops. Studies in the first group search for disparities in the likelihood that minorities will be stopped by the police as compared to Whites (Lamberth 1996; Cordner, Williams and Zuniga

2000; Smith and Petrocelli 2001; Meehan and Ponder 2002; Withrow 2004; Roh and Robinson 2009). Efforts to determine the extent of racial disparities in this initial phase are hampered, however, by the lack of an adequate baseline, or "denominator" (Walker 2001). It is not at all clear what an appropriate rate-of-stop should be for minorities and Whites in a given community. A common baseline is to simply compare stop rates to community populations; so, for example, if Blacks make up 30% of the residents in a community and 50% of the traffic stops, we can say that Blacks are overrepresented among traffic stops. But, the population of drivers in a community need not correspond to overall population levels (Tillyer et.al. 2010). People living in neighboring communities may drive in the city, and not all residents drive the same amount. Even when using an "estimated driving population" as the baseline, one still has no information about the behaviors of the drivers. Observed behaviors, such as speeding, that merit the stop might differ across population groups. Doubts have also been raised about the ability of officers to identify the race of drivers prior to making a stop (Alpert, Dunham and Smith 2007). Absent any data on observed behaviors by those stopped and not stopped, this initial approach is of interest *prima facie* but does not generate all the information needed to reach firm conclusions.

A second approach asks what happens to drivers after a stop has been initiated (Withrow 2004, 2006; Gaines 2006; Novak and Chamlin 2008; Tillyer, Klahm, and Engel 2011). Are they given a citation, a verbal warning, arrested, searched, or what? Taking this approach affords researchers greater analytic leverage, as it avoids the messy process of estimating a baseline comparison. If we take the traffic stop as the beginning of the process, and compare outcomes

across population groups, we know both the numerator and the denominator. We limit our focus

here to where we have the most complete data: Given a traffic stop, what happens?[2]

Still, there are reasons for researchers to proceed cautiously when making determinations

of racial disparity in traffic stops, even with an outcome-based approach. When it comes to

searches, Fallik and Novak (2012) emphasize that the legal discretion to carry out a search

varies. For example, departmental protocol will often require an officer to search an individual

incident to making an arrest. Likewise, an officer might discover that a vehicle has an

outstanding search warrant, or perhaps contraband is plainly visible in the vehicle. These types of

searches, where the officer has very little discretion, can be contrasted with consent searches,

where an officer may simply be following a hunch, or a "reasonable suspicion." Another, more

general consideration, is the need to control, where possible, for extralegal circumstances that

might affect the propensity of an officer to conduct a search. Any number of factors can fall into

this category, such as the time of day the stop was conducted, or the age and gender of the driver

(Fridell 2004; Durose et.al. 2009).   In the analysis below, we compare all searches with consent

searches to control for these factors. Further, since we focus on just one police department, we

can be confident that all police officers are operating under the same set of rules.

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[2] Of course, this is not to suggest that traffic stops themselves are racially neutral. Institutionalized practices that cause some neighborhoods to be patrolled more intensely than others could lead to dramatic differences in racial outcomes, even with equal search or arrest rates, after a stop. Individual officers could have equal rates of search for Black and White motorists, for example, but if there are more officers in minority neighborhoods disparities will ensue even if driving behaviors are identical. We can call this a "system-level" disparity because it would be due to agency- or system-level decisions about where to patrol. Our focus is on "individual-level" or "officer-level" disparities. We recognize that this is only part of the picture. However, by showing significant individual-level effects, we demonstrate that even if a city eliminated any system-level effects by patrolling White and minority areas with equal intensity, the disparities we document here would remain.

Causes of Racial Disparities

Racial disparities in police enforcement are easy to document, but efforts to explain them must consider a variety of potentially overlapping causes. One explanation is the police go where the crime is. If that means there is greater police presence in certain neighborhoods, and those neighborhoods have high minority populations, then even without any disparities on the part of the individual officers on patrol, the higher rate of stops in minority areas will lead to disparate outcomes. Police resources will naturally gravitate toward high-crime areas and this can mean an increase, not only in levels of police attention, but also the aggressiveness of that attention; officers may be instructed to "crack-down" in high-crime neighborhoods by conducting searches with less provocation, or reasonable cause, than would be used in an area with lower rates of crime (Smith, Visher and Davidson 1984; Sherman, Gartin and Buerger 1989). For example, being in a "known drug area" is often used as a justification for a search. As discussed above, we control for this system-level disparity by looking at the percentage of White and Black motorists searched, given a stop, by individual officers.

A second possible explanation is that police departments are populated by a number of "bad apple" individuals, who act out of explicit racial animus. This would certainly go a long way toward explaining why certain racial groups experience less favorable outcomes from their interactions with police than others and, especially with a historical view, the conclusion that racism has had a significant influence on America's police force is hard to avoid (Tomaskovic-Devey, Mason and Zingraff 2004; Wilson et.al. 2004).[3] We can explicitly test this proposition

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[3] It is important to note that racial disparities in outcomes can also arise for legitimate reasons. Racial groups do not necessarily commit crimes at the same rate and, if crimes are being disproportionately committed by a particular group, it follows that members of that group would more often experience punitive police enforcement. Certainly then, evidence of racial disparity is not the same thing as evidence of discrimination or prejudice. The type of disparity we refer to in

by identifying officers with the highest racial disparities in the outcomes associated with their stops of White and Black drivers.

Beyond outright prejudice, more nuanced explanations for racial disparities in the modern justice system abound. Studies in psychology find that individuals have greater difficulty empathizing with people from different racial groups. The implication is that White police officers would be somewhat less inclined to view minorities sympathetically (Brewer 1979; Tajfel and Turner 1979; Turner 1987; Williams and Eberhardt 2008). Likewise, unconscious stereotyping (e.g., implicit bias) can lead officers to make false assumptions about the propensity of minorities to engage in criminal activities (Chapman 1967; Hamilton et.al. 1985; Smith et.al. 2006). Implicit bias may affect Black officers just as much as Whites. These assumptions are fed by an uncritical awareness among officers that Blacks make up a disproportionate number of the offenders processed by the criminal justice system (Weitzer 1999; Clearly 2000; Meehan and Ponder 2006). It was clearly part of a pattern of profiling at the beginning of the War on Drugs, where Hispanics and Blacks were targeted because of a sense among officers that many drug dealers and couriers were members of minority groups (see Harris 1999).

Eduardo Bonilla-Silva's (1997) work in fact identifies "structural racism" as a fundamental aspect of social systems, including the criminal justice system, which assume, rely on, and perpetuate disparate outcomes across segments of the population. He urges scholars to move beyond the "prejudice problematic" to look at broader factors By focusing on the Durham Police Department, we by no means suggest that issues of poverty, access to education, health care, jobs, or other social systems which also differ by race, are unrelated to what we find. But it

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this section is the illegitimate kind, where holding inputs – in this case, crimes – constant, members of certain racial groups experience harsher enforcement tactics than others.

is important to document the degree of disparity present in each of these institutions, and we do so by focusing on a high quality and official source of information that has not yet been analyzed.

Why Durham?

Durham, NC is an important venue for the study of race and policing as it is a highly diverse community, and one with a rapidly growing population. The city's population grew from 187,000 to 228,000 from 2000 to 2010, and is made up of approximately 46 percent White and 38 percent Black residents, according to the city web site and census data. Like many towns across America, Durham has seen accusations of biased policing. Further, two major interstate highways criss-cross the city (I-40, running from North Carolina to California, and I-85, a major north-south corridor along the east coast including Atlanta and Richmond, VA) and issues of drug trafficking have made the city's police department active in this area. During the past few years issues of race and policing have been high on the city's agenda, with concern in the minority community that low-level drug arrests are given too much priority and that the bulk of traffic stops and searches relate to Blacks. Relations were strained as well when a young Hispanic man, Jesus Huerta, died in the backseat of a police cruiser in November 2013 while parked at the Durham police headquarters in what the police ruled a self-inflicted gunshot wound; Huerta was handcuffed at the time (Wise 2014). Allegations of racial profiling and the mishandling of the Huerta case, among other elements, caused the city to accept that its human relations commission would look into the police department's practices, leading one local news report to suggest that the police department practices were being put "under [the] microscope" (Shropshire 2014).

