

Analysis of Black-White Differences in Traffic Stops and Searches in Cary, NC, 2002-2013

December 7, 2014

Frank R. Baumgartner, Derek Epp, and Kelsey Shoub¹
University of North Carolina at Chapel Hill
Department of Political Science
<http://www.unc.edu/~fbaum/traffic.htm>

Contact: Frankb@unc.edu

[Prepared by Katherine Elliott]

¹ Baumgartner is the Richard J. Richardson Distinguished Professor of Political Science at UNC-Chapel Hill. Epp and Shoub are graduate students in political science. We thank UNC undergraduates Katherine B. Elliott, Amirah Jiwa, Morgan Herman, and Reena Gupta for assistance on the logistics of this project. We also acknowledge the assistance of the NC Department of Justice and State Bureau of Investigation for making available the official statistics on which this analysis relies, and for answering technical questions about the organization of this complex database.

Table 1. Overview of the Data

Data Subsets	Observations
Total stops	191,429
-2014	5,194
-Passengers	1,307
-Checkpoint stops	467
Stops for analysis	184,534
Searches	3,334

Search Rate = 1.81

Figure 1. Number of Traffic Stops per Year

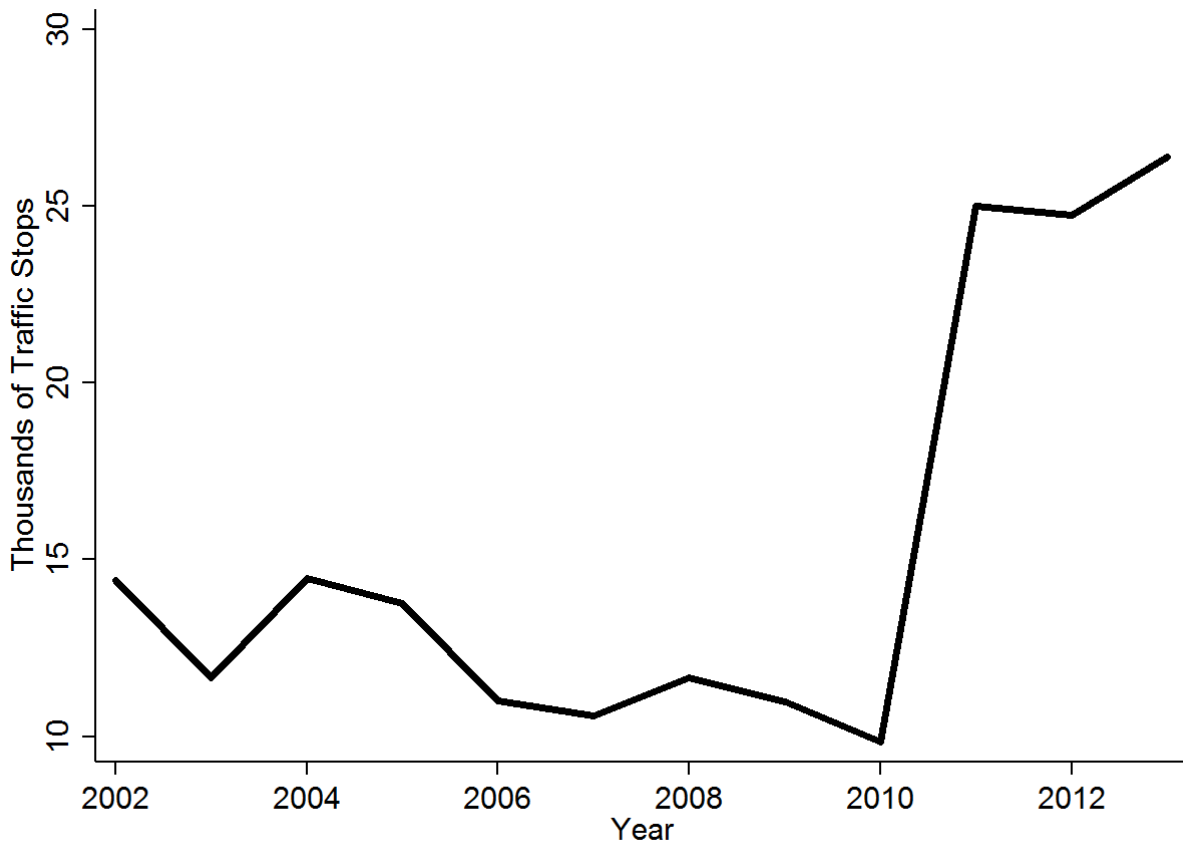


Figure 2. Racial Composition of Traffic Stops by Year

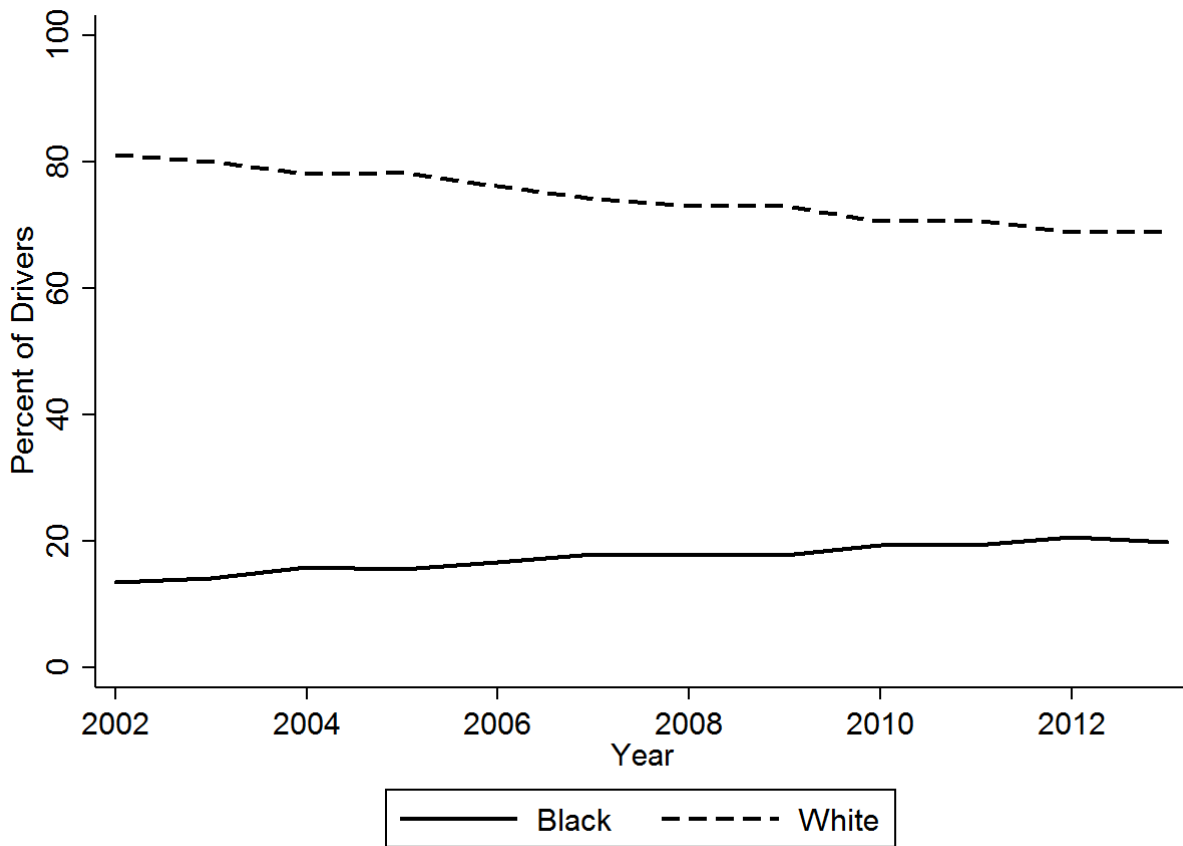


Table 2. Racial Composition of Traffic Stops by Purpose, Drivers

Purpose	Number	Percent	
		White	Black
Total Stops	184,533	73.50	17.81
Speed Limit	77,846	74.54	16.63
Stop Light/Sign	13,297	72.57	13.97
Driving Impaired	1,696	77.89	15.15
Safe Movement	6,382	70.73	18.13
Vehicle Equipment	24,201	67.45	23.25
Vehicle Regulatory	38,374	74.49	18.38
Seat Belt	9,029	78.82	15.58
Investigation	4,679	74.67	19.88
Other Vehicle	6,029	74.27	18.16

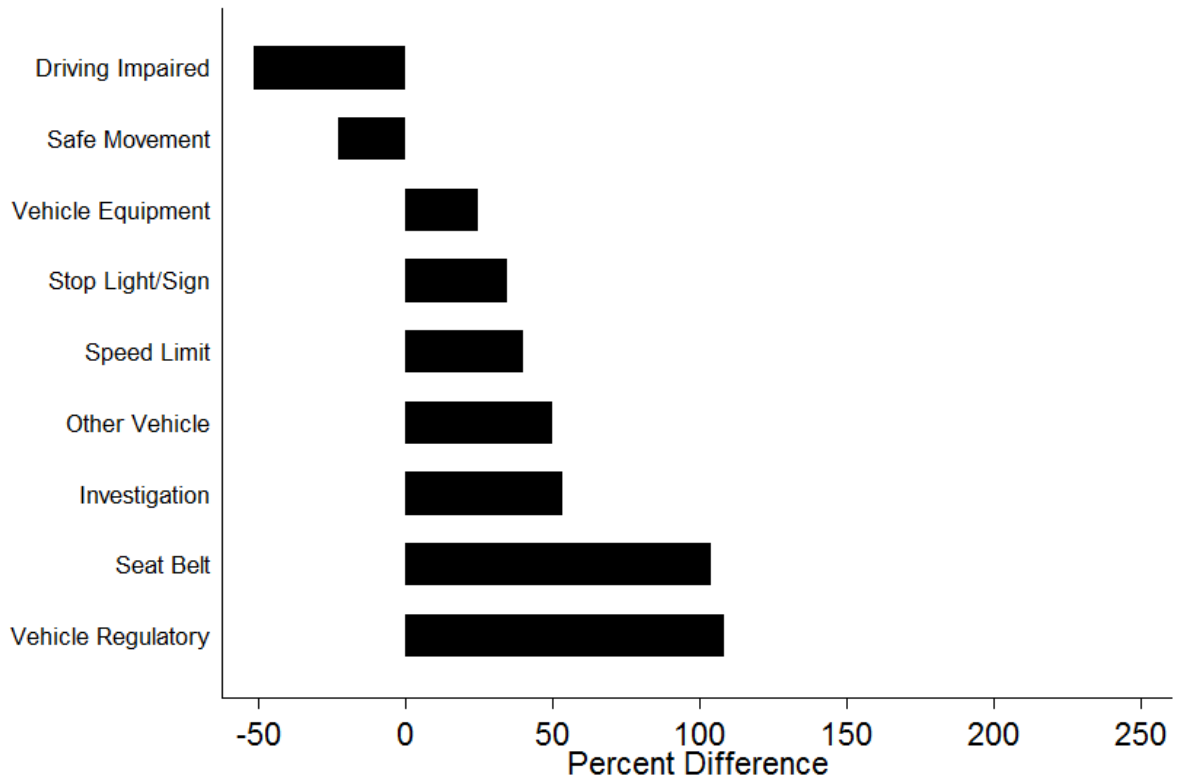
Note: Includes only drivers. Excludes 467 checkpoint stops. Excludes 1,307 passengers.

