

Race-of-Officer Effects in Traffic Stop Outcomes

Representative Bureaucracy and the Routine Traffic Stop

March 12, 2019

On-Line Appendix. Robustness Tests

We present two sets of robustness tests here. First, to assess a concern that some stops and searches are not as discretionary as others, we replicate our analysis while omitting all stops where the purpose was classified as “investigation” or “driving while intoxicated.” As Table A-1 shows, these stops have very high rates of search which may not reflect the same degree of discretion on the part of the officer. Indeed, these two stop purposes generate the highest search rates, by far.

Table A-1. Search Rates by Stop Purpose.

Stop Purpose	Traffic Stops	Percent Leading to Search
Speeding	23,039	1.32
Stop Light/Sign	9,063	3.33
Safe Movement	5,650	3.93
Check Point	311	4.50
Vehicle Regulatory	34,801	4.93
Vehicle Equipment	10,078	6.84
Other	2,061	7.57
Seat Belt	931	8.70
Investigation	2,001	16.74
Driving While Impaired	121	50.41
Total	88,056	4.41

Tables A-2 to A-5 and Figures A-1 to A-5 replicate the analysis from each of the tables and figures in the main text while excluding the 2,122 stops associated with Investigations and DWI stops.¹

In a second test, we assess the effect of including non-discretionary searches in the analysis. The 2016-17 CMPD database used in the main article does not give information about the type of search. Therefore, we rely on the 2002-2016 database collected by Baumgartner et al. (2018), which allows us to focus on probable cause and consent searches only. Table A-6 shows the results of a standard regression replicating the spirit of the analysis presented in the main text with all available data for the CMPD, then eliminates years before 2016, then eliminates all searches other than consent and probable cause searches. In all cases, results confirm those shown in the main text. In fact, the odds ratios for Black male drivers increase as the filters are progressively applied. If anything, therefore, the analysis presented in the main text under- rather than over-estimates any apparent bias that could come from including non-discretionary searches or stops. It is impossible to replicate the analysis completely because the 2002—2016 database does not include information about officers. The key point therefore is whether the results change when the non-discretionary stops and searches are excluded, and we confirm that they remain substantively powerful, or even increase in strength.

¹ Note: In the paper we refer to “investigatory” stops, borrowing language from Epp et al. 2014, distinguishing moving violations (speeding, stop light / sign, safe movement, and DWI) from all other types of stops, most of which are equipment or regulatory. “Investigation” stops refer to cases where officers are looking for a specific suspect or person / car fitting a description of a criminal suspect. These stops, therefore, have low discretion and are perhaps better considered criminal investigations rather than traffic stops. For these reasons, we exclude them here and replicate our analyses.

Table A-2. Robustness test for Table 1.

	Traffic Stops	Searches	Percent Searched
Overall	85,934	3,485	4.06
Driver Characteristics			
White	26,699	392	1.47
Black	47,476	2,791	5.88
Hispanic	8,458	272	3.22
Other	3,301	30	0.91
Male	50,219	2,899	5.77
Female	35,715	586	1.64
Less than 35 years old	45,772	2,621	5.73
35 years old or older	40,162	864	2.15
Investigatory stop	48,182	2,657	5.51
Safety stop	37,752	828	2.19
Officer Characteristics			
White	61,150	2,823	4.62
Black	15,509	325	2.24
Hispanic	3,760	154	4.10
Asian-American	5,041	115	2.28
Other or unknown race	1,474	68	4.61
Male	78,556	3,265	4.16
Female	7,378	220	2.98
White male	55,350	2,647	4.78
Black male	13,580	301	2.22
White female	5,800	176	3.02
Black female	929	24	2.58
Other or unknown race	10,275	337	3.33
Less than 5 years of service	26,937	1,565	5.81
Five to 13 years of service	29,973	1,615	5.39
14 or more years of service	29,024	305	1.05
Officer-Driver Combinations			
White officer, White driver	19,092	317	1.66
White officer, Black driver	33,864	2,289	6.76
White officer, Other race driver	8,194	217	2.65
Black officer, White driver	4,532	29	0.64
Black officer, Black driver	8,078	263	3.26