Information gathered as part of these investigations has included a number of testimonials and qualitative evidence of disparate police behaviors based on race. Here, we focus solely on the quantitative evidence based on official traffic stops data, and, in fact, another reason Durham is a prime venue to study racial disparities in policing is the richness of this data. As the first state to mandate the collection of traffic stop data for almost every type of stop, North Carolina now makes an enormous amount of data available to the public; over 17 million traffic stops are documented in the NC DOJ database across the entire state, from 2000 to present. While our focus here is only on Durham, the wealth of data allows us reliably to measure trends in racial disparities over time—an analytic approach that data limitations rarely allow for in traffic stop studies, and yet, a critical one for assessing progress toward more race-neutral policing.

Traffic Stops by Race

Table 2 shows the number and percent of Black and White motorists pulled over for each of 9 reasons laid out in the law, as well as overall statistics. Almost 230,000 traffic stops are included, covering each stop from 2002 through 2013.

Table 2. Traffic Stops by Purpose and Race of Driver, Durham 2002-2013

Purpose	Number	Percent	
		White	Black
Total Stops	229,550	39.43	57.32
Driving Impaired	990	63.43	33.03
Speed Limit	72,780	46.31	48.65
Stop Light/Sign	15,913	41.19	54.56
Safe Movement	17,050	41.44	54.93
Investigation	19,248	37.91	60.60
Other Vehicle	11,999	36.16	60.77
Vehicle Regulatory	49,576	35.39	62.67
Seat Belt	8,621	34.24	63.39
Vehicle Equipment	33,373	31.21	66.81

Note: The table excludes 2,852 checkpoint stops and 9,182 passengers. NC law requires these records to be collected only in the case when a search occurs, not for every stop. Therefore we do not know how many drivers were stopped at a checkpoint, nor how many passengers were in vehicles that were stopped. Table A-1 in the Appendix shows information about passengers. Unless explained otherwise, all references to data in this paper exclude passengers and checkpoints. Our racial comparisons include only Blacks and Whites, excluding 7,479 drivers of other or unknown races.

Table 2 is presented in order of the percent of Blacks stopped for each purpose, and shows the total number of drivers stopped for each purpose. Looking first at that column, the largest numbers of stops relate to speed limit, regulatory, equipment, and investigations, followed by safe movement, stop light / stop sign concerns, followed by "other" reasons, seat belt violations, and finally driving while impaired. The types of stops more associated with White drivers, compared to the overall average, include DWI, speeding, stop sign violations, and safe movement. Blacks are 57 percent of those stopped overall, but their numbers exceed the average for investigations, the "other" category, regulatory, seat belt, and equipment issues. Blacks are more than twice as likely as Whites to be stopped for equipment issues. Many of the types of stops listed toward the bottom of Table 2, where Blacks are more likely to be stopped, appear to be more discretionary as compared to violations such as speeding or driving while impaired, where the officer may have a clear visual cue that the behavior merits investigation.

Figure 1 continues our introduction to the data collected by showing trends in the number of stops per year.

Figure 1. Number of Traffic Stops, 2002 – 2013
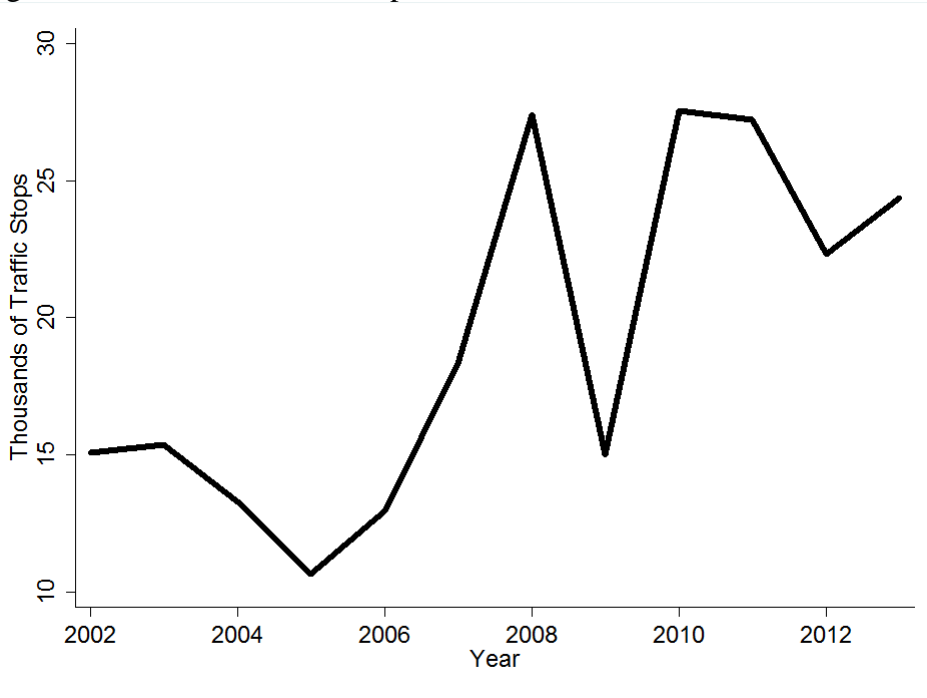
The number of drivers stopped in Durham ranges range from 10,000 to almost 30,000. The figure makes clear that the volume of traffic stops virtually doubled after 2007. Several factors may be related to this, for instance, the current Police Chief, Jose Lopez Sr., was sworn into office in September of 2007 and may have decided to dramatically ramp up enforcement. Also, Durham is a rapidly growing city, so some increase in the number of traffic stops over time is to be expected from population growth alone.

Table 2 showed that the overall racial breakdown in Durham traffic stops was 39 percent White and 57 percent Black. Figure 2 shows that this roughly 40 / 60 split has been consistent over recent years, with a slight but noticeable increase in disparity over time. We have no information on the race of drivers, as compared to the general population of Durham. But the US Census Bureau estimated that in 2013 Blacks were approximately 39 percent of the

population in Durham County, so we see that compared to population statistics the number of Blacks stopped by the police is higher by 50 percent. Whites appear correspondingly less likely to be pulled over, as their proportion in the population is substantially greater than among those stopped.

Figure 2. Percent of Drivers Stopped by Race, 2002 – 2013
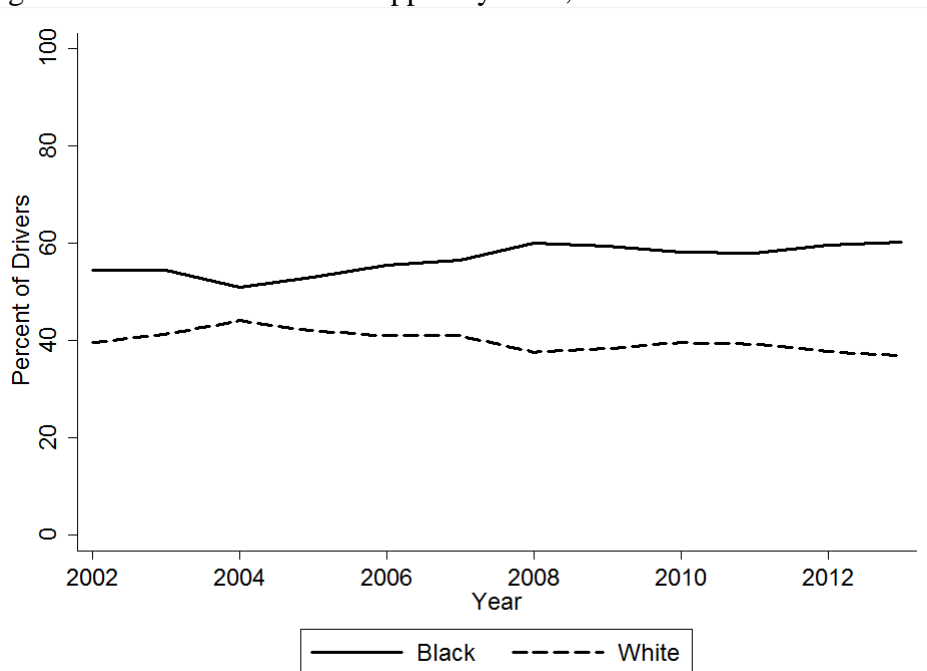
In a report by the US Department of Justice on how to analyze racial statistics in police stops, McMahon and Kraus (2005) note the difference between the population of "violators" and that of "observed violators." Violators may come from the community or from surrounding areas. Violators come from the population of drivers, and not all community members are drivers. So we do not focus on these issues. However, the same authors note that officer discretion comes in three places: which violators are: 1) observed; 2) stopped; and 3) searched. Our focus is on the third element here, clearly an area where the police have discretion, and one where we have the relevant data on the previous step in the process, so that we can measure both the numerator (e.g., the number of searches) as well as the denominator (the number of stops).