Table 3. Percent Searched by Race and Purpose of Stop

Purpose	Number	% Total	% White	% Black	Ratio
					Black:White
Total Stops	184,534	-	135,632	32,870	-
Total Searches	3,334	1.81	1.81	2.36	1.30
Speed Limit	77,846	0.93	0.93	1.30	1.40
Stop Light/Sign	13,297	1.16	1.20	1.62	1.35
Driving Impaired	1,696	28.66	32.17	15.56	0.48
Safe Movement	6,382	3.60	4.13	3.17	0.77
Vehicle Equipment	24,201	2.48	2.47	3.08	1.25
Vehicle Regulatory	38,374	1.20	1.04	2.17	2.09
Seat Belt	9,029	1.06	0.94	1.92	2.04
Investigation	4,679	6.52	6.04	9.25	1.53
Other Vehicle	6,029	2.77	2.68	4.02	1.50

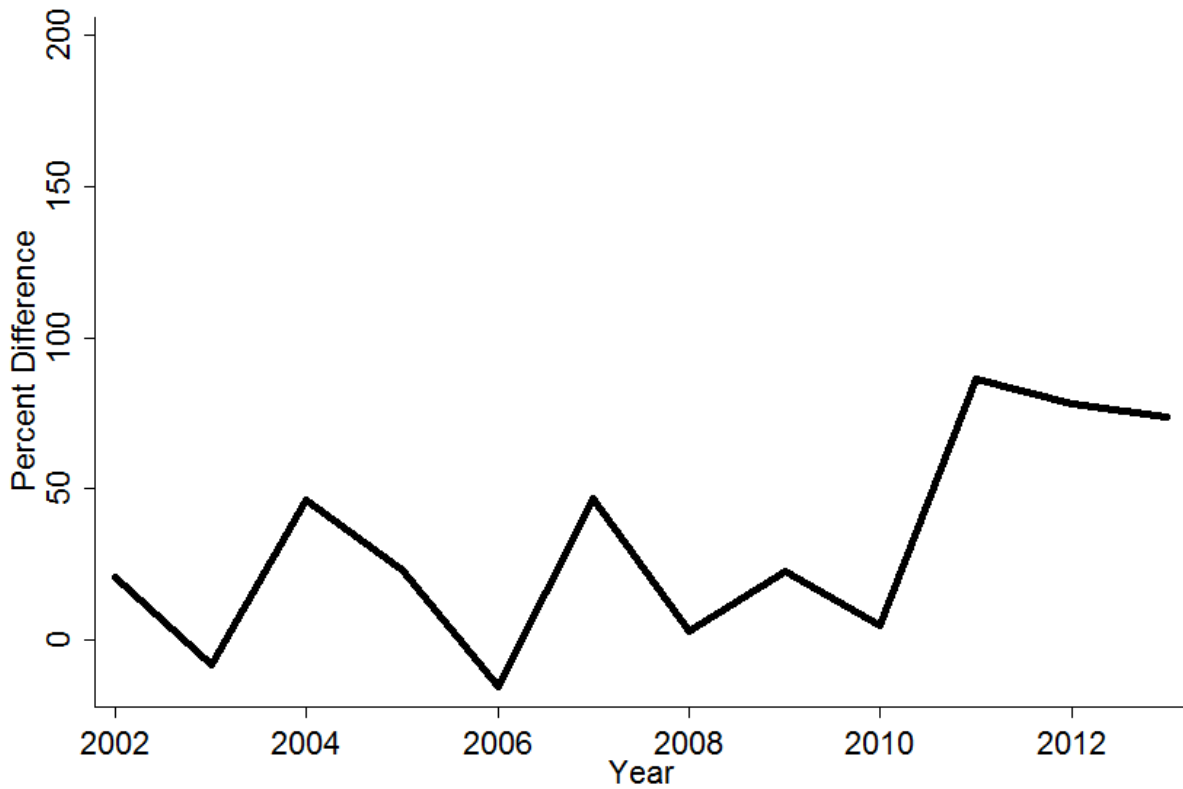
Note: See the appendix for this same table broken down for Men and Women.

Figure 3. Difference in Likelihood of Being Searched, by Race and Type of Stop



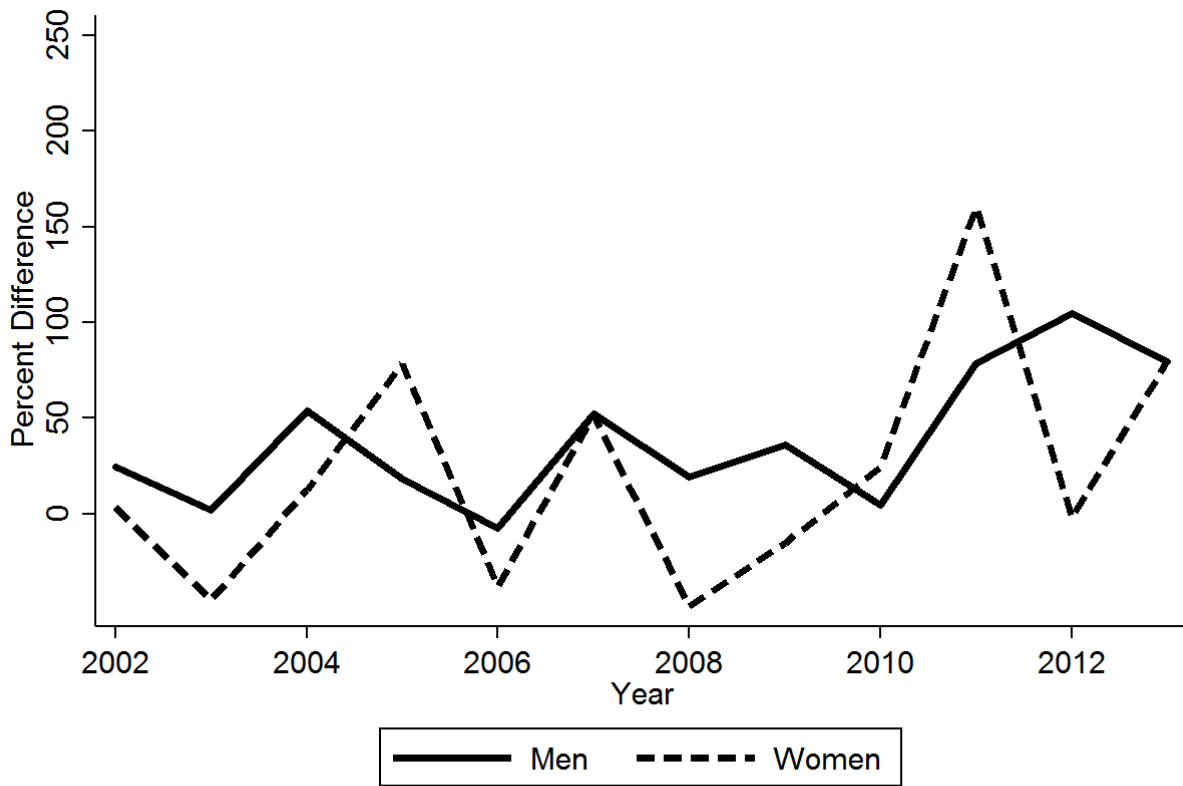
The figure shows the percentage difference in the likelihood of Blacks being searched as compared to Whites by purpose of stop.

