

Race, Place, and Context: The Persistence of Race Effects in Traffic Stop Outcomes in the Face of Situational, Demographic, and Political Controls

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Abstract: Evidence that racial minorities are targeted for searches during police traffic stops is widespread, but observed differences in outcomes following a traffic stop between white drivers and people of color could potentially be due to factors correlated with driver race. Using a unique dataset recording over 5 million traffic stops from 90 municipal police departments, we control for and evaluate alternative explanations for why a driver may be searched. These include: (1) the context of the stop itself, (2) the characteristics of the police department including the race of the police chief, and (3) demographic and racial composition of

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41 the municipality within which the stop occurs. We find that the driver's race
42 remains a robust predictor: black male drivers are consistently subjected to
43 more intensive police scrutiny than white drivers. Additionally, we find that all
44 drivers are less likely to be subject to highly discretionary searches if the police
45 chief is black. Together, these findings indicate that race matters in multiple
46 and varied ways for policing outcomes.

47 **Keywords:** policing, race and public policy, traffic stops.

48
49 The United States is going through a period of renewed and continued
50 attention to questions of racial justice. The concern that police officers
51 direct undue scrutiny to minority groups has prompted state and local gov-
52 ernments and media organizations to seek out and engage with data on
53 police–citizen encounters, particularly traffic stops, in order to verify or
54 discount claims of racially disparate policing. Using such data, many
55 studies have shown that there is a consistent pattern across agencies and
56 across the nation: the driver's race strongly affects the outcome
57 (Baumgartner, Epp, and Shoub 2018; Baumgartner et al. 2017; Epp,
58 Maynard-Moody, and Haider-Markel 2014; Gelman, Fagan, and Kiss
59 2007; Peffley and Hurwitz 2010; Pierson et al. 2020). Nevertheless,
60 some argue these disparities are not due to the race of the driver, but
61 instead to other factors that merely correlate with race (Engel, Calnon,
62 and Bernard 2002; Roh and Robinson 2009). In this paper, we seek to
63 evaluate whether an officer's decision to search a vehicle can be explained
64 by the race of the driver, even after contextual factors are taken into
65 account. Research highlighted elsewhere in this volume, including Ash,
66 Fagan, and Harris (*in press*); Rocha et al. (*in press*); and Weaver,
67 Prowse, and Piston (*in press*), contextualize our analysis and give further
68 reason to be concerned about these characteristics of policing: they may
69 be driven by a racialized practice of financial extraction, and they may
70 have numerous downstream consequences for political behavior of the dif-
71 ferent groups involved.

72 We look at three types of explanations for searches following a traffic
73 stop. These are: (1) the context of the stop itself (e.g., the “stop
74 purpose” and time of day); (2) the characteristics of the police department
75 whose officer conducted the stop (e.g., race of the police chief and rele-
76 vant policies); and (3) the characteristics of the municipality within
77 which the stop occurred (e.g., the proportion of the population living in
78 poverty and crime rate). If poverty, unemployment, or other factors fully
79 determine the racial disparities we observe, we would conclude that sys-
80 temic factors drive the outcomes. If the race of the driver remains

81 significant even after these controls, then both systemic and individual
82 factors must both be seen as important contributors to the wide racial dis-
83 parities that we and others have documented (see, e.g., Baumgartner et al.
84 2017).

85 Our study is based on almost 6 million traffic stops across 90 police
86 departments in IL and NC. These two states mandate comprehensive
87 data collection for all police agencies, which we supplemented with
88 further contextual data relating to the city and the police department, as
89 described below. Several key takeaways emerge from our analysis. First, the-
90 theoretically meaningful contextual factors do have explanatory power; much
91 of the observed disparity is indeed related to poverty, crime rates, and other
92 contextual factors. However, these connections are not always consistent
93 across states or alternative model specifications. Second, leadership
94 matters: with a black police chief at the helm, consent searches are less
95 likely, for drivers of all races. This finding suggests black leadership
96 leads to a decline in these high discretion searches, which often
97 produce racial disparities.

98 Finally, and most crucially, even when these factors are taken into
99 account, the race of the driver remains a significant predictor of a
100 search across both states and across different search types. Black male
101 drivers are two to three times more likely to experience a search than
102 white males, even when controlling for other predictors of search.
103 Latino male drivers are also much more likely to be searched. Thus,
104 racial disparities in traffic stop searches cannot be “explained away.” We
105 also note much lower racial disparities among female drivers, and some-
106 times lower search rates among minority males who are neither black
107 nor Latino. These results buttress widespread complaints about differential
108 policing by race, and document the powerful place of race in explaining
109 social outcomes in the United States, even after controlling for various
110 factors associated with geographic variability. They also clarify the high
111 degree of targeting only of certain minorities: black and Latino men.
112
113

114 The Puzzle

115

116 Widespread racial disparities in the outcomes of citizen encounters with
117 the police are not the question here; rather, we question the cause.
118 Many have suggested that it is unfair to blame the police for 400 years
119 of American history. Following from slavery, educational disadvantage,
120 employment discrimination, housing segregation, and poverty and

121 health disparities, there is no question that black and white Americans
122 have different experiences, and different behaviors and attitudes follow
123 from these (see Banks 2003; Banks, Eberhardt, and Ross 2006;
124 Blackmon 2008; Gilliam and Iyengar 2000; Gilliam, Valentino, and
125 Beckmann 2002; Glaser 2015; Goff and Kahn 2012; Harris 2002a;
126 2002b; O’Connel 2012; Lerman and Weaver 2014a; Oshinsky 1996).
127 This perspective emphasizes that the police respond to behaviors, and
128 those behaviors may well be driven by factors *associated with* race, given
129 our nation’s history. Put another way, perhaps the police exhibit no
130 racial bias, but their actions show racial difference because history has gen-
131 erated the conditions for different levels of criminal behavior by race or for
132 the use of differential police tactics in areas where more black drivers coin-
133 cidentally live or drive through. If this perspective is correct, then statistical
134 controls for factors beyond race should make any apparent racial difference
135 disappear.

136 Two other perspectives suggest perhaps the situation is otherwise. One,
137 following from history and common media portrayals, many Americans,
138 police included, associate minorities, particularly young men of color,
139 with crime (see Eberhardt 2019; Gilliam and Iyengar 2000; Gilliam,
140 Valentino, and Beckmann 2002). Another is that institutional practice,
141 cultural norms, and professional socialization within the world of policing
142 generate disparate patterns of interaction with citizens of different racial
143 backgrounds (see, e.g., Glaser 2015; Goffman 2014). Fagan and Geller
144 (2015) in particular have recently argued that police often make use of
145 a racialized “script” in structuring their encounters with citizens.
146 Looking at highly routinized “stop and frisk” pedestrian stops, they
147 argue that the police use highly racialized and widely shared “memes of
148 suspicion,” narratives that explain the justification for the momentary
149 detention and investigation of an individual. In particular, they rely on
150 the concept of identifying, by sight, a person who fits the profile of a
151 “criminal suspect” based on such factors as location, dress, age, gender,
152 and attitude. Not only are these factors highly subjective, the authors
153 note, but the same characteristics presented by a white individual may
154 not be deemed suspicious but might be for a black person. If policing
155 is driven by these “memes of suspicion,” then controlling for contextual
156 factors will not make the race effect disappear.