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We know precisely who was stopped, though we do not know who was observed violating the law, or who, in fact, was violating. Neighborhoods with little police presence, for example, may see many fewer observed violations as a percentage of total violations, and these differences add to the racial disparities in law enforcement outcomes if, as is common, the level of police presence is correlated with the racial composition of the area. By focusing on the third element in the chain of events laid out by McMahon and Kraus, we seek to limit our attention on where we have the most complete data, not to suggest this is the only area of potential concern.

The SBI form also indicates what else occurs as the outcome of the stop: drivers may see no action, get a verbal warning, get a written warning, be issued a citation, or be arrested. Table 3 shows the linkage between being searched and the five possible outcomes of a stop. If we consider citations and arrest as relatively negative outcomes, with the others relatively positive outcomes from the perspective of the driver, then we see that searches are related to negative outcomes about 68 percent of the time. Stops without searches see such outcomes only 54 percent of the time. These differences are not very great by race. Arrests show the correlation even more sharply: 27 percent of those searched are arrested, but only 0.56 percent of those not searched are arrested. Thus, in the analysis below, we use as our variable of interest whether a search occurred, as it is highly correlated, for both Blacks and Whites, with different outcomes of a traffic stop.[4]

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[4] Contraband was found in 3,409 cases, or 1.49 percent of all traffic stops. In stops associated with a search, the "hit rate" for contraband is 24 percent, with Blacks and Whites seeing 26 and 19 percent "hit rates,' respectively.

Table 3. Outcomes of a Stop, with and without a Search, by Race

Race	Search?	N	No Action	Verbal Warning	Written Warning	Citation	Arrest	Total
White	No	87,009	3.11	32.16	6.30	57.73	0.70	100.00
Black	No	121,180	4.49	39.12	6.36	49.35	0.69	100.00
Total	No	215,483	3.87	35.71	6.31	53.18	0.56	100.00
White	Yes	3,493	2.75	22.30	7.21	35.96	31.78	100.00
Black	Yes	10,389	2.98	22.41	6.14	43.41	25.06	100.00
Total	Yes	14,067	2.93	22.41	6.42	41.37	26.88	100.00

Note: The total numbers include drivers who are reported as "other" for race (about 3% of the total).

The key entry point to a negative outcome, and the one where we can study it most completely given the data collected by official sources, is the search rate, and that will be our focus for the remainder of the paper.

## Racial Differences in Percentage of Stops Leading to a Search

Table 4 shows the number of stops and searches by purpose, and the percent of Black and White motorists searched. Overall, just over 6 percent of searches in Durham lead to a search of the driver or the vehicle. Just under 4 percent of White drivers are searched, and almost 8 percent of Black drivers. This ratio: the percent of Blacks searched divided by the percent of Whites searched, equals 2.05 overall, and, as the table shows, is higher or lower than this number for various types of traffic stop. A ratio of 1.00, of course, would represent a case where Blacks and Whites had equal probabilities of being searched, given a stop.

Table 4. Percent of Stops Resulting in a Search by Race and Purpose of Stop

Purpose	Number	Total	% White	% Black	Ratio Black / White
Total Stops	229,550	-	39.43	57.32	-
Total Searches	14,067	6.13	3.86	7.90	2.05
Driving Impaired	462	46.67	49.52	42.51	0.86
Safe Movement	1,378	8.08	6.82	9.28	1.36
Vehicle Equipment	2,848	8.53	6.04	9.86	1.63
Other Vehicle	964	8.03	5.25	9.87	1.88
Investigation	2,427	12.61	7.51	15.93	2.12
Stop Light/Sign	693	4.35	2.69	5.86	2.18
Speed Limit	1,649	2.27	1.40	3.16	2.26
Vehicle Regulatory	3,006	6.06	3.14	7.86	2.50
Seat Belt	640	7.42	3.25	9.79	3.01

Based on the overall ratio of 2.05 listed in Table 4, we see that Blacks have a 105 percent greater likelihood of being searched than Whites, overall. Figure 3 shows how this comparison differs across the reason for the stop, and Figure 4 shows how it has varied across time.

Figure 3. Percent Difference in the Likelihood of Blacks Being Searched as Compared to Whites, by Purpose of Stop
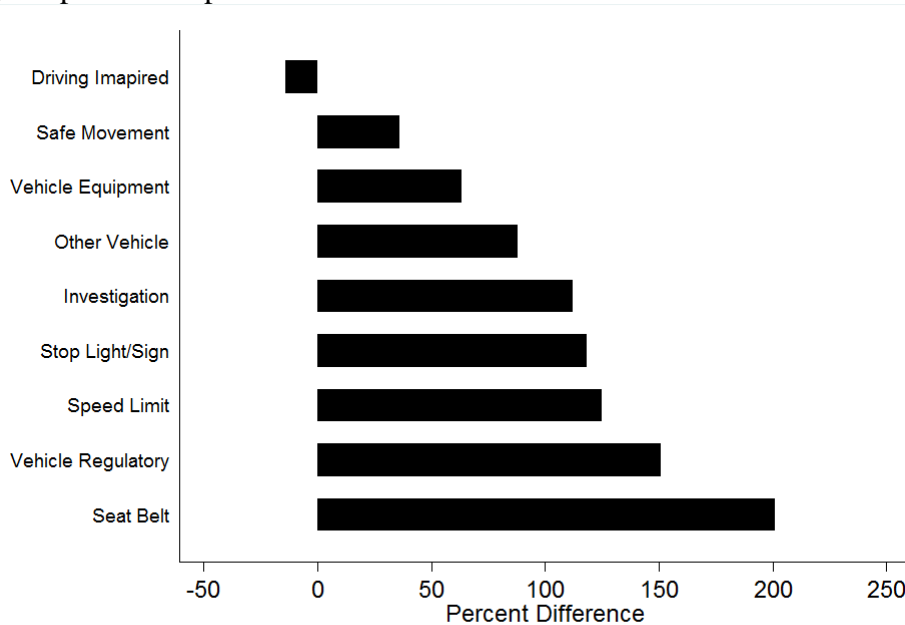
The figure shows the percentage difference in the likelihood of Blacks being searched as compared to Whites by purpose of stop.

Figure 4. Percent Difference in the Likelihood of Blacks Being Searched as Compared to Whites, 2002 – 2013