Patrol Districts

Central	4,133	162	3.92
Eastway	8,874	301	3.39
Freedom	3,983	231	5.80
Hickory Grove	7,176	407	5.67
Independence	5,358	234	4.37
Metro	3,979	467	11.74
North	7,157	135	1.89
North Tryon	6,758	488	7.22
Providence	10,131	155	1.53
South	9,254	92	0.99
Steele Creek	5,804	203	3.50
University City	5,500	147	2.67
Westover	6,635	424	6.39
Missing	1,192	39	3.27

Table A-3. Robustness test for Table 2.

Variable	Model 1		Model 2		Model 3	
	Odds-Ratio (SE)	Prob.	Odds-Ratio (SE)	Prob.	Odds-Ratio (SE)	Prob.
Officer is White Male	1.89 (.078)	.000	1.89 (.078)	.000	1.89 (.075)	.000
Officer years of service	0.93 (.003)	.000	0.93 (.003)	.000	0.93 (.003)	.000
Investigatory stop purpose	1.75 (.074)	.000	1.75 (.073)	.000	1.54 (.067)	.000
Driver is less than 35 years old	2.44 (.099)	.000	2.44 (.099)	.000	2.47 (.101)	.000
Driver is male	3.61 (.171)	.000				
Driver is Black	3.08 (.171)	.000				
Driver is Hispanic	1.56 (.127)	.000				
Driver is of another race	0.54 (.104)	.000				
Driver is Black female			1.79 (.197)	.000	1.38 (.143)	.004
Driver is Hispanic female			1.07 (.219)	.720	.87 (.179)	.516
Driver is female of another race			1.00 (.334)	.461	.97 (.325)	.934
Driver is White male			2.05 (.236)	0.00	1.98 (.229)	0.00
Driver is Black male			7.32 (.741)	0.00	5.54 (.570)	0.00
Driver is Hispanic male			3.62 (.431)	0.00	2.84 (.343)	0.00
Driver is male of another race			.95 (.233)	.743	.86 (.213)	.555
Patrol Districts						
Central					0.69 (.127)	.044
Eastway					0.69 (.122)	.037
Freedom					1.11 (.202)	.559
Hickory Grove					0.99 (.173)	.935
Independence					1.01	.958

					(.182)	
Metro					1.99	.000
					(.349)	
North					0.38	.000
					(.071)	
North Tryon					1.09	.636
					(.190)	
Providence					0.49	.000
					(.090)	
South					0.36	.000
					(.066)	
Steele Creek					0.87	.440
					(.158)	
University City					0.45	.000
					(.084)	
Westover					1.20	.292
					(.211)	
Constant	0.003	.000	0.005	.000	0.009	.000
	(.0003)		(.0006)		(.0017)	
N		85,934		85,934		85,934
Log Likelihood		-12569		-12551		-12236
LR Chi-2	(8)	4027	(11)	4065	(24)	4695
Pseudo-R2		.1381		.1394		.1610

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

Table A-4. Robustness test for Table 3.

Category			Search Rates		N
Driver Race	White	Black	1.47	5.88	74,175
Driver Sex	Female	Male	1.64	5.77	85,934
Driver Age	Old	Young	2.20	5.84	85,934
Officer is White Male	No	Yes	2.74	4.78	85,934
Officer Years of Service	High	Low	2.14	5.96	85,934
Safety v. Investigatory Stop	Safety	Investigatory	2.19	5.51	85,934
Low Search Neighborhood	Yes	No	1.44	5.22	85,934
High Search Neighborhood	No	Yes	3.68	11.74	85,934

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

Table A-5. Robustness test for Table 4.