157 Finally, our study focuses on whether or not a search follows a traffic
158 stop. Epp, Maynard-Moody, and Haider-Markel (2014) have clearly
159 shown powerful racial differences in the likelihood that black and white
160 drivers will be subjected to a “pretextual” traffic stop. Given that the

161 average driving speed is often over the speed limit and anyone not speed-
162 ing could be viewed as “obstructing traffic” at the discretion of the officer,
163 drivers are in a uniquely vulnerable position with regards to police inves-
164 tigations. The many elements of the vehicle and traffic codes provide
165 ample opportunity for a police officer to investigate virtually any driver.
166 Their study leaves little doubt that black and white Americans have
167 vastly different experiences with traffic stops, nor that black drivers know
168 when their traffic stop was warranted by a legitimate traffic safety
169 concern and when it was a pretext for an unwelcome investigation (see
170 Epp, Maynard-Moody, and Haider-Markel 2014; Meares, Tyler, and
171 Gardener 2016). Our focus here is slightly different: We analyze the
172 odds of search following a stop, and we use the racial disparities revealed
173 in these rates as our key indicator of racial difference in policing.
174

175 **Racial Disparities in Policing**

177 We briefly review the relevant literature on traffic stops, focusing on three
178 levels that may influence decision-making: the characteristics of (1) the
179 driver and stop itself, (2) the police agency, and (3) the municipality.
180 This perspective on race, place, and context allows us to see if race still
181 matters, after these other elements are accounted for. Finally, we discuss
182 how these possible explanations apply to the specific case of searches fol-
183 lowing a traffic stop.
184

185 **The Traffic Stop**

187 During the 1980s and 1990s, police departments came to rely on a high-
188 contact policing strategy that sought to maximize encounters between
189 police officers and citizens. The idea was to deploy these tactics to send
190 a message to criminals that the local police force was active and,
191 through frequent searches of motorists and pedestrians, to locate as
192 much contraband as possible (Tyler, Jackson, and Mentovich 2015;
193 Wilson and Kelling 1982). Consequently, officers were called upon to
194 be as active as possible during their patrol, deciding rapidly, perhaps
195 from only a momentary glimpse of a motorist, if a car should be
196 stopped and its occupants investigated (Epp, Maynard-Moody, and
197 Haider-Markel 2014; Remsberg 1995).
198

199 This type of low-information decision-making can amplify existing
200 biases, both explicit and implicit. In such ambiguous and uncertain

201 situations, officers may rely on widespread stereotypes about who fits a
202 criminal profile, as stereotypes are often used as heuristics when full infor-
203 mation is not available (Fiske 1993). Even if these stereotypes are not held
204 by the individual officer, they are often codified into the agency’s practice
205 as police are trained to operate on notions of “suspicion,” which are often
206 race- and neighborhood-dependent (Epp, Maynard-Moody, and
207 Haider-Markel 2014; Fagan and Geller 2015). Thus, even officers who
208 are racial minorities are not necessarily immune to such biases. Such
209 “high-contact” strategies also often involved sending officers to “high
210 crime areas” where they might encounter more drivers of color, a systemic,
211 not implicit, source of potential disparities in outcomes.

212 The “typical” criminal profile in the United States is of a dark-skinned
213 minority male (Gillian and Iyengar 2000; Welch 2007). Scholarship has
214 shown that individuals fitting this profile tend to appear more dangerous to
215 law enforcement than their white or female counterparts, and there is evi-
216 dence that officers interact more aggressively with members of these
217 groups (Correll and Keesee 2009; Correll *et al.* 2002; 2007; Glaser
218 2015; Voigt *et al.* 2017). Thus, we have strong theoretical reasons based
219 on widely shared physiological processes to anticipate an intersection of
220 race *and* gender effects in policing. Note that our focus on traffic stops iso-
221 lates police targeting of possible criminal behaviors (drug trafficking and
222 violent crime) where males are more likely to appear suspicious than
223 females. Thus, we expect the racial disparities to be more strongly
224 evident among males than among females. This leads to our first hypoth-
225 esis: (H1) *Black and Latino male drivers are more likely to be searched than*
226 *their white or female counterparts.*

227 Beyond the race and gender of the driver, at the level of the individual
228 stop, a variety of contextual elements may make an officer more or less
229 likely to carry out a search (Baumgartner, Epp, and Shoub 2018).
230 Chief among these external factors is the reason the stop was made in
231 the first place. A driver who appears to be intoxicated will likely experience
232 a more intrusive police response than a driver who forgot to fasten their
233 seat belt or whose car was going too fast while descending a hill.
234 Including the purpose of the stop in our analyses will capture this
235 effect. Further, the time of day that the stop occurred may affect how sus-
236 picious an officer perceives the driver (Fagan and Geller 2015). Drivers
237 who are on the road on the weekend or late at night may immediately
238 stoke more suspicion in the officer, divorced from their race or gender.
239 Searches during the morning rush hour are correspondingly low.

The Police Agency

Different police departments may have different informal norms or standard protocols, and these may affect search rates. Of course, a central figure is the chief of police. Some have argued that officer “predispositions” are resistant to change regardless of leadership directives (Brehm and Gates 1999) or that substantial principal-agent problems limit attempts to constrain officers’ behavior (see Miller 2005 for an overview). On the other hand, police chiefs do have substantial influence over the way their department operates through policy directives and informing (informal) norms—with regard to hiring, firing, policing styles, and tactics (Cohen Marks and Stout 2011; Rainguet and Dodge 2001). So, it seems plausible that characteristics of the chief would influence how officers under their leadership operate—either through explicit, official policies or through an implicit construction of departmental norms.