Figure 4. Racial Differences in the Likelihood of Search



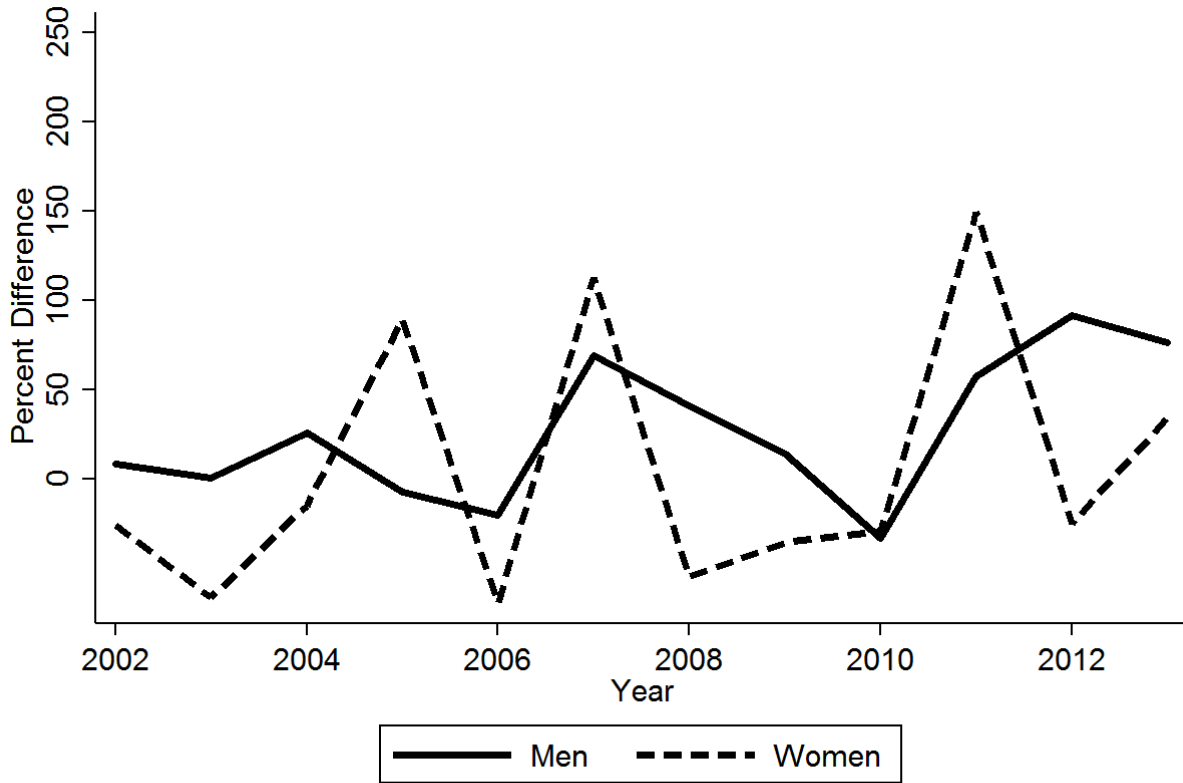
The figure shows the percentage difference in the likelihood of Blacks being searched as compared to Whites.