Number of Targeted Characteristics	N	Percent Searched
None	185	0.00
One	2,751	0.18
Two	8,475	0.33
Three	13,795	0.90
Four	17,029	1.75
Five	16,283	4.54
Six	11,097	9.68
Seven	4,209	18.79
Eight	351	33.33
Total	74,175	4.29

The number of targeted characteristics is the count of such characteristics from Table A-4.

Figure A-1. Robustness Test for Figure 1.

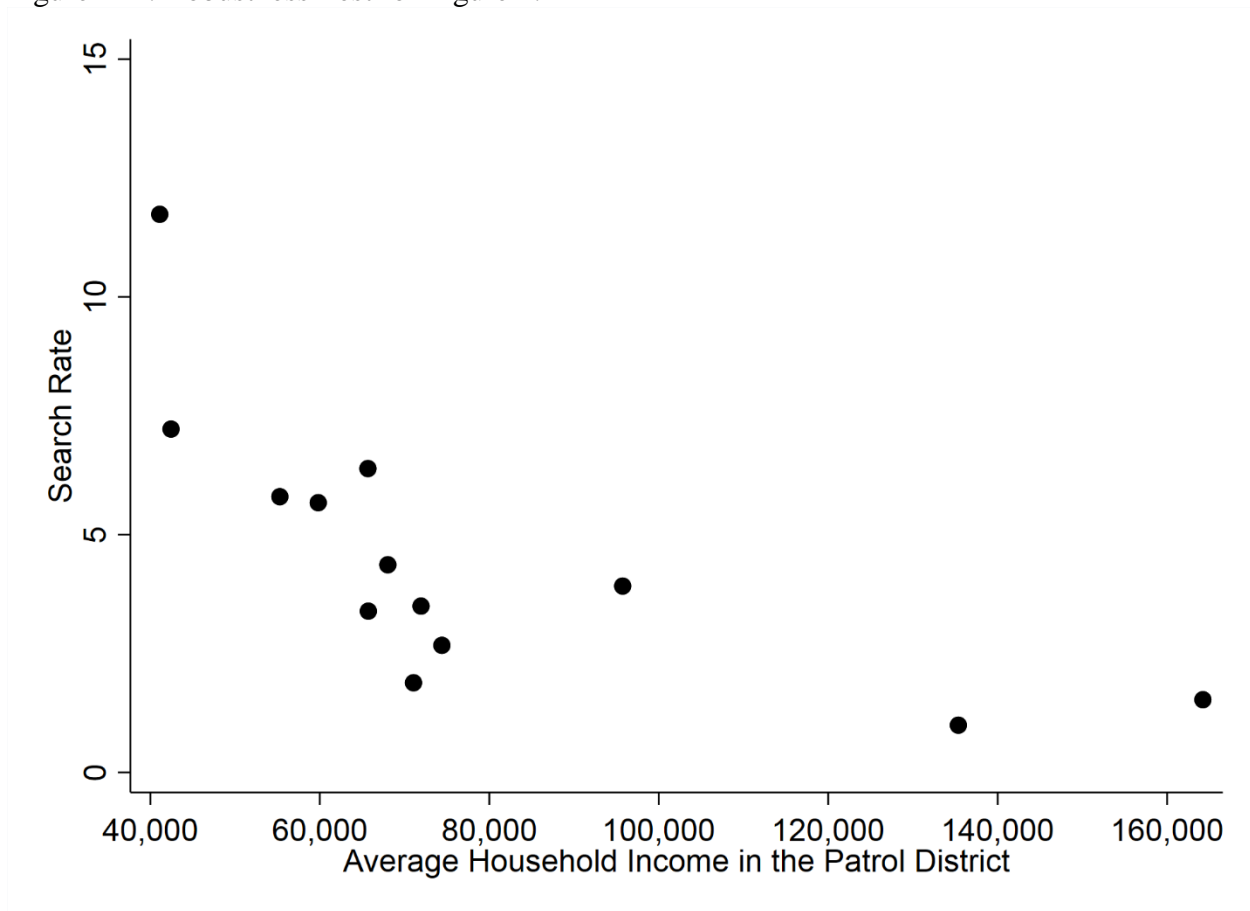


Figure A-2. Robustness test for Figure 2.