While police chiefs are not elected political representatives, they are typically appointed by the city council, mayor, and/or the city manager (depending on the form of local government). Given the highly public nature of the position, police chiefs can be considered key players in local politics (Cohen Marks and Stout 2011). As such, it may be that, similar to political offices, the descriptive characteristics of the police chief matter in affecting outcomes. For example, we know from previous scholarship that having elected officials that share the racial identity of their constituents (descriptive representation) can lead to better policy outcomes for minority groups (Clark 2019; Sances and You 2017; Sharp 2014), though this relationship may depend on the coalition that is formed and the electoral position (mayor or city council) that is examined (Browning, Rogers Marshall, and Tabb 1984; Saltzstein 1989; Sonenschein 1993). Black politicians are more likely to listen and respond to black constituents (Broockman 2013), encourage black voter turnout (Whitby 2007), and bring attention to the concerns of black constituents (Canon 1999; Grose 2011). In the case of policing, it may be that black police chiefs are less inclined to pursue high-contact policing strategies, since these are understood to have disproportionate effects on black and Latino community members. Following this logic, we introduce our second hypothesis: *H2: Police agencies with black chiefs will have lower rates of search following traffic stops than agencies with white chiefs.*

Note that we expect a black chief to affect search rates overall, not only search rates of black or Latino drivers. This is because chiefs can set the tone and affect institutional procedures for their departments more

281 easily than they can direct their officers to target one racial group over
282 another. In other work where the race of individual officers was available,
283 Baumgartner *et al.* (2020) found that officers who are racial minorities had
284 lower rates of search overall, but similar likelihoods of targeting black and
285 Latino drivers. Officers (and chiefs) of all racial backgrounds may harbor
286 the same vision of the “criminal profile” but leaders may direct a depart-
287 ment to be more or less assertive in using the traffic code to conduct crim-
288 inal investigations. De-emphasizing traffic stops as an investigatory tool is
289 certainly within the chief’s purview, so we expect agencies with black
290 chiefs to have a lower rate of search for drivers of all types.

291 In addition to the race of the police chief, previous studies have found
292 that specific departmental policies matter. Mummolo (2018) finds that
293 police officers are responsive to directives. A sudden policy change requir-
294 ing officers to provide in-depth justifications for any stops of criminal sus-
295 pects led to an increase in the rate at which these stops produced
296 evidence. In his interviews with officers, it became clear that they
297 viewed this policy change as likely to lead to increased scrutiny, and mod-
298 ified their behavior accordingly. Others (Baumgartner, Epp, and Shoub
299 2018; Epp and Erhardt 2020) similarly find evidence that a shift requiring
300 written rather than verbal consent when asking to conduct a consent
301 search following a traffic stop in a number of cities in NC led to a dramatic
302 decrease in the number of consent searches conducted. Given these find-
303 ings, and that one of the states studied is NC, we include an indicator for
304 whether or not the jurisdiction in a given year required written consent
305 forms to conduct a search.

306 307 308 **The Composition of the Municipality**

309
310 The place where a stop takes place is an important determinant of police
311 behavior (Fagan and Geller 2015; Smith 1986). Social disorganization
312 theory highlights how certain conditions, such as a transient population
313 with fragile social networks, poverty, and low education rates, combine to
314 create the right conditions for crime (Sampson and Grove 1989; Kurbin
315 and Witzer 2003). Disadvantaged neighborhoods may have a harder
316 time procuring prompt municipal services, including police protections
317 (Sampson and Bartusch 1998). But over-policing can also be a problem.
318 The logic behind the “broken windows” approach is to concentrate officers
319 in neighborhoods with higher rates of violent crime. This place-based
320 policing strategy renders some residents more “suspicious” simply by

321 virtue of their address (Alexander 2010; Burch 2013; Lerman and Weaver
322 2014a; Sampson and Loeffler 2010; 2014b). In the United States, the
323 prevalence of each circumstance is, on average, correlated with race.

324 Another possibility is that law enforcement will target minority commu-
325 nities explicitly out of a perceived racial threat. White residents of a muni-
326 cipality may view minorities as a threatening, either physically or
327 economically. To mitigate the perceived threat, minority neighborhoods
328 may be subject to heightened social controls in the form of police scrutiny
329 (Blalock 1967; Dollar 2014; Stults and Baumer 2007). As minority pop-
330 ulations grow, so too does the punitiveness of the local police force
331 (King and Wheelock 2007). Others have noted the conditional import-
332 ance of place, depending on the pedestrian or motorist in question. A
333 black motorist in a predominately white neighborhood may appear to
334 be a “fish out of water” (or vice versa) and attract police attention
335 (Novak and Chamlin 2008).

336 In order to account for some of the location-based explanations of
337 police scrutiny, we control for as many municipal characteristics as pos-
338 sible, including explicitly racial factors (such as the racial composition
339 of the community) as well as factors that merely correlate with race
340 (such as poverty). Demographically, we control for the proportion of the
341 population that is a non-White and the proportion that is foreign-born.
342 To approximate the level of transience of a population, we include a
343 measure for the percent of municipal residents who recently moved into
344 a new home. Accounting for poverty-based rather than race-based expla-
345 nations, we include measures for the percent of the population that lives
346 below the poverty line and for the level of educational attainment.
347 Finally, we include the crime rate. If police are merely searching black
348 drivers because they tend to live in places that are more prone to crime,
349 we should capture that effect by controlling for the crime rate. Our goal
350 is to incorporate controls for contextual factors potentially associated
351 with police decision-making but unrelated to the race and gender of the
352 driver of any particular car.

355 Elements of a Traffic Stop

357 Each of the explanations and hypotheses discussed in the previous section
358 could apply to many different types of policing. Here we focus on just one:
359 traffic stops. Traffic stops are the most common way individuals directly
360 engage with the police, which makes understanding their dynamics very

361 important. They are used to both enhance traffic safety and pursue criminal
362 investigations. Moreover, traffic stops provide officers with many points
363 at which they must make decisions. The first of these is whether or not to
364 stop a particular vehicle. Unfortunately, studying this specific decision is
365 prohibitively difficult: for the type of study conducted here, researchers
366 would need information on the individual drivers that pass through the
367 same area or reliable estimates of the *driving* (i.e., not simply the residential)
368 population. It would also be preferable to have information about
369 how motorists are actually driving, as this might justify the traffic stop.
370 Because of the difficulties in establishing these “baselines,” we follow
371 the lead of others and focus on the outcome of the stop, given that it
372 occurred.

373 Having made a stop, an officer makes several related decisions based on
374 the behavior of the driver, information gleaned from a search of the
375 driver’s license and tag information, and other considerations. The
376 officer may take no action at all, issue a warning, give a citation (ticket),
377 or arrest the driver. In addition to these actions, the officer may search
378 the driver or the vehicle; that is our focus here. Searches may be mandated
379 by law (e.g., if the stop followed from a warrant for the driver to be arrested
380 in which case a search is standard procedure), or they may be discretionary.
381 Discretionary searches may be based on “probable cause” or
382 “consent.” Probable cause searches follow the officer’s observation of
383 contraband or suspicious activity; consent searches follow an officer’s
384 request for a driver’s permission to conduct a search. We focus on discretionary
385 searches here, as these reflect clear cases where the officer evaluates
386 the suspicious nature of the driver. Fagan and Geller (2015) note that the
387 typical NY police officer deciding to stop and frisk an individual observes
388 that person for just a minute or two, on average. Thus, the decision that
389 the individual merits investigation is quick, similar to an officer’s decision
390 to conduct a search following a traffic stop. With such little information
391 available, officers may rely on “scripts,” “memes,” or stereotypes to guide
392 their behaviors. Note that such heuristics may be based on widely
393 shared institutional or cultural norms, not necessarily the result of a specific
394 racial attitude held by an individual.