Figure 5. Racial Differences in the Likelihood of Search by Gender



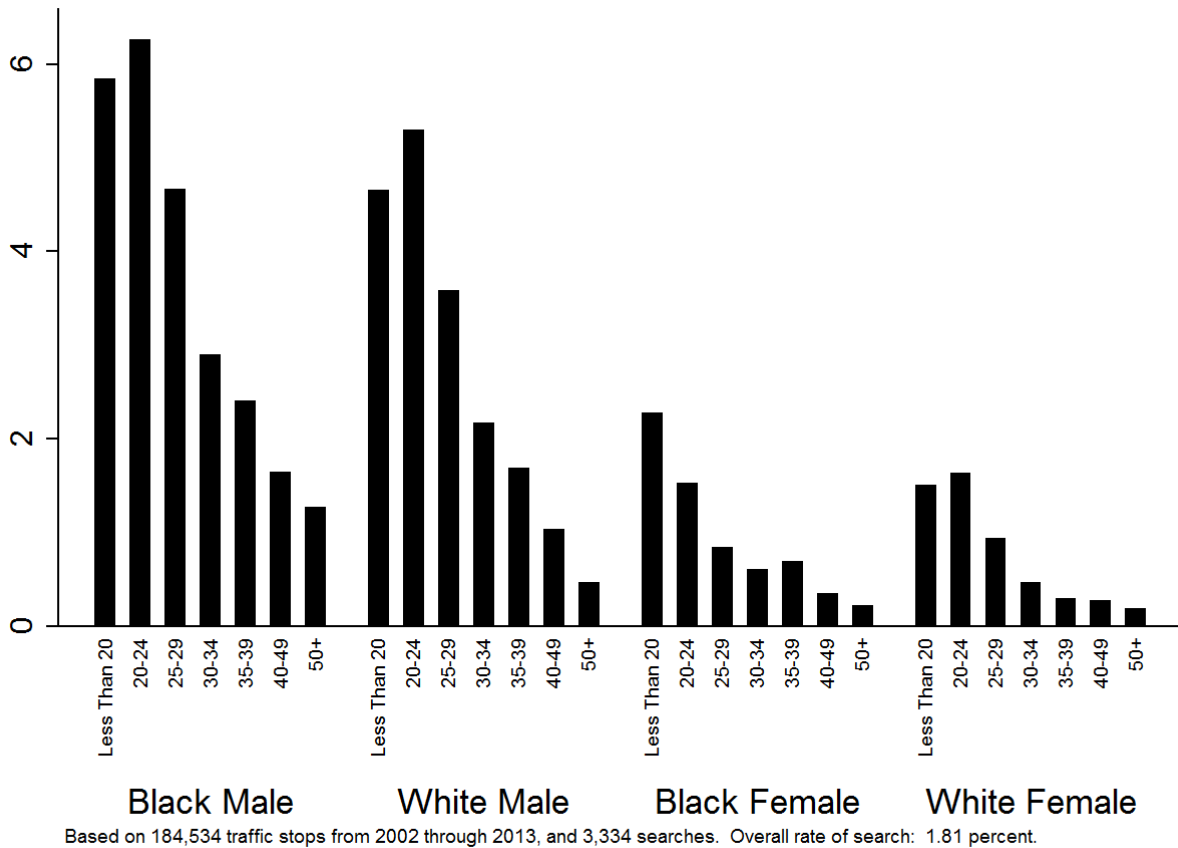
The figure shows the percentage difference in the likelihood of Blacks being searched as compared to Whites by gender.

Figure 6. Racial Differences in the Likelihood of Search by Gender, for Drivers Under 30



The figure shows the percentage difference in the likelihood of Blacks being searched as compared to Whites by gender for motorists under 30.

Figure 7. Search Rates by Race, Gender, and Age Group



Black men under 35 years are searched at rates around or above 5 percent; women in general are searched in less than 2 percent of all stops. The figure makes clear how race, age, and gender combine to indicate where searches are most likely.

The patterns in Figure 7 are highly consistent over time. Figures 8 and 9 show the number of stops, then searches, by the four race/gender groups.