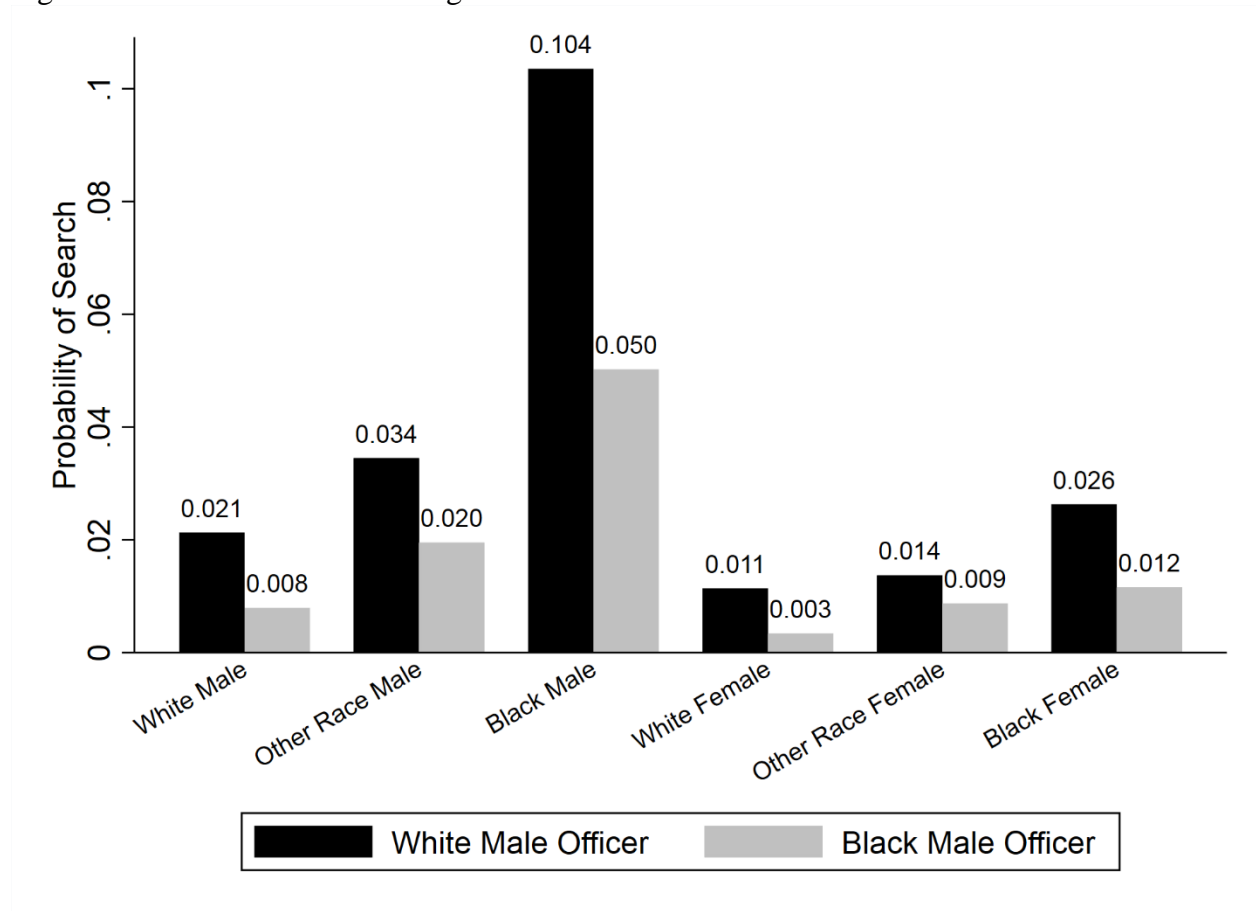