397 Data and Measures

399 We test the hypotheses presented above using micro-level data on traffic
400 stops made by municipal police departments from two states: IL (2008–

2011) and NC (2002–2016). We focus on stops made by municipal police departments because this allows us to incorporate covariates concerning the context of the stop, limit the focus to agencies with clear jurisdictional bounds, and ensure a common manner by which the police chief is put in place (i.e., by appointment). By focusing on municipal police departments, we exclude stops made by state troopers who operate throughout the state and county sheriffs who are typically elected and operate in unincorporated areas of counties (i.e., non-municipal areas). Our study is limited to IL and NC because they are the only two states that make reliable micro-level data publicly available spanning numerous municipal police departments within the state.¹

In each state, the mandate to collect and make public traffic stop data originates in laws that were first passed during the initial conversation surrounding “driving while black” in the late 1990s and early 2000s. IL passed and signed into law Public Act 93-0209, which mandated the initial statewide study of traffic stops in the state. It was then extended through July 1, 2019 with Public Act 98-0686 (Baumgartner et al. 2017). In response to concerns of racially biased policing raised within the legislature and by the public, NC initially passed Senate Bill 76 into law in 1999, which mandated the State Highway Patrol to collect traffic stop statistics. This was then expanded to include most county Sheriff’s offices and municipal police departments beginning in 2002. For more information on NC, see Baumgartner, Epp, and Shoub (2018). In neither case does it appear that the existence of publicly available micro-level traffic stop data materially affects how officers or departments in IL and NC approach or carry out traffic stops as compared to those in other states. First, there is not a regular, well-publicized analysis of the data in either state. Second, as compared to states and municipalities that make only aggregate data available, agencies in IL and NC search motorists at similar rates and show similar levels of racial disparities in outcomes (Baumgartner et al. 2017). As a result, the existence of the datasets and collection efforts does not appear to affect police conduct during traffic stops.

Due to the limited availability of the data, we are necessarily using a non-random sample of traffic stops from the United States, which may influence the results. IL and NC are not representative of the broader country: they are two of the most populous states in the nation and one contains one of the largest cities in the nation. On the other hand, neither state is in the top nor bottom 10 states with respect to GDP per capita, the share of population that is non-White, or crime rates.

441 Additionally, they provide regional variation, one being from the Midwest
442 and one the South. Furthermore, we are interested in a process that takes
443 place at the sub-state level. Due to this, these two states make for excellent
444 case studies. Each provides a variety of contexts (i.e., urban and rural, large
445 and small municipalities) and variation in the demographic composition
446 of the citizens in different cities. Finally, we have not a sample, but a
447 census of every traffic stop in these two states for the period studied.
448 Thus, while not strictly representative of the United States, our focus on
449 IL and NC provides us with a robust opportunity to evaluate our
450 hypotheses.

453 **The Dependent Variable: Whether a Driver is Subjected to a** 454 **Discretionary Search**

456 We focus on searches rather than other traffic stop outcomes because
457 searches are directly tied to the concept of suspicion, and officers make
458 decisions about who to search with a great deal of discretion (Epp,
459 Maynard-Moody, and Haider-Markel 2014; Glaser, Spencer, and
460 Charbonneau 2014). Note that we exclude mandatory searches. An
461 example of a mandatory search would be one that follows the issuance
462 of a warrant or following the decision to arrest an individual;
463 incident-to-arrest searches are standard practice for officer safety, not discre-
464 tionary. In NC, we exclude warrant, protective frisk, and incident-to-arrest
465 searches. In IL, we exclude searches in the context of a custodial arrest,
466 drug-dog alert searches, and incident-to-arrest searches.

467 This leaves two general types of searches: consent and probable cause.
468 Probable cause searches are those that occur when the officer has reason-
469 able suspicion that something illegal is in the car or on the driver. In these
470 cases, officers need to justify why the search is taking place, such as
471 alcohol being visible, but have the legal right to conduct a search. In
472 the absence of probable cause, but where officers seek nonetheless to
473 conduct a search, they may ask for “consent.” Citizens may refuse to
474 give consent, but given the power dynamic in these situations, most
475 comply with the request. Both types of search are highly discretionary
476 for the officer.

477 We model consent and probable cause searches separately in the anal-
478 ysis that follows. IL did not record search type before 2008, which explains
479 why IL data are restricted to the period after 2008, and the last available
480 year of data is 2011, which is the end of the time series. NC mandated

Table 1. Traffic stops, searches, and search rates, by state

State	Years	Agencies	Stops	Discretionary searches	Discretionary search rate (%)
IL	2008–11	41	1,355,975	25,770	1.90
NC	2002–16	49	4,511,384	145,781	3.23
Total		90	5,867,359	171,551	2.93

that search-type information to be included for the entire period of data collection from 2002 through 2016. Note that data are restricted to drivers, because information on passengers is inconsistently recorded. We exclude checkpoint stops in NC for the same reason: drivers passing through a checkpoint with no action are not recorded. [Table 1](#) summarizes the data we use and demonstrates there is variation between the states: NC has a higher search rate than IL.

Primary Driver-Level Independent Variables: Race and Gender

Our first hypothesis centers on how the driver’s race and gender relate to relative degrees of suspicion, which in turn make it more or less likely that a driver is searched. Many studies have shown that how officers, and average citizens, interact with individuals is a result of stereotypes associated with the intersection of characteristics—especially as it connects to black men (Baumgartner, Epp, and Shoub 2018; Baumgartner, Bayard, Epp, and Shoub 2017; Christiani 2020; Fagan et al. 2010). Specifically, we hypothesize that black and Latino males are most likely to experience searches. To operationalize this, we generate a series of dichotomous variables based on the intersection of the driver’s race and gender.

For both states, gender–race is a categorical variable identifying the following groups: non-Latina white female, non-Latina black male, non-Latina black female, Latino male, Latina female, non-Latina other race male, and non-Latina other race female. The “other race” categories include those of Native American or Asian descent or from other racial groups. The excluded group is white male, which is the modal category for both states. A summary of the number of stops, searches, and search rates for each group by state is shown in [Table 2](#).

[Figure 1](#) presents a visualization of the data in [Table 2](#). The figure clearly shows significant variation across race–gender groups in each state.