The figure shows the percentage difference in the likelihood of Blacks being searched as compared to Whites.
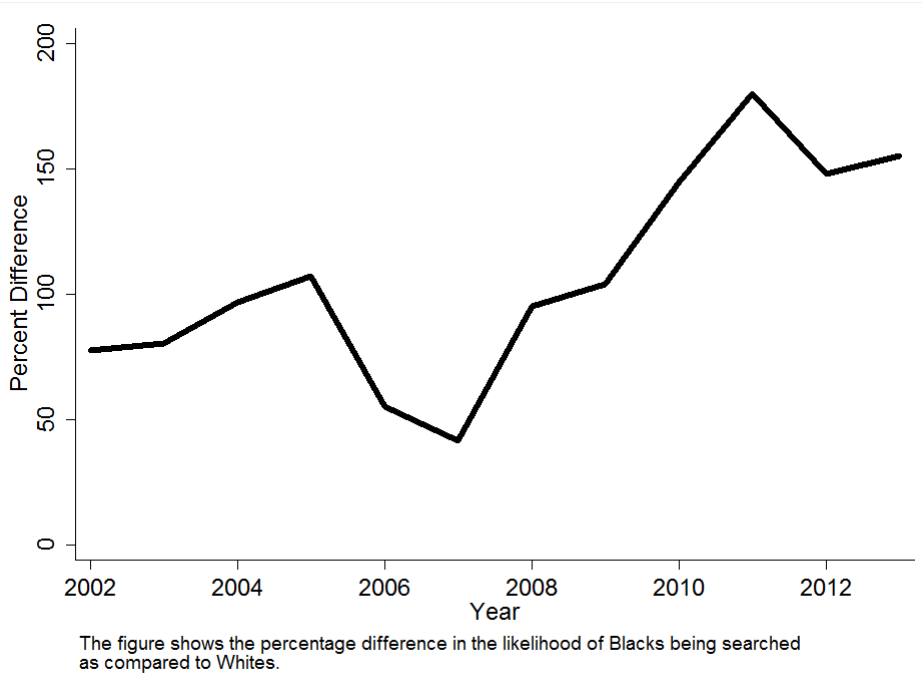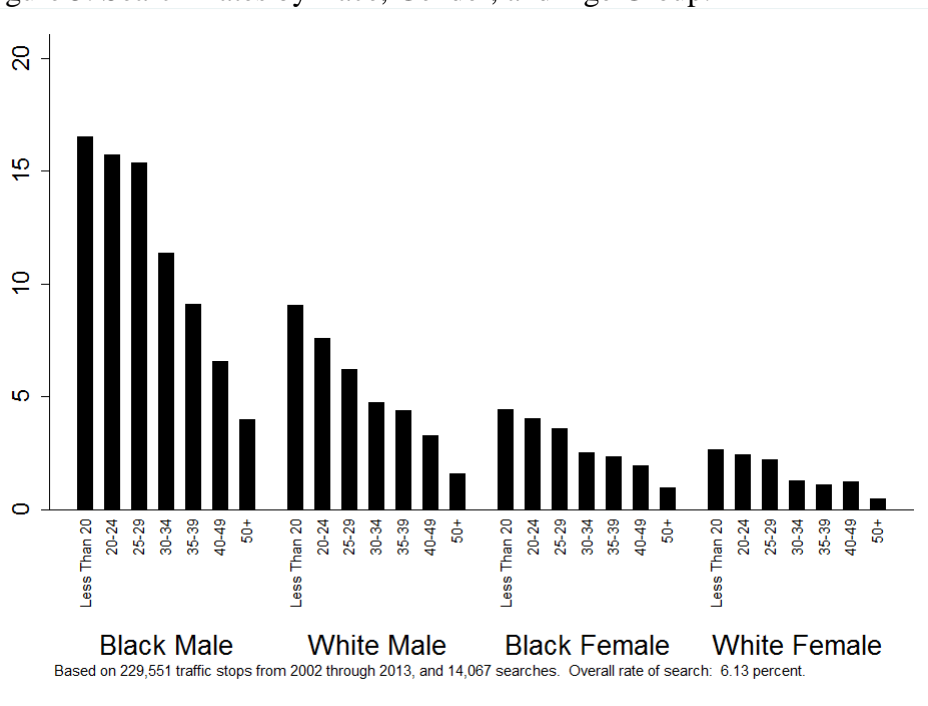
Figure 1 showed a dramatic change in police behavior in Durham after 2007, and Figure 4 suggests that the dramatic increase in police stops was also accompanied by an increased focus on targeting Black motorists, at least as related to searches. The disparity by race has always been substantial, it was on the order of 50 to 100 percent increased chances during the first 8 years listed (2002 through 2009), it surged, however, to more than 150 percent increased likelihood after 2010. The trends in Figure 4 are stronger among males than females. Appendix Figure A-1 shows separately the data for male and female drivers; virtually the entire increase can be attributed to the treatment of men, not women.

The differences laid out in Table 4 depend dramatically on the gender of the driver. We replicate Table 4 for male and female drivers in Table A-2 in the Appendix. Across every category, the rates of search are much higher for men than for women, and the racial disparities are also higher among men. Overall, whereas Table 4 shows 3.86 percent of Whites being

searched and 7.90 percent of Blacks, leading to a ratio of 2.05, those numbers for women are: 1.54, 2.79, with a ratio of 1.81. For men, on the other hand, 8.31 percent overall are searched, with 5.03 percent of Whites and 11.07 percent of Blacks, leading to a ratio of 2.20.

Not surprisingly, the race and gender differences we have noticed are even more powerful when we add the age of the driver to the comparison. Figure 5 shows the rate of search for different age groups within each of four race / gender categories.

Figure 5. Search Rates by Race, Gender, and Age Group.

Based on 229,551 traffic stops from 2002 through 2013, and 14,067 searches. Overall rate of search: 6.13 percent.

Young Black men, particularly those under 30, see search rates above 15 percent. Black men up through the age of 49, in fact, experience search rates higher than the city-wide average. Across every category, youth has a notable effect on the likelihood of search. Similarly, gender systematically matters. And across similar categories of age and gender, Blacks experience higher rates of search in every case. But young Black men stand out in this comparison, with rates that are three times higher than the city-wide average, and strikingly higher than any other group. Among those under 20 years old (who always see the highest search rates) the percentage

searched are as follows: White women, 2.65, Black women, 4.42, White men, 9.07, and Black

men, 16.52.

Figure 6 shows the rate of search over time for the four race / gender categories listed.

Figure 6. Percent of Stops Resulting in a Search by Race and Gender
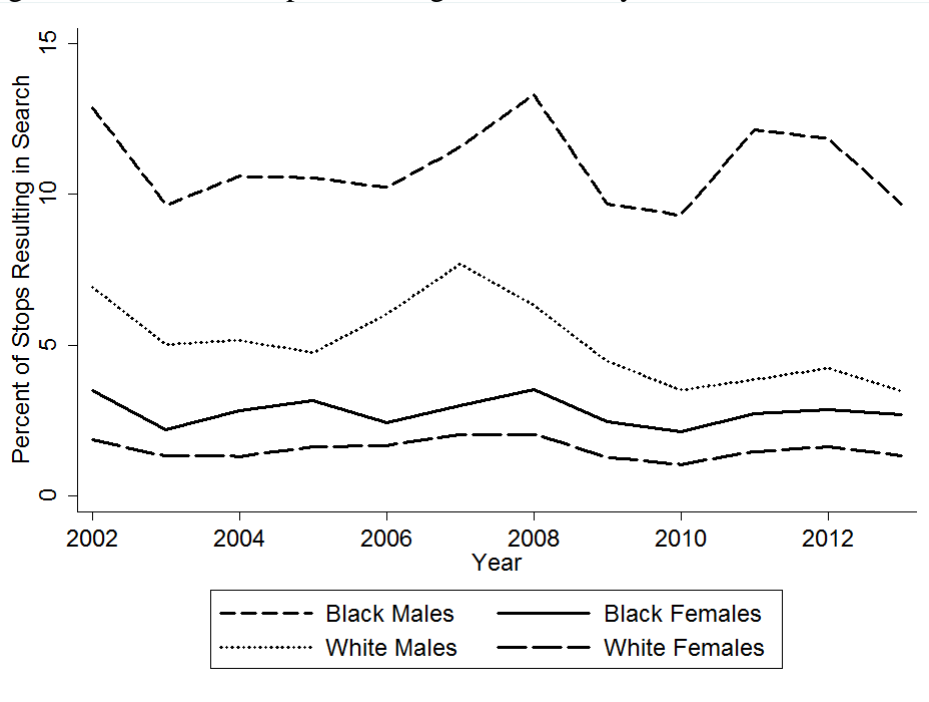
Black males consistently have rates of search much higher than any others. White males,

however, have seen their rates of search decline substantially over the years, with White females

consistently below the averages for the other groups. Observing differences in trends over time

in the percentage of stops leading to a search suggest that police training and policies may be

related to these shifts. It is unlikely that underlying driver behaviors would change very

dramatically over time among these different groups. Of course, were we to add a line for Black

men under 30, or Black men under 20, their rates would be higher than any of those appearing in

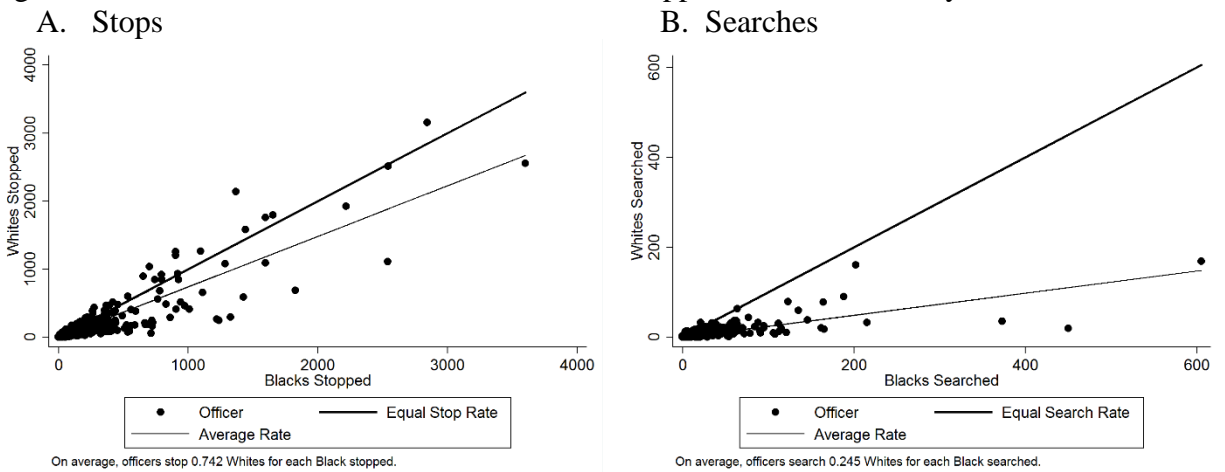Figure 6.