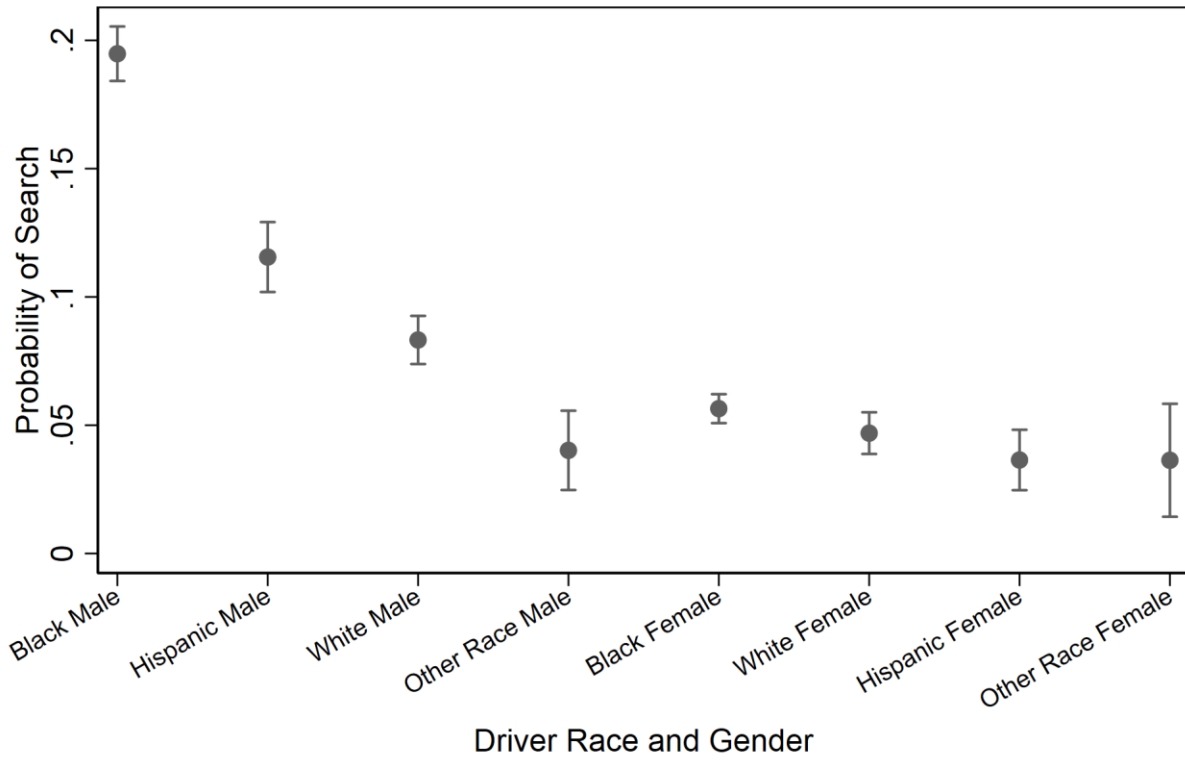