Figure 8. Number of Stops, by Race and Gender

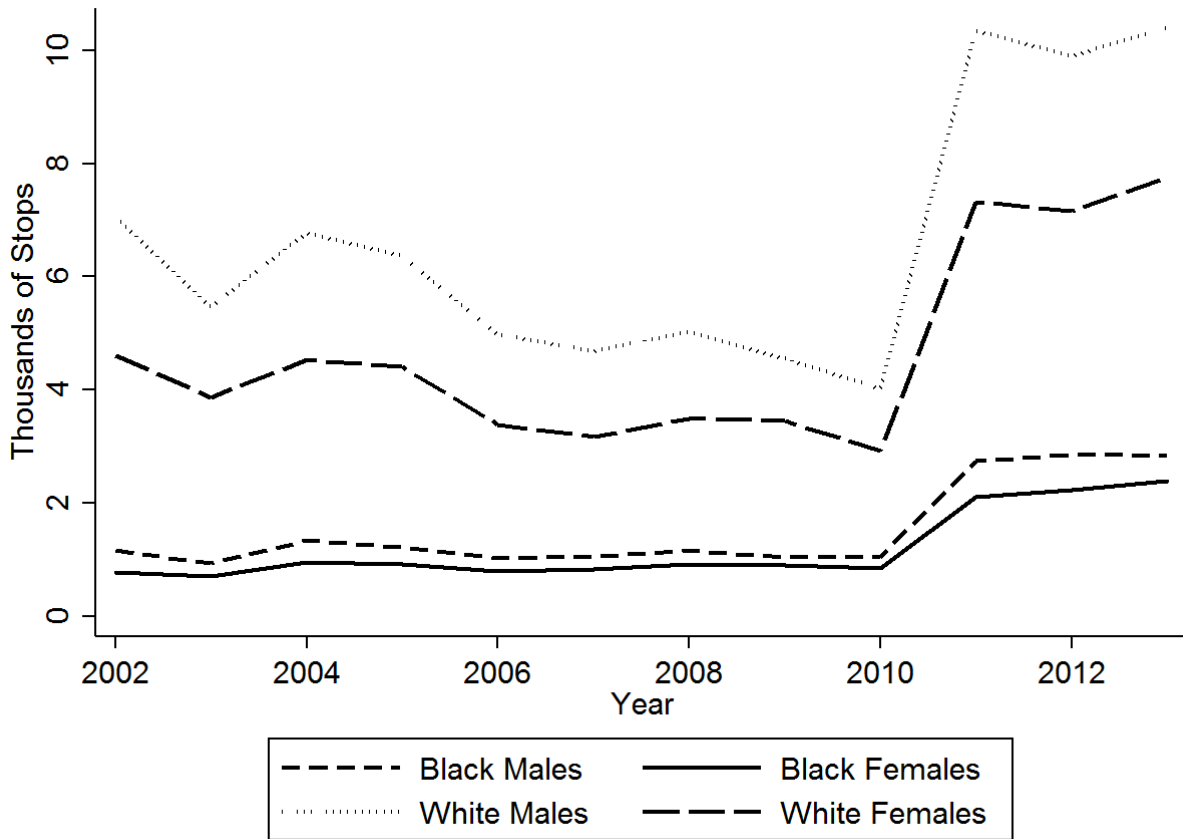


Figure 9. Percent of Stops Resulting in a Search, by Race and Gender

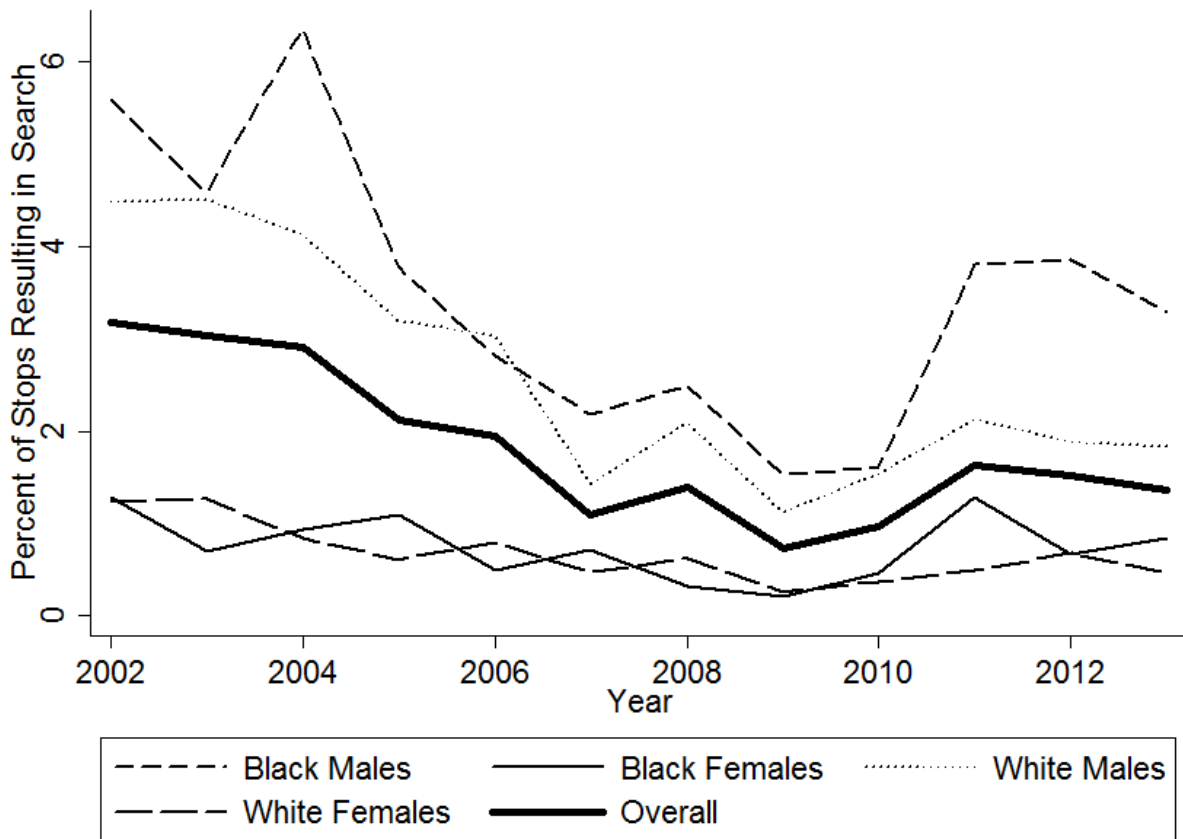


Table 4. Type of Search by Race

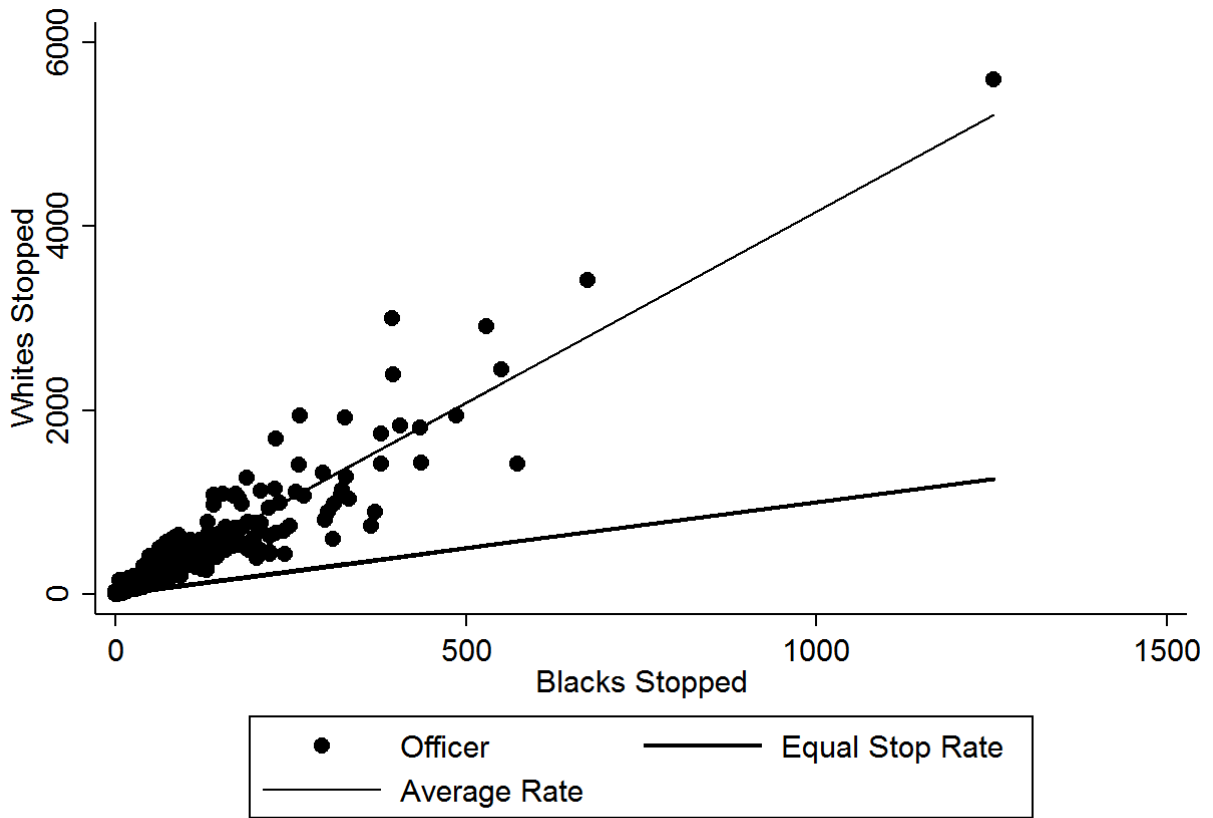
Search Type	Number	% Total	% White	% Black	Ratio
					Black:White
Total Stops	184,534	-	135,632	32,870	-
Total Searches	3,334	1.81	1.81	2.36	1.30
Consent	1,256	0.68	0.66	0.96	1.45
Search Warrant	11	-	-	-	-
Probable Cause	589	0.32	0.28	0.59	2.11
Incident to Arrest	1,450	0.79	0.85	0.79	0.93
Protective Frisk	28	0.02	0.01	0.02	2.00

Note: See the appendix for this same table separately for Men and Women.