Identifying High Disparity Officers

Data collected by the NC DOJ include an anonymous identification number for each police officer. Without knowing anything about any individual officers on the police force, we can nonetheless compare each officer with some minimum number of stops with regards to the racial characteristics of the drivers they have stopped and searched. Before analyzing any data relating to these officer IDs, it is important to understand that many officers conduct very few traffic operations, and that a high percentage of all the traffic stops relate to a small number of the officers. Table 5 shows the distribution of stops by officer ID. Just 38 officers, or 3 percent of the total, are responsible for 39 percent of the traffic stops.

Table 5. Distribution of Stops by Officer IDs

Number of Stops	Officers with this many Stops	Percent of Officers	Cumulative Percent	Percent of Stops	Cumulative Percent
1	233	21	21	0.1	0.1
2 – 10	186	17	38	0.3	0.4
11 - 100	290	26	64	6	6.4
101 – 1,000	379	34	98	54	60.4
1,001 +	38	3	100	39	100.0
Total	1,126	100	-	100	-

Officers have very diverse rates of stopping motorists of different races. Figure 7 shows the numbers of Blacks and Whites stopped and searched by each officer.

Figure 7. Number of Black and White Motorists Stopped, and Searched, by Officer ID.

A. Stops

B. Searches

On average, officers stop 0.742 Whites for each Black stopped.

On average, officers search 0.245 Whites for each Black searched.

Part A of Figure 7 shows the number of stops of Black and White motorists by each officer reporting any stops, including those with very few stops (clustered near the origin of the graph), and a few who have stopped thousands of Blacks and Whites. One officer appears to have stopped almost 4,000 Blacks and 2,500 Whites; another, about 3,000 of each race. The dark line at a 45 degree angle represents what we would see if officers stopped one Black for each White driver. It is clear from glancing at the figure that few officers are above this line, having stopped more Whites than Blacks. The thinner line shows the result of a simple regression, indicating that, on average, Durham police officers stop 0.742 Whites per Black motorist. Part B shows the number of searches, following the same format. As is clear, numbers are much more strongly skewed towards Blacks; in fact the regression indicates that 0.245 Whites are searched for each Black, less than one in four. The average Durham officer stops three Whites for every four Blacks, but searches one White for every four Blacks. One officer has searched over 600 Blacks, but fewer than 200 Whites. Two others have searched about 400 Blacks but just a few dozen Whites.

In the next section we measure, for each officer, the percentage of Blacks and Whites searched, given a stop. Because searches are relatively rare (just six percent of all stops), and many officers have few stops in the first place, we must be careful in calculating this percentage, because such calculations based on very few stops could be misleading: an officer with just three stops but one search would have a 33 percent search rate. On the other hand, an officer with many searches of drivers of one race, but no searches of drivers of the other race should be included if there are enough stops to trust the statistical robustnesss of the pattern observed. Our reasoning is this: to calculate the likelihood that an officer shows a tendency to focus their searches particularly on one racial group, we should exclude all officers with insufficient data to

generate robust statistics; we therefore eliminate all officers with fewer than ten searches of that race. Some officers have fewer than ten searches of one race, but more than ten of the other race. Therefore, we make two indices, one in which we look for officers with relatively high rates of searching Whites, and one with the opposite pattern. Figure 8A shows our comparison for all those officers with at least ten searches of Whites and Figure 8B shows the pattern of searches for those officers who have searched at least ten Black drivers.

Figure 8. Percentage of Blacks and Whites Searched, by Officer

A. Officers with at least 10 White searches   B. Officers with at least 10 Black searches

Includes 85 officers with 10 or more searches of White motorists.
Of these officers, 2 have rates of searching Whites more than twice their rate of searching Blacks.

Includes 203 officers with 10 or more searches of Black motorists.
Of these officers, 54 have rates of searching Blacks more than twice their rate of searching Whites.
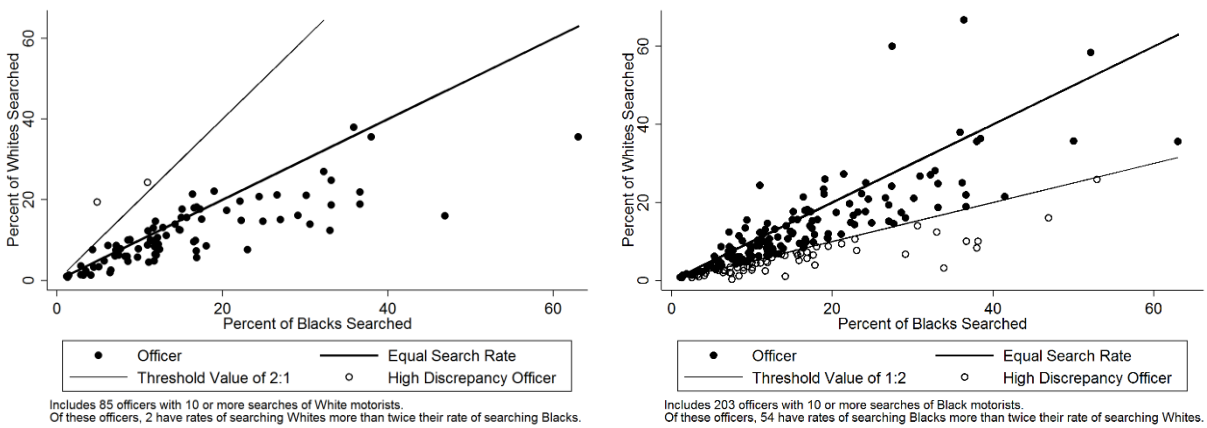
Figure 8A is limited to those 85 officers who searched at least 10 White drivers. The Figure shows a thick line at the 45 degree angle representing an equal search rate, as well as a sharper angled line representing a 2 to 1 rate with twice as many searches of Whites as compared to Blacks, proportionately. We find that 2 of the 85 officers listed are above this line.

Figure 8B, in parallel, shows each of 203 officers who searched 10 or more Black motorists. Of these, 54 had rates of search for Blacks that was more than twice their rate of search for Whites. We refer to these 54 officers, as well as the two in Figure 8A as "high disparity" officers—they are identified by hollow circles in the Figure, and appear to the left or the right of the corresponding lines showing the 2:1 or 1:2 search rates.

We have now reviewed a number of factors that could be related to racial differences in traffic stop outcomes: the nature of the stop, the age, race, and gender of the driver, and which officer conducted the stop. We move in the next section to multivariate analyses of the data described and explained in the sections above.

Multivariate Analyses

Having reviewed a number of factors relating to the correlates of a search, given a traffic stop, we turn now to a multivariate treatment of the question. Our approach is very simple. We conduct a logistic regression where the dependent variable is being searched (searched = 1; not searched = 0). We use the same variables as described above, with some additional controls. Our interest is in the coefficient for Race, which is coded as White = 0 and Black = 1; other and unknown races are excluded from the analysis (only 3% of the total observations). We present the results in terms of odds-ratios, with standard errors in parenthesis. Thus, numbers above 1.00 represent the degree to which Blacks have a higher likelihood of being searched than Whites, controlling for the other variables included in the model. A coefficient of 2.5 would represent 2.5 times increased odds, or a 150 percent increase in likelihood; a coefficient of 0.89 would mean that a Black driver has just 89 percent the likelihood of being searched, compared to a White, or 11 percent decreased odds. Because our analysis above showed that men and women experience quite different outcomes, we present two sets of results, one for each gender. Table 6 shows our results for men, and Table 7 for women. The tables are identically formatted and can be directly compared. Model 1 presents the simplest model, including just race and ethnicity (Hispanic = 1, non-Hispanic = 0). Successive models include additional controls. If disparities apparent in one model were statistically explained by another variable, then inclusion of that variable in successive models would dramatically change the coefficient for the variable of

interest. The coefficients for Hispanic declines somewhat from Model 1 to Model 5, which

includes the fullest set of controls, but that for Race remains very high, moving from 3.33 to

2.64. Other coefficients are extremely stable. This indicates that the results shown are highly

robust and that the inclusion of various control variables, including even that for having been

stopped by a high disparity police officer, does little to affect the overall patterns with regards to

race. Black men experience a 164 percent increased likelihood of being searched, controlling for

all the factors we can include from the official data collected (Table 6, Model 5). For Black

women, this increased risk of search, compared to White women, is 34 percent, still a significant

difference, but much lower than among men.