Table 2. Number of stops and searches, by state, race-gender and search type

	Stops	Consent		Probable cause		
		Count	Rate	Count	Rate	
IL						
White male	443,851	2,527	0.57%	3,105	0.70%	
White female	277,472	595	0.21%	854	0.31%	
Black male	220,146	6,658	3.02%	4,267	1.94%	
Black female	125,801	854	0.68%	752	0.60%	
Latino male	158,743	2,880	1.81%	2,421	1.53%	
Latino female	59,397	262	0.44%	335	0.56%	
Other race male	47,502	124	0.26%	104	0.22%	
Other race female	23,063	12	0.05%	20	0.09%	
Total	1,355,975	13,912	1.03%	11,858	0.87%	
NC						
White male	1,316,219	23,843	1.81%	10,475	0.80%	
White female	906,073	7,379	0.81%	3,252	0.36%	
Black male	1,136,656	45,263	3.98%	31,216	2.75%	
Black female	785,689	6,606	0.84%	5,572	0.71%	
Latino male	276,613	6,645	2.40%	2,808	1.02%	
Latino female	98,186	440	0.45%	265	0.27%	
Other race male	88,570	1,149	1.30%	581	0.66%	
Other race female	49,163	181	0.37%	106	0.22%	
Total	4,657,169	91,506	1.96%	54,275	1.17%	

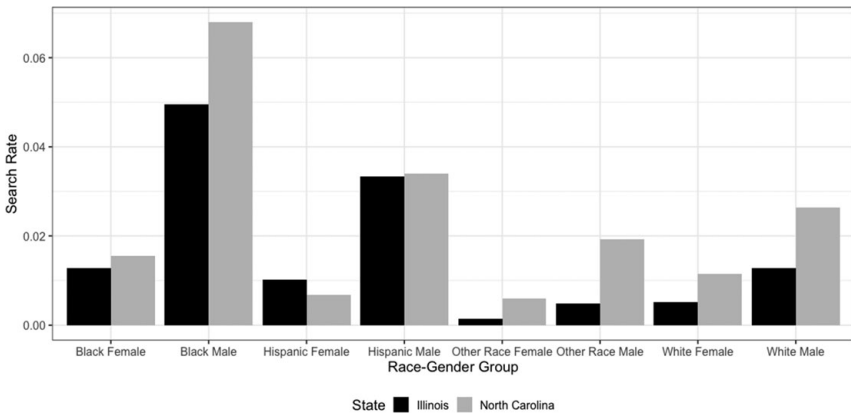


Fig. 1 - B/W online

FIGURE 1. Search rates, by race-gender group and state

561 Across the board, men are searched at higher rates than their female
562 counterparts. Additionally, black and Latino men in both states are
563 searched at higher rates than their white male counterparts. Further,
564 this figure highlights that while searches are relatively rare events, the
565 rates at which different groups are searched are highly variable. Female
566 drivers often see rates of search below 1%, but black males see rates
567 above 4 or 6%.

569 **Primary Agency-Level Independent Variable: Race of the Police Chief**

571 As discussed above, we expect that black police chiefs will instruct their
572 officers to engage in fewer discretionary searches. We include dichotomous
573 indicators for police chief race: white, black, and Latino/a, with
574 white as the excluded category in the regressions below. In IL, four depart-
575 ments had a black police chief for at least one year during the period of
576 study and in NC 12 departments did.

577 To visualize how drivers' search rates vary by the race of the police chief,
578 we calculate search rates for those agencies that had a white and a black
579 chief during the time period examined. We exclude agencies that insti-
580 tuted major changes to their consent search procedures. This ensures
581 that we are only comparing chiefs operating in similar situations, which
582 produce more meaningful comparisons. [Figure 2](#) shows these compar-
583 isons by police chief race, separately for each state.

584 [Figure 2](#) demonstrates that the relationship between chief race and
585 search rates are mixed in the bivariate case. For consent searches, black
586 chiefs are associated with lower rates of search in both states. With
587 regards to probable cause searches, however, black chiefs are associated
588 with lower rates in IL, but higher ones in NC. We will return to this com-
589 parison in a multivariate treatment below.

592 **Control Variables**

593
594 In addition to the two primary independent variables of interest, we
595 include a number of controls both at the level of the stop and at the
596 level of the agency and municipality. First, associated with the traffic
597 stop, we include: driver age, day of the week, hour of the day (available
598 only in NC), vehicle age (available only in IL),² and "stop purpose." In
599 each state, speeding stops are the modal stop purpose; for a complete list
600 of stop types for each state, see the online Appendix.

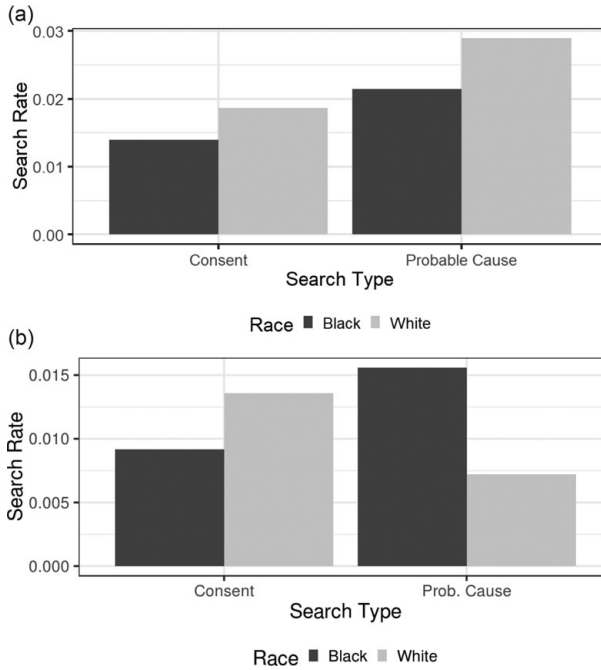


Fig. 2 - B/W online

FIGURE 2. Search rates, by race of police chief and search type. (a) IL. (b) NC. *Note:* Only agencies with both a white and black chief and who did not change consent search policy are included. For IL, these are Aurora, Springfield, and Waukegan. For NC, these are Asheville, Greenville, Huntersville, Raleigh, Shelby, and Winston-Salem

In NC, we also include a variable for whether a high disparity officer conducted the traffic stop. We define a high disparity officer as one who searches either black or Latino drivers at twice or more the rate that he or she searches white drivers, while also searching at or above the average rate for their department. This variable is not included in the IL regression, because there are no officer identifiers. The high disparity officer measure allows us to understand existing policing patterns beyond those attributable to “bad apple” officers. Previous research has shown the importance of this, as approximately one-third are identified as high-disparity officers (Baumgartner, Epp, and Shoub 2018; Baumgartner, Christiani, Epp, Roach, and Shoub 2017; Epp, Maynard-Moody, and Haider-Markel 2014).