Table 5. Distribution of Officer IDs by Stop

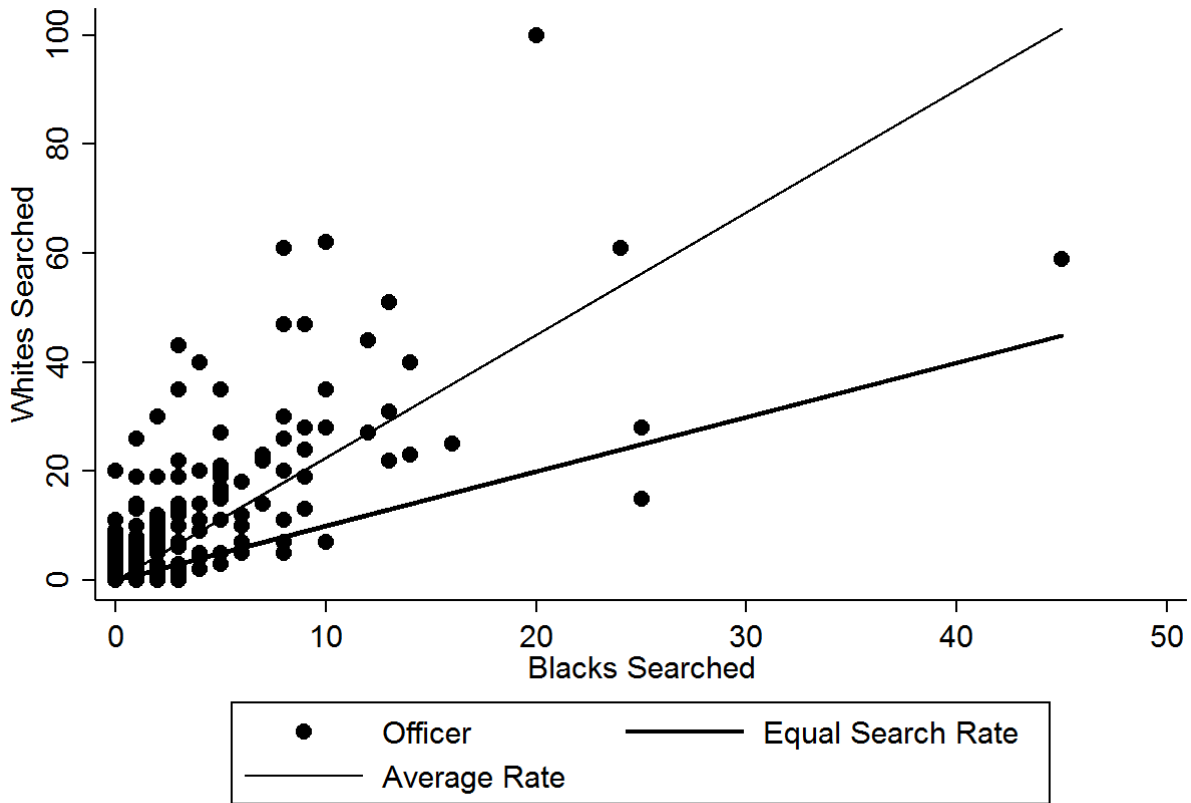
Number of Stops	Officers w/ this many Stops	Percent of Officers	Cumulative Percent	Percent of Stops	Cumulative Percent
1	227	32.98	32.98	0.15	0.15
2 – 10	159	18.93	51.90	0.37	0.52
11 - 100	144	17.14	69.05	3.39	3.91
101 – 1,000	210	25.00	94.05	45.04	48.96
1,001 +	50	5.95	100.00	51.05	100.00
Total	840	100	-	100	-