Table 6. Determinants of Searches, Men.

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Demographics					
Race	3.33* (0.09)	3.11* (0.08)	2.70* (0.08)	2.68* (0.08)	2.64* (0.08)
Hispanic	2.27* (0.08)	1.85* (0.06)	1.32* (0.05)	1.33* (0.05)	1.29* (0.05)
Age	-	0.95* (0.00)	0.95* (0.00)	0.95* (0.00)	0.95* (0.00)
Stop Purpose					
Speed Limit	-	-	-	-	-
Stop Light	-	-	1.86* (0.09)	1.88* (0.09)	1.83* (0.10)
Impaired	-	-	34.25* (2.68)	34.94* (2.73)	30.81* (2.88)
Movement	-	-	3.24* (0.13)	3.23* (0.13)	3.06* (0.13)
Equipment	-	-	3.03* (0.10)	3.03* (0.10)	2.80* (0.11)
Regulatory	-	-	2.45* (0.08)	2.41* (0.08)	2.18* (0.08)
Seat Belt	-	-	2.45* (0.12)	2.40* (0.12)	2.46* (0.14)
Investigation	-	-	4.59* (0.17)	4.64* (0.17)	4.21*(0.17)
Other	-	-	2.94* (0.13)	2.98* (0.13)	2.71* (0.14)
Officer Type					
Black Disparity[†]	-	-	-	1.40* (0.03)	1.49* (0.04)
White Disparity[ɸ]	-	-	-	1.51* (0.13)	1.50* (0.13)
Time					
Hour of Day	-	-	-	-	Included
Day of Week	-	-	-	-	Included
Constant	0.03* (0.00)	0.15* (0.00)	0.07* (0.00)	0.07* (0.00)	0.05* (0.00)
N	141,210	141,210	141,210	141,210	113,553
Pseudo R^2	0.027	0.055	0.093	0.096	0.101

Note: Entries are odds-ratios, with standard errors in parenthesis.

Note : The number of observations is smaller for Model 5 because the "hour of stop" variable is missing in some cases.

* = Significant at 0.05 p-value

† = Coded 1 for 54 officers who searched Blacks at twice the rate of Whites; otherwise zero. Officers with fewer than 10 searches of Black motorists are automatically coded zero.

ɸ = Coded 1 for 2 officers who searched Whites at twice the rate of Blacks; otherwise zero. Officers with fewer than 10 searches of White motorists are automatically coded zero.

Table 7. Determinants of Searches, Women.

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Demographics					
Race	1.79* (0.10)	1.68* (0.09)	1.41* (0.08)	1.39* (0.08)	1.34* (0.08)
Hispanic	0.87* (0.10)	0.76* (0.09)	0.53* (0.06)	0.53* (0.06)	0.51* (0.07)
Age	-	0.96* (0.00)	0.96* (0.00)	0.96* (0.00)	0.96* (0.00)
Stop Purpose					
Speed Limit	-	-	-	-	-
Stop Light	-	-	2.09* (0.25)	2.06* (0.25)	1.82* (0.26)
Impaired	-	-	72.41* (14.64)	73.05* (14.80)	59.40* (13.58)
Movement	-	-	3.80* (0.40)	3.70* (0.39)	3.32* (0.39)
Equipment	-	-	3.82* (0.33)	3.75* (0.32)	3.07* (0.30)
Regulatory	-	-	3.28* (0.26)	3.19* (0.26)	2.89* (0.26)
Seat Belt	-	-	2.79* (0.43)	2.71* (0.42)	2.79* (0.50)
Investigation	-	-	8.55* (0.74)	8.45* (0.73)	6.75* (0.66)
Other	-	-	3.46* (0.41)	3.30* (0.40)	2.80* (0.39)
Officer Type					
Black Disparity[†]	-	-	-	1.40* (0.08)	1.59* (0.10)
White Disparity[ϕ]	-	-	-	3.59* (0.55)	3.67* (0.57)
Time	-				
Hour of Day	-	-	-	-	Included
Day of Week	-	-	-	-	Included
Constant	0.01* (0.00)	0.06* (0.00)	0.02* (0.00)	0.02* (0.00)	0.02* (0.00)
N	80,861	80,861	80,861	80,861	66,023
Pseudo R^2	0.007	0.027	0.077	0.081	0.093

Note: Entries are odds-ratios, with standard errors in parenthesis.

Note : The number of observations is smaller for Model 5 because the "hour of stop" variable is missing in some cases.

* = Significant at 0.05 p-value

† = Coded 1 for 54 officers who searched Blacks at twice the rate of Whites; otherwise zero. Officers with fewer than 10 searches of Black motorists are automatically coded zero.

ϕ = Coded 1 for 2 officers who searched Whites at twice the rate of Blacks; otherwise zero. Officers with fewer than 10 searches of White motorists are automatically coded zero.

Looking first at Table 6, Model 1 shows a baseline effect of Race, controlling for

Ethnicity, of 3.33. Successively including controls for age, various stop purposes, whether the

officer was identified in Figure 8 as a high discrepancy officer, the time of day (each of 23 hours

included, compared to a baseline of midnight), and the day of the week (each day included,

compared to Sunday). (There are, of course, differences in the numbers of stops and the

likelihood of search at different times of the day or days of the week, but we do not present each

coefficient here for the sake of space and because they are not central to our theoretical concerns.) It is useful to note that for both men and women, compared to drivers stopped for speeding (the reference category), several of the other stop purposes have very high coefficients. Those pulled over for DWI are highly likely to be searched, controlling for other factors.

Given the large number of observations in our dataset, every coefficient in both tables is statistically significant. Many are substantively large as well. Being stopped by a high disparity officer increases the likelihood of being searched, of course; these officers, by definition, have searched more than a minimum number of drivers. Most importantly, our ability to control for so many relevant factors gives us the opportunity to impose a hard test on the impact of race. If being Black were associated with some particular other characteristics, such as being on the street at a particular time of day, or if discrepancies were explained fully by the actions of just a few rogue officers, then the coefficient for race in Model 5 would be close to 1.00 and statistically insignificant. The race coefficient remains high in all models, however, particularly for men.

Figure 9 shows the value of the race coefficient when we conduct the regression from Model 3 in the tables above separately for each year from 2002 through 2013. We use Model 3, rather than Models 4 or 5, because the variables for high disparity officers are calculated with the full range of observations; if we tried to recalculate these variables on a yearly basis, few officers would meet the 10-search cutoff that we established to ensure our calculations were robust. But the coefficients for Race in Models 3 and 5 are very similar in both Tables 6 and 7, so this is a good indicator, and one that we can calculate separately for each year.

Figure 9. Increased Odds of Search for Blacks, by Gender, 2002-2013
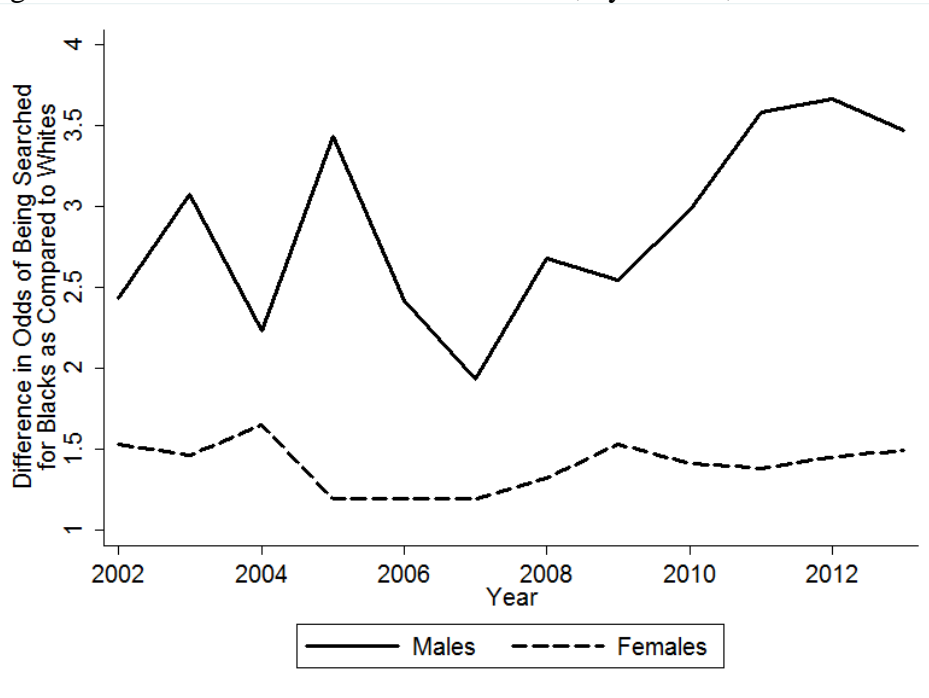
Note: The Figure shows the odds-ratio from Model 3 of Tables 6 and 7 showing the increased odds for Blacks to be searched, as compared to Whites, controlling for various factors as listed in the tables.