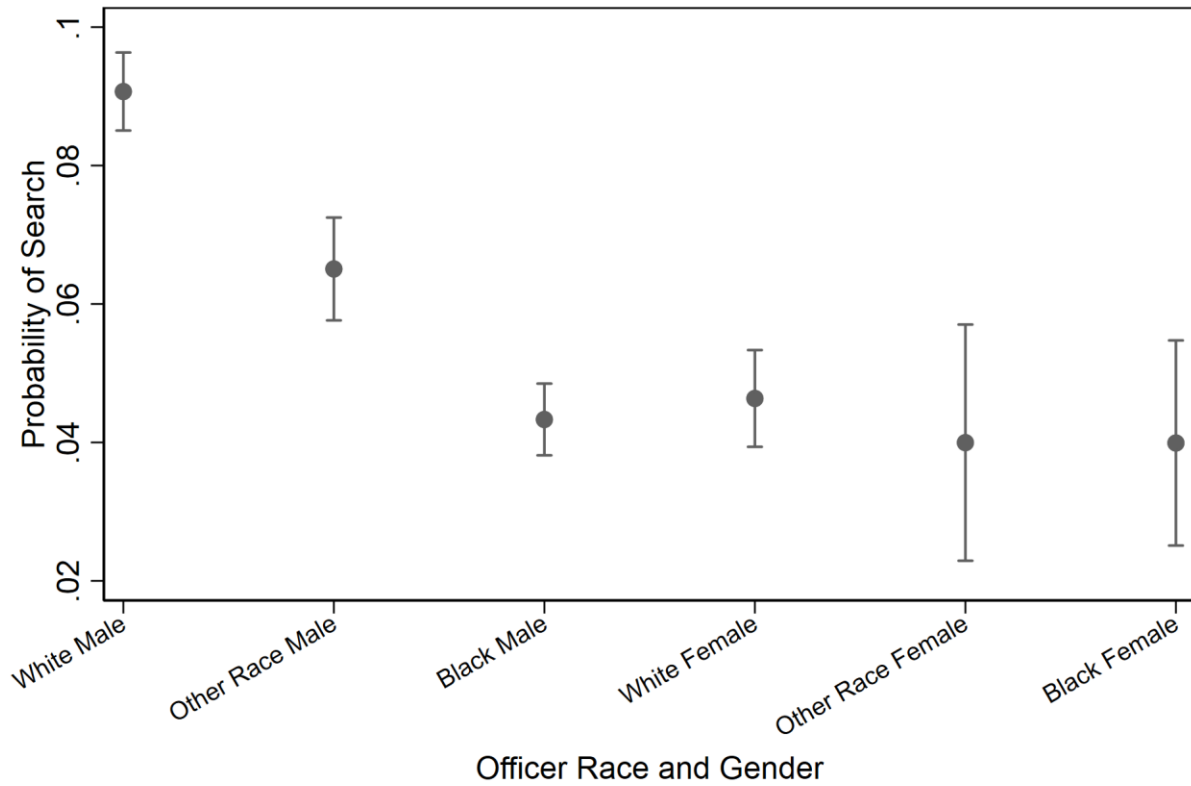