These variables represent the most complete picture of the context of the specific stop that we can estimate, given the data collected in each state; we exclude no element of the traffic stop that the state-sponsored

641 databases include. However, it is not and could never be fully comprehen-
642 sive. We do not know, for example, whether there were passengers in the
643 car, who those passengers were, the precise location (e.g., street address) of
644 the stop, the demeanor of the driver and passengers, or the race, gender, or
645 years of experience of the officer. Nevertheless, these variables represent
646 the fullest picture of what occurred based on the available data.

647 We supplement the stop-based data collection by adding a variety of
648 contextual factors relating to the agency and the municipality. In NC,
649 we control for whether the police department mandates a written form
650 for consent searches. This policy has typically been introduced as a
651 result of pressure from the public, local interest groups, and/or the local
652 city council aimed at limiting officer discretion and altering practices per-
653 ceived as arbitrary (Baumgartner, Epp, and Shoub 2018). As it dramatic-
654 ally reduces consent searches, one of our dependent variables, it is an
655 important control factor. (We are not aware of any agencies in IL mandat-
656 ing written consent forms.)

657 Lastly, we control for four aspects of community composition that may
658 be linked to police behavior: socio-economic composition, racial and
659 ethnic diversity, prevalence of crime, and degree of urbanization (Fagan
660 and Davies 2000; MacDonald, Fagan, and Geller 2016; Smith 1986).
661 Each variable is constructed from a combination of the Census,
662 American Community Survey (ACS), and the FBI's Universal Crime
663 Reports.

664 To control for socio-economic factors, we include the percentage of the
665 population that is living below the poverty line; is newly renting or owning
666 a home in the area (housing turnover); and has less than a high school
667 degree. To control for the racial and ethnic demographics of the neighbor-
668 hood, we include the percentage of the population that is black, foreign
669 born. To control for crime levels, we include the overall crime rates
670 from the FBI's universal crime reports. While there is no universally
671 acknowledged definition and measure of degree of urbanization, a
672 common theme across definitions is that the population size of a munici-
673 pality is correlated with the degree of urbanization. As a result, we include
674 the logged population size as a proxy variable for the degree of urbaniza-
675 tion. To account for remaining variation between agencies/cities, we
676 include agency fixed effects.³ Finally, we include fixed effects for years,
677 because there are changes that occur over time in each state and nationally
678 that are otherwise unaccounted for. (See our appendices for extensive
679 robustness tests based on alternative measurements where available.)
680

Analysis

For each state, we estimate a logistic regression predicting whether a given traffic stop will lead to a consent or a probable cause search. Each regression includes our primary independent variables of interest—race–gender of driver and the race of police chief—and the control variables previously described.⁴ Table 3 presents the results of these regressions.

Recall the first hypothesis concerning the race–gender of the driver: *Black and Latino male drivers are more likely to be searched than their white or female counterparts.* Support for this hypothesis would consist of positive and statistically significant coefficients associated with being a black or Latino male across all six models and both states, indicating that black and Latino males are more likely to be searched than white men. We indeed observe this across all models, lending support to the key hypothesis that motivates this research. The comparison between black and Latino men and their female counterparts can also be examined. The coefficients on the variables for black and Latina females are negative and statistically significant across all six models, which indicates support for the second part of this hypothesis.

To evaluate the substantive significance, we can examine the increase or decrease in the odds of being searched (the odds ratio) for each race–gender group compared to a white male driver being stopped. These are presented in Figure 3, with subfigure (a) for IL and subfigure (b) for NC. Equal odds are indicated by the solid horizontal line.

The figure demonstrates that in both IL and NC, black male drivers are more than twice as likely to be searched as white male drivers (in IL, they are almost three times as likely). Conversely, white women are about half as likely to be searched as their male counterparts in both states. Interestingly, the relative odds of Latino men experiencing a search compared to white men differs drastically between the two states. In IL, Latinos are almost twice as likely to experience a search, while in NC, they see approximately equal odds to white men. These results demonstrate that the race and gender of the driver are robust predictors of the likelihood of a search occurring. So, we find both statistical and substantive support for our first hypothesis.

Next, we turn to an evaluation of our second hypothesis, which concerns the race of an agency’s police chief. First, we evaluate the relationship between police chiefs and the probability of a driver being searched in that jurisdiction. A negative and statistically significant coefficient

Table 3. Logistic regression explaining search, by state and search type

	IL		NC	
	Consent	Prob. cause	Consent	Prob. cause
(Intercept)	-47.86*	-41.89*	13.64*	-15.39*
	(5.42)	(6.18)	(0.88)	(1.37)
White female	-0.91*	-0.82*	-0.72*	-0.74*
	(0.05)	(0.04)	(0.01)	(0.02)
Black male	1.07*	1.06*	0.64*	1.05*
	(0.03)	(0.03)	(0.01)	(0.01)
Black female	-0.25*	-0.19*	-0.82*	-0.24*
	(0.04)	(0.04)	(0.01)	(0.02)
Latino male	0.70*	0.45*	0.04*	-0.09*
	(0.03)	(0.03)	(0.02)	(0.02)
Latina female	-0.53*	-0.50*	-1.47*	-1.36*
	(0.07)	(0.06)	(0.05)	(0.06)
Other race male	-0.64*	-0.91*	-0.29*	-0.32*
	(0.09)	(0.10)	(0.03)	(0.05)
Other race female	-2.03*	-1.83*	-1.37*	-1.30*
	(0.29)	(0.23)	(0.08)	(0.10)
Other stop controls	Yes	Yes	Yes	Yes
Black chief	-0.29*	-0.23*	-0.03*	0.21*
	(0.07)	(0.05)	(0.01)	(0.01)
Latino chief	0.07	-0.40*	0.06	0.03
	(0.23)	(0.13)	(0.03)	(0.04)
Written consent	-	-	-1.28*	-0.05*
	-	-	(0.03)	(0.02)
Pct. foreign born	0.10*	0.07*	-0.04*	-0.03*
	(0.05)	(0.03)	(0.0070)	(0.01)
Pct. Black	-0.20*	0.15*	-0.02*	0.01
	(0.04)	(0.03)	(0.00)	(0.01)
Pct. less than HS	0.39*	-0.04	0.08*	0.10*
	(0.05)	(0.04)	(0.01)	(0.01)
Pct. below poverty	0.22*	-0.01	0.05*	-0.08*
	(0.03)	(0.02)	(0.01)	(0.01)
Pct. newly moved	0.03	-0.07*	-0.03*	-0.01
	(0.02)	(0.02)	(0.00)	(0.00)
log(Population)	2.61*	3.52*	-1.98*	0.95*
	(0.50)	(0.57)	(0.09)	(0.14)
Crime rate in 10s	0.05*	0.00	0.03*	0.02*
	(0.01)	(0.01)	(0.00)	(0.01)
Agency + year FE	Yes	Yes	Yes	Yes
Log likelihood	-64,013	-51,174	-345,523	-230,011
Num. obs.	1,344,117	1,342,063	4,184,049	4,153,004

Note: * $p < 0.05$. Coefficients shown in table with standard errors in parentheses underneath.