Figure 9 shows that the findings from Tables 6 and 7 are consistent over time. They vary to some extent, but in all years the racial disparity apparent for women is relatively modest as compared to men. For Black men in Durham, being searched by the police comes at a rate approximately three times more than that of Whites, and while this number fluctuates somewhat over time, it is higher in recent years than it has ever been. In fact, since 2007 the degree of racial disparity by this measure has almost doubled in magnitude. (See Figure A-2 and A-3 which show that the data presented in Figure 7 correspond closely to the simple percentage differences by race reported in Figures 4 above.)

Conclusion

Our review of racial differences in traffic stops in Durham reveals some very troubling patterns and trends. Consistently, no matter whether we look at univariate correlations or conduct a more

sophisticated multivariate regression analysis using every available control, Blacks are subject to much greater odds of search and therefore arrest. This is particularly true among men, and especially so among younger men. Further, the trends are growing, not disappearing, over time.

There may be good policing reasons for the trends we have documented. The analysis we have presented here is limited to the data that the state mandates be collected, and therefore lacks information on many potentially important variables. Therefore the analysis may be said to raise important questions rather than to provide conclusive proof that the racial disparities we document are unwarranted. The questions posed here are important, however. Evidence suggests that Black male motorists in Durham are subjected to almost three times the likelihood of search as compared to Whites, and that these discrepancies are growing. Perhaps there is a reason rooted in the behaviors of these drivers. In the absence of such a demonstration, however, and based on official data collected by police officers themselves, the patterns and findings shown here document extensive, troubling, and official evidence of dramatic and growing disparities in how Black and White motorists are treated by the Durham Police Department. Such patterns call into question constitutional guarantees of equal protection under the law and foster hostility and resentment in a group of the population that regularly comes into contact with the police. That these trends appear to be accelerating rather than holding steading or being ameliorated is a troubling suggestion that the policies, and the resulting citizen response, may be self-perpetuating: A downward spiral of policing and citizen resentment.

No matter what substantive conclusions one may draw from the analysis presented here, our analyses highlight at least two key areas where leaders of the agency could and should take action. Given the data at their disposal, any agency would easily be able to generate a periodic report showing the numbers of stops and searches, by race, for each officer, as we have done

here. Those officers with patterns substantially different from others can easily be identified, and the reasons for these disparities explored. We strongly urge every police department in North Carolina to adopt periodic review of these officer-related records and to incorporate such review as a standard part of monthly or quarterly management review.

Equally important, our analysis clearly shows that "bad apples" alone cannot explain the racial disparities across police stop and search procedures. Even if the individual "high disparity" officers within the Durham Police Department were taken out of our analysis, the differences we identify would persist. Therefore, we suggest that all departments utilize the growing research on implicit bias and systemic and cultural racism to explore how the department on a whole is creating racially inequitable outcomes, in spite of intent to the contrary. While the situation can certainly be improved by identifying those officers who appear to be the most disparate in their actions, the issues we have identified cannot be solved by focusing there alone.

Having made use of official data to make these analyses, we can also suggest some simple ways in which the data collected could be made substantially more useful, at minimal cost to the state. Automating the SBI-122 form would allow several pieces of information to be coded with no action by the officer: their ID number (many of the officer IDs in the state database appear to have misspellings and sometimes purposeful use of false names; any inaccuracies in these ID numbers renders it impossible to compare behaviors across individual officers); a location / GIS stamp; and a time stamp (many of our observation were excluded because the time variable was missing or left blank). Adding the location would be the most significant improvement in the usefulness of the SBI-122 form.

Only so much can be gleaned from the current version of the SBI-122 form, and we have exhausted that analysis in this paper. In order to assess the full extent of any "driving while

Black" phenomenon, some periodic review, by an independent group not affiliated with the police, should focus on the racial, age, and gender characteristics of drivers, as well as their behaviors. Only with a realistic, real-time, and routine review of motorist behaviors could we assess whether the racial composition of those stopped by the police is justified by driving behavior. Data on drivers, compiled periodically and according to scientifically sound sampling procedures, could then be compared with police stops data to assess the initial steps in the process by which some citizens, but not others, come into contact with law enforcement. We can go a long way by analyzing the data that are currently being collected, as we have done here. We could improve these forms. But a full understanding of "driving while Black" will also require periodic field study beyond what is collected by the police officers themselves.

Appendix

This appendix provides additional statistical summaries of the North Carolina Traffic Stops database. Table A-1 reflects information for passengers. Note that the law does not require information about passengers to be included unless they are searched. In practice, information is sometimes included about passengers and sometimes not, even when they are not searched: we found that only 350 passengers were searched, though 9,182 passengers are listed in the database. We do not analyze the data on passengers in the text of the article but present it here for the sake of completeness.

Table A-1. Passenger Statistics

Purpose	Number	Percent	
		White	Black
Total Stops	9,182	21.49	77.88
Speed Limit	952	25.84	72.37
Stop Light/Sign	473	25.79	73.78
Driving Impaired	133	60.90	38.35
Safe Movement	795	29.18	69.56
Vehicle Equipment	2,045	19.46	80.20
Vehicle Regulatory	2,015	17.17	82.48
Seat Belt	488	13.11	86.68
Investigation	1,624	20.81	78.63
Other Vehicle	657	22.22	77.17

Note: Only 350 passengers (4% of total) are searched and there is no racial difference in the likelihood of a search for Blacks and Whites.

Table A-2. Percent of Drivers Searched by Race and Purpose of Stop

Part A: Men

Purpose	Number	Total	% White	% Black	Ratio Black:White
Total Stops	146,492	-	41.03	55.36	-
Total Searches	12,174	8.31	5.03	11.07	2.20
Speed Limit	1,417	3.28	1.93	4.87	2.52
Stop Light/Sign	599	6.08	3.49	8.61	2.47
Driving Impaired	417	48.60	51.58	43.97	0.85
Safe Movement	1,228	10.33	8.69	12.03	1.38
Vehicle Equipment	2,490	11.16	7.38	13.35	1.81
Vehicle Regulatory	2,510	8.37	4.01	11.24	2.80
Seat Belt	587	9.22	3.86	12.34	3.20
Investigation	2,067	15.03	8.45	19.59	2.32
Other Vehicle	859	10.42	6.44	13.28	2.06

Part B: Women

Purpose	Number	Total	% White	% Black	Ratio Black:White
Total Stops	83,058	-	36.59	60.76	-
Total Searches	1,893	2.28	1.54	2.79	1.81
Speed Limit	232	0.79	0.55	1.00	1.82
Stop Light/Sign	94	1.55	1.18	1.89	1.60
Driving Impaired	45	34.09	30.00	37.14	1.24
Safe Movement	150	2.90	2.02	3.53	1.75
Vehicle Equipment	358	3.24	2.78	3.45	1.24
Vehicle Regulatory	496	2.53	1.62	3.05	1.88
Seat Belt	53	2.35	1.46	2.80	1.92
Investigation	360	6.55	4.72	7.64	1.62
Other Vehicle	105	2.80	2.21	3.14	1.42

Table A-3 shows that consent searches have similar characteristics to searches overall, which explains why in our paper we focus on all searches combined, not consent searches in particular. Both the overall ratios of percent searched by race, and the gender differences that we observed overall in the body of the paper are confirmed for consent searches as well. Notable, however, is that searches that occur "incident to arrest", where officers have the least discretion when it comes to searching, also show the lowest levels of racial disparity.

Table A-3. Type of Search by Race

Part A: All drivers.