Figure A-3. Robustness test for Figure 3.



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

Figure A-4. Robustness test for Figure 4.



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

Figure A-5. Robustness test for Figure 5.

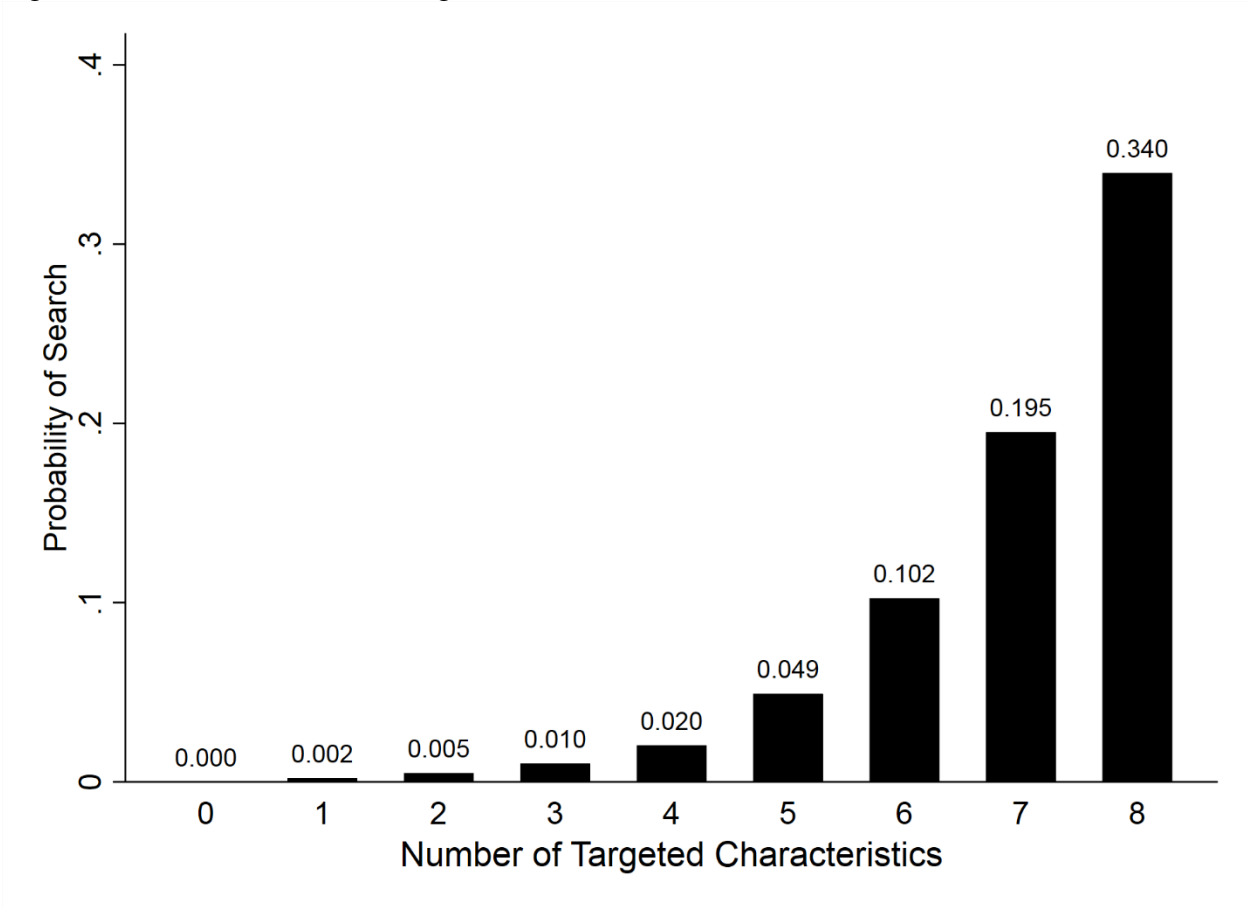


Table A-6. Regressions predicting a search following a traffic stop.

Driver characteristics	Model 1	Model 2	Model 3	Model 4
Black female	1.19 (.02)	1.61 (.14)	1.70 (.16)	1.79 (.18)
Hispanic female	0.49 (.02)	0.70 (.13)*	0.83 (.15)++	0.83 (.17)++
Other race female	0.40 (.03)	0.53 (.18)+	0.67 (.22)++	0.80 (.27)++
White male	2.15 (.03)	2.34 (.20)	2.27 (.21)	2.35 (.24)
Black male	5.52 (.08)	6.87 (.54)	7.25 (.61)	7.83 (.72)
Hispanic male	2.31 (.04)	2.65 (.25)	2.95 (.30)	2.77 (.31)
Other race male	1.35 (.04)	1.05 (.18)++	0.96 (.19)++	0.84 (.19)++
Age (in years)	0.96 (.00)	0.95 (.00)	0.95 (.00)	0.95 (.00)
Stop purpose	Included	Included	Included	Included
Hour of day	Included	Included	Included	Included
Constant	0.059 (.001)	0.085 (.010)	0.85 (.010)	0.68 (0.01)
N	1,704,765	86,138	83,604	83,076
Log Likelihood	-383,492	-16,180	-14,829	-13,494
LR Chi-2	(39) 155,034	(39) 8,475	(37) 6,987	(37) 6,659
Pseudo-R2	.168	.208	.191	.198

Note: Entries are logistic odds ratios, with standard errors in parentheses. All coefficients are significant at .000 unless otherwise indicated. * prob. < .05; + prob. < .10; ++, n.s. Model 1: CMPD, 2002–2016; Model 2 includes only 2016; model 3 excludes DWI and Investigation stops; Model 4 excludes searches other than probable cause and consent. Each model includes the filters imposed on the previous models. The omitted (baseline) category for driver race and gender is White female.