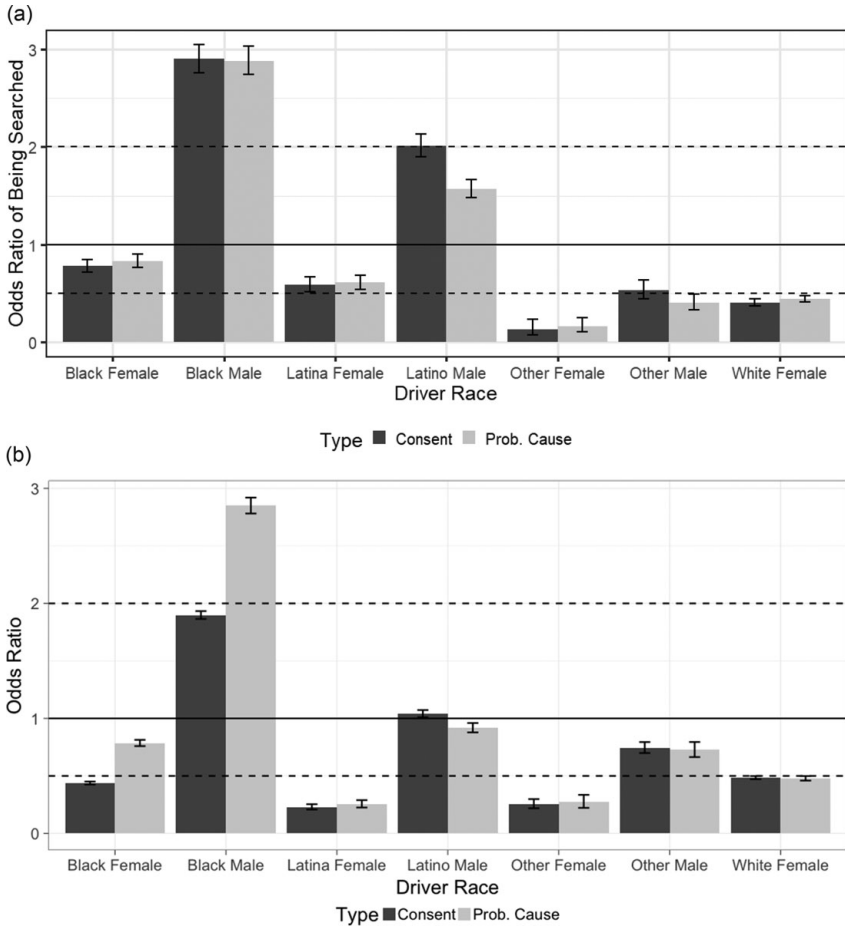


Fig. 3 - B/W online

FIGURE 3. Odds-ratios of being searched, by race-gender of the driver. (a) IL. (b) NC.

Note: Solid horizontal line indicates an equal likelihood of a stopped driver being searched compared to if the chief is white. Dashed horizontal line below the horizontal indicates that a stopped driver is half as likely to be searched compared to if the chief is white. Dashed horizontal line above the horizontal indicates that a stopped driver is twice as likely to be searched compared to if the chief is white. Predictions from Table 3

associated with the presence of a black chief would constitute support for our hypothesis.

Figure 4 plots the relative odds of a driver being searched if stopped where the local agency is headed by a black or Latino police chief relative to a white chief.

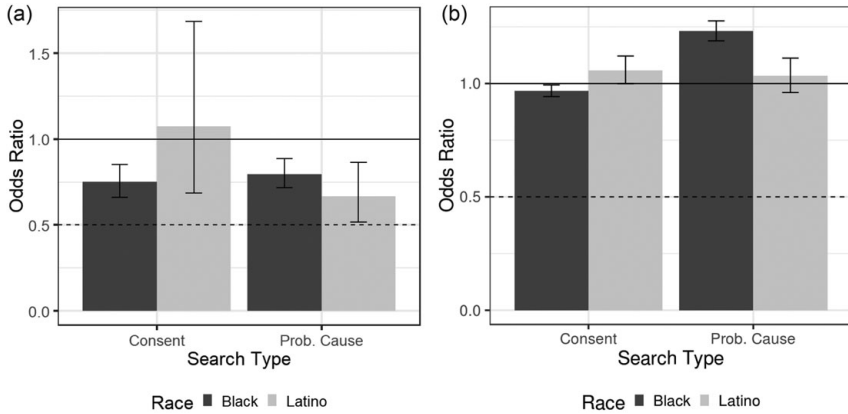


FIGURE 4. Odds-ratios of being searched, by search type and race of the police chief. (a) IL. (b) NC.

Note: Solid horizontal line indicates an equal likelihood of a stopped driver being searched compared to if the chief is white. Dashed horizontal line indicates that a stopped driver is half as likely to be searched compared to if the chief is white. Predictions from Table 3

In IL, stops made by officers belonging to agencies headed by a black and Latino chief are less likely to result in searches, almost regardless of search type (the exception is Latino chiefs in the case of consent searches, which is not statistically significantly different). Under black chiefs, officers are about approximately 25% less likely to search drivers than if they operate in jurisdictions overseen by white chiefs—across all types of searches. Officers under Latino chiefs are approximately 30% less likely to perform probable cause searches than those under white chiefs. In NC, the story is less clear. In jurisdictions headed by black police chiefs, consent searches are less likely to occur, while probable cause searches are more likely. Consent searches take place when there is no compelling legal reason why an officer should conduct a search, which is why they require a motorist's consent. As such, they are the search type where officer discretion is the highest and therefore the most likely to be scaled back by police chiefs interested in promoting a less high-contact style of policing.

Finally, we can evaluate what our models tell us about the relationship between our control variables. First, in NC, if a written consent policy is in place, drivers are less likely to be searched. Second, findings with respect to many of the municipal-level variables reinforce what previous studies have found: first, on average across the regressions, as the percentage

841 of citizens with less than a high school diploma increases, the probability
842 of search increases; second, as the percentage of the population living
843 below poverty increases, the probability of search increases; and third, as
844 the crime rate increases, the probability of search increases. The stop
845 control variables support what previous studies have shown: those
846 driving older cars are more likely to be searched in IL; those stopped by
847 high disparity officers are more likely to be searched in NC; and those
848 who are older are less likely to be searched in either state (shown in the
849 Appendix). Results are mixed or inconsistent regarding the several of the
850 demographic control variables: population size, proportion recently
851 moved, proportion foreign born, and proportion black.