Search Type	Number	Total	White	Black	Ratio Black:White
Total Stops	229,550	-	39.43	57.32	-
Total Searches	14,067	6.13	3.86	7.90	2.05
Consent	8,028	3.50	2.23	4.49	2.01
Search Warrant	10	-	-	-	-
Probable Cause	2,476	1.08	0.42	1.58	3.76
Incident to Arrest	3,042	1.33	1.09	1.51	1.39
Protective Frisk	511	0.22	0.11	0.31	2.81

Part B: Men

Search Type	Number	Total	White	Black	Ratio Black:White
Total Stops	146,492	-	41.03	55.36	-
Total Searches	12,174	8.31	5.03	11.07	2.20
Consent	6,953	4.75	2.87	6.34	2.21
Search Warrant	8	-	-	-	-
Probable Cause	2,135	1.46	0.53	2.23	4.21
Incident to Arrest	2,607	1.78	1.49	2.03	1.36
Protective Frisk	471	0.32	0.15	0.46	3.07

Party C: Women

Search Type	Number	Total	White	Black	Ratio Black:White
Total Stops	83,058	-	36.59	60.76	-
Total Searches	1,893	2.28	1.54	2.79	1.81
Consent	1,075	1.29	0.98	1.52	1.55
Search Warrant	2	-	-	-	-
Probable Cause	341	0.41	0.22	0.54	2.45
Incident to Arrest	435	0.52	0.31	0.66	2.13
Protective Frisk	40	0.05	0.03	0.06	2.00

Figure 4 in the text shows trends over time in the difference in rate of search for Blacks

and Whites. Figure A-1 shows that the overall increase observed there is almost entirely due to

changes in the treatment of males. For female drivers, there is little movement over time, with

the difference in likelihood that a Black driver be searched consistently rating about 50 to 100

percent greater than that of White female drivers. Among men, the difference reaches 200

percent in recent years.

Figure A-1. Percent Difference in the Likelihood of Blacks Being Searched as Compared to
Whites by Gender, 2002 – 2013

The figure shows the percentage difference in the likelihood of Blacks being searched
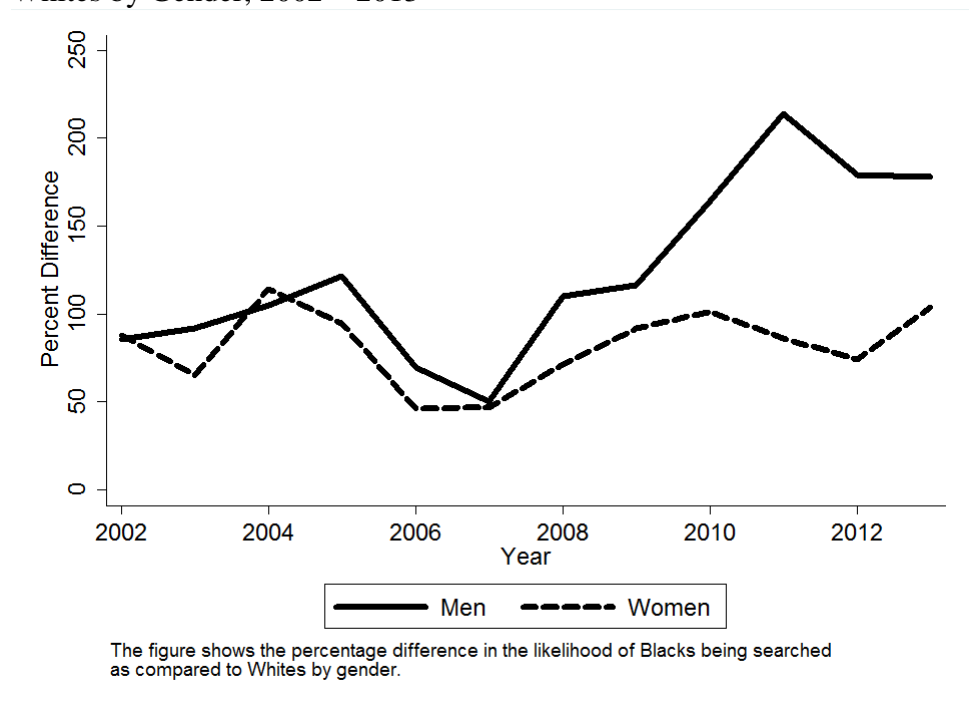as compared to Whites by gender.

Figure 4 focused on a simple percentage difference. Tables 6 and 7 in the text, and

Figure 9 showed a more complicated odds-ratio. Figures A-2 and A-3 show that these alterative

presentations of the data are highly similar. The multivariate odds-ratios correlate very strongly

with the simpler univariate differences shown above and in Figure 4.

Figure A-2. Correlation Between Percent Difference in Likelihood of Black Men being Searched as Compared to Whites and Odds-Ratios from Logistic Regression (Table 6)
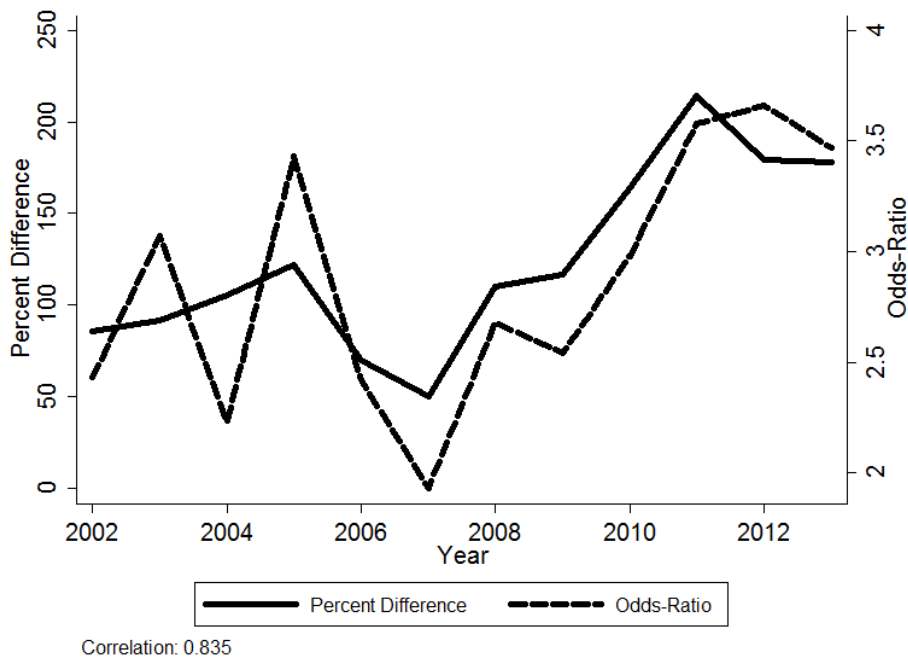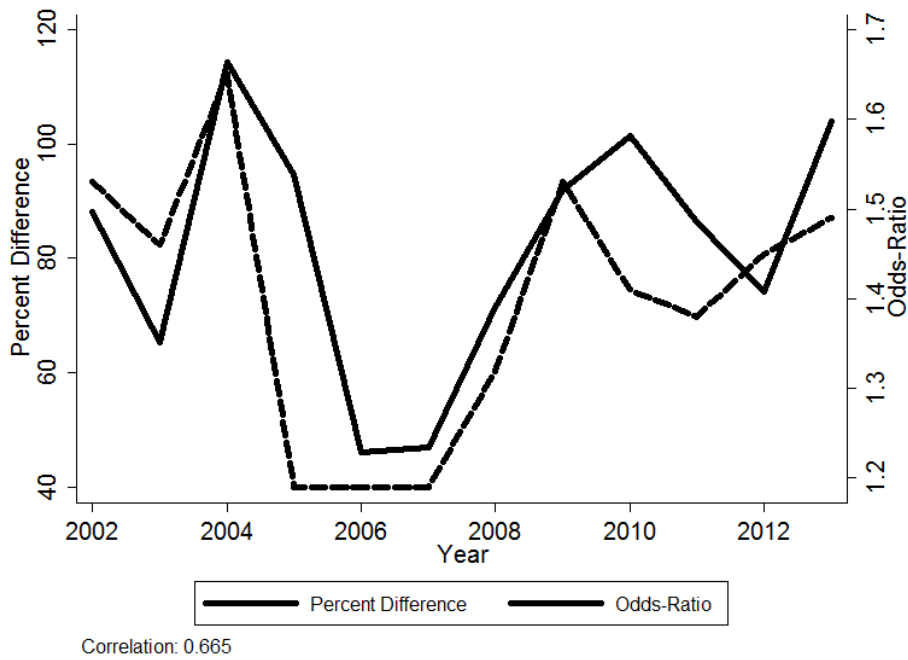

Correlation: 0.835

Figure A-3. Correlation Between Percent Difference in Likelihood of Black Women being Searched as Compared to Whites and Odds-Ratios from Logistic Regression (Table 7)

Correlation: 0.665

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