852 As with any statistical test on observational data, a concern is that the par-
853 ticular model specification and measures used may influence the results.
854 To address this, we run three sets of robustness checks. First, we adopt two
855 alternate modeling strategies to test whether this impacts our findings: (1)
856 instead of separately modeling each search type, we jointly model them
857 using multinomial regression (Table D1); and (2) we run regressions on
858 subsets of the data based on stop purpose to test whether stop purposes
859 induce entirely different processes and alter the results (Tables D2 and
860 D3). In the first case, the results remain substantively and statistically the
861 same. In the second, some variation is seen with regards to chief race
862 but not driver race and gender. In NC, chiefs of color seem linked to
863 lower rates of consent searches following safety stops, while in IL, chiefs
864 of color seem linked to lower rates of consent searches (and probable
865 cause searches) following investigatory stops.

866 Then, in the last two robustness checks, we examine whether the results
867 change when alternative measures are used. We test whether our decision
868 to create an indicator variable that jointly captures driver race and gender
869 rather than interacting two indicator variables—(1) race and (2) gender—
870 alters the results. In this case, the statistical results are the same. However,
871 one can more clearly see that drivers of color regardless of gender are, on
872 average, searched at higher rates than white drivers (Table E1). Finally, we
873 tested whether using alternate measures for the municipal context varia-
874 bles alters the results: (1) measuring crime using the component parts
875 of the overall crime rate (Tables E2 and E3), (2) measuring the economic
876 context with percent unemployed rather than percent living below the
877 poverty line (Table E4), and (3) measuring local diversity with (a) a
878 reverse Herfindahl index or (b) the percent foreign born and percent not-
879 white (Tables E5 and E6). Overall, the results remain the same. However,
880

881 conflicting results across states with regards to municipal characteristics
882 remain.

883 In summary, black and Latino men are much more likely to experience
884 a search than any other race–gender group, and the importance of race
885 persists despite multiple control variables measuring such things as the
886 crime rate, poverty, demographics, and other factors that affect police
887 behavior. Additionally, we find conditional support for the importance
888 of the descriptive characteristics of the head of the police department.
889 In IL, at least, the presence of a black police chief leads to a decline in
890 searches of all types. In NC, a black chief leads to a decline in consent
891 searches.

893 Discussion

894
895
896 The relevant laws mandating the collection of traffic stops statistics were
897 uniformly motivated by concerns about the possibility of racial disparities
898 (see Baumgartner, Epp, and Shoub 2018, chapter 2). It makes sense then
899 to employ these data for their intended purpose, which is what we do here.
900 Looking at more than 5 million traffic stops in the two states that provide
901 the most extensive data, we have asked a simple question: Are black and
902 Latino male drivers searched at higher rates than white male drivers,
903 and do these disparities remain after we control for potentially spurious
904 or legally relevant factors that might explain them? The answer is that dis-
905 parities are large and robust, even after controlling statistically for every vari-
906 able made available. Few agencies are racially neutral in the odds of
907 searching black, Latino, and white drivers after a routine traffic stop, and
908 their greater rates of searching black or Latino drivers cannot be explained
909 by “extraneous” factors, at least not any factors which are systematically col-
910 lected by law enforcement officers or available through such sources as the
911 U.S. Census or the FBI’s crime reports. Indeed, we go well beyond previ-
912 ous studies to look at factors such as poverty and crime rates. These con-
913 textual factors are indeed strong predictors of higher rates of
914 discretionary search. Systemic factors clearly matter. However, and crui-
915 cially, the identity of the driver remains a powerful predictor even when
916 these contextual factors are included in the model.

917 Substantively, our conclusions are very troubling. In its review of the
918 Ferguson, MO, Police Department, the U.S. Department of Justice dis-
919 covered that black drivers were 75% more likely to be searched after a
920 traffic stop than white drivers. In this analysis covering millions of stops

921 in many agencies across two states, the average disparity is much higher for
922 black men. Black men are 123% more likely to experience a discretionary
923 search in NC, all else equal, and 194% more likely to experience such a
924 search in IL, all else equal. This disparity is not explained by individual,
925 departmental, or municipal characteristics. It is solely explained by the
926 race of the driver stopped.

927 Despite the disconcerting role that the race of the driver consistently
928 plays in structuring individuals' interactions with the police, our analysis
929 does contribute something slightly more hopeful: black leadership of
930 the police department may work to combat these effects. In IL, the pres-
931 ence of a black police chief led to a decline in all types of discretionary
932 searches. In NC, this presence led to a decline in consent searches,
933 which, due to their highly discretionary nature, are thought to be a
934 major driver of racial disparities in traffic stops. So, despite the persistence
935 of such disparities, there is some indication in this study that representa-
936 tion may be a way forward in ameliorating such targeting. Of course,
937 this finding should be subjected to confirmation and further study, par-
938 ticularly since a small proportion of agencies had black or Latino chiefs.

939 Here, we have given no insights into what is generating these racial
940 disparities, except to document that nothing in the current data collection
941 protocols used by most police agencies explains them away. If there are
942 other factors absent from our datasets that might explain away these
943 racial differences, then police departments should start collecting that
944 data to better understand the dynamics at play and to help improve the
945 relationship between the police and the communities they serve.
946 Existing datasets, which are extensive, point to large, widespread, and
947 statistically robust, racial disparities. If they cannot be accounted for by
948 contextual factors, then they must be confronted and accepted for what
949 they are.

951 **Supplementary material**

952
953 To view supplementary material for this article, please visit [https://doi.org/](https://doi.org/10.1017/rep.2020.8)
954 [10.1017/rep.2020.8](https://doi.org/10.1017/rep.2020.8)
955

957 **NOTES**

958 1. CT and MD make public their micro-level stop data, but have 10 or fewer municipalities con-
959 sistent. Additionally, a number of other states require the collection of data about the racial break-
960 down of who is stopped and what happens to them afterwards, but many of these do not make the
data publicly available. For a summary of this, see Baumgartner et al. (2017).

961 2. IL also includes a vehicle make field, but the data is nearly unusable: there are more than 63,000
 962 unique values for this variable. We therefore exclude it.

963 3. Note that we do not include the proportion of the police force that is black, because the only
 964 publicly available data, drawn from the U.S. DOJ Law Enforcement Management and
 965 Administrative Statistics (LEMAS) survey is not administered on a regular basis and does not
 966 include enough of our 90 municipal agencies to provide valid estimates.

967 4. Additionally, we include fixed effects by agency/municipality and use heteroskedastic robust
 968 standard errors (HC3) estimated with the `lmtest` and `sandwich` packages in R. In robustness checks,
 969 we alternatively fit the model as a multilevel model with random intercepts by agency; the substantive
 970 results are the same. Additional robustness checks are discussed at the end of this section.

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