Figure 10. Number of Black and White Motorists Stopped, by Officer



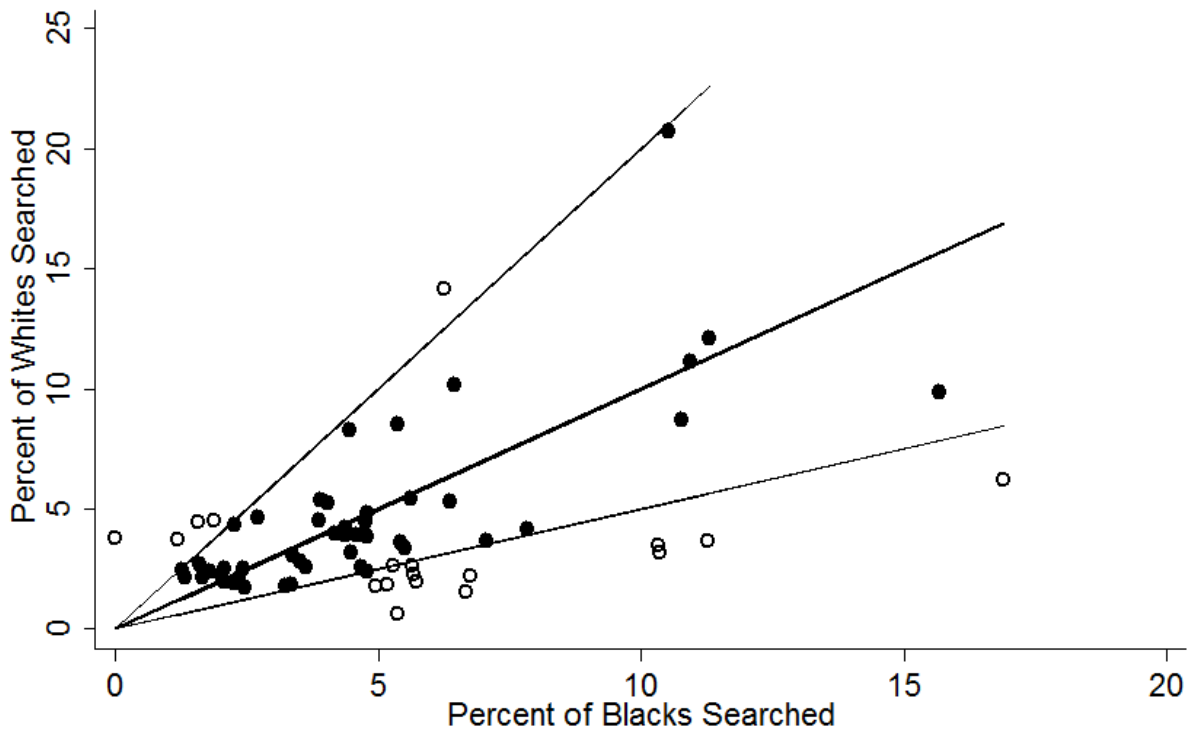
On average, officers stop 4.164 Whites for each Black stopped.

Figure 11. Number of Black and White Motorists Searched, by Officer



On average, officers search 2.252 Whites for each Black searched.

Figure 12. Percent of White and Black Drivers Searched, by Officer



Includes 64 officers with a minimum of 50 White stops, 50 Black stops, and a search rate above the department average of 1.81. The hollow circles indicate high disparity officers. 5 officers search Whites at more than twice the rate that they search Blacks. 13 officers search Blacks at more than twice the rate that they search Whites.

Table 6. Predicting the Occurrence of a Search by Cary Police Officers for Male Motorists with Odds-Ratios and Standard Errors in Parentheses, 2002-2013

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Demographics					
Race	1.67*(0.08)	1.60*(0.08)	1.58*(0.08)	1.56*(0.08)	1.44*(0.07)
Hispanic	2.56*(0.12)	2.16*(0.11)	1.61*(0.08)	1.57*(0.08)	1.68*(0.09)
Age	-	0.94*(0.00)	0.94*(0.00)	0.94*(0.00)	0.95*(0.00)
Stop Purpose					
Speed Limit	-	-	-	-	-
Stop Light	-	-	1.17*(0.11)	1.12(0.11)	1.06(0.11)
Impaired	-	-	29.52*(2.33)	28.06*(2.24)	14.90*(1.26)
Movement	-	-	3.19*(0.24)	3.13*(0.24)	2.34*(0.18)
Equipment	-	-	1.96*(0.12)	1.93*(0.12)	1.33*(0.09)
Regulatory	-	-	1.34*(0.09)	1.31*(0.09)	1.32*(0.09)
Seat Belt	-	-	0.84*(0.10)	0.86(0.10)	1.13(0.14)
Investigation	-	-	4.42*(0.35)	4.30*(0.34)	3.33*(0.27)
Other	-	-	2.28*(0.22)	2.21*(0.21)	1.83*(0.18)
Officer Type					
Black Disparity [†]	-	-	-	2.00*(0.15)	2.16*(0.16)
White Disparity [‡]	-	-	-	1.59*(0.19)	1.33*(0.16)
Time					
Hour of Day	-	-	-	-	Included
Day of Week	-	-	-	-	Included
Constant	0.02*(0.00)	0.15*(0.01)	0.09*(0.01)	0.12*(0.01)	0.18*(0.02)
N	97,991	97,991	97,991	97,991	97,842
Pseudo R²	0.01	0.01	0.13	0.13	0.16

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 13 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.

‡ = Coded 1 for 5 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. Predicting the Occurrence of a Search by Cary Police Officers for Female Motorists with Odds-Ratios and Standard Errors in Parentheses, 2002-2013

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Demographics					
Race	1.17(0.13)	1.12(0.12)	1.10(0.12)	1.09(0.12)	0.98(0.11)
Hispanic	0.79(0.17)	0.70(0.16)	0.53*(0.12)	0.53*(0.12)	0.51*(0.12)
Age	-	0.93*(0.00)	0.94*(0.00)	0.94*(0.00)	0.96*(0.00)
Stop Purpose					
Speed Limit	-	-	-	-	-
Stop Light	-	-	1.67*(0.39)	1.58*(0.37)	1.43(0.34)
Impaired	-	-	71.44*(11.27)	68.75*(11.02)	21.61*(3.75)
Movement	-	-	6.95*(1.14)	3.69*(1.12)	6.34*(0.63)
Equipment	-	-	2.88*(0.44)	2.79*(0.43)	1.35(0.22)
Regulatory	-	-	1.44*(0.23)	1.38*(0.23)	1.37(0.22)
Seat Belt	-	-	2.12*(0.56)	2.17*(0.57)	3.31*(0.89)
Investigation	-	-	10.01*(1.99)	9.55*(1.90)	4.89*(1.01)
Other	-	-	3.59*(0.86)	3.47*(0.83)	2.28*(0.56)
Officer Type					
Black Disparity [†]	-	-	-	2.25*(0.38)	2.56*(0.44)
White Disparity [‡]	-	-	-	1.55(0.43)	1.27(0.35)
Time					
Hour of Day	-	-	-	-	Included
Day of Week	-	-	-	-	Included
Constant	0.01*(0.00)	0.06*(0.01)	0.02*(0.00)	0.03*(0.01)	0.05*(0.01)
N	70,511	70,511	70,511	70,511	70,428
Pseudo R²	0.00	0.00	0.16	0.16	0.21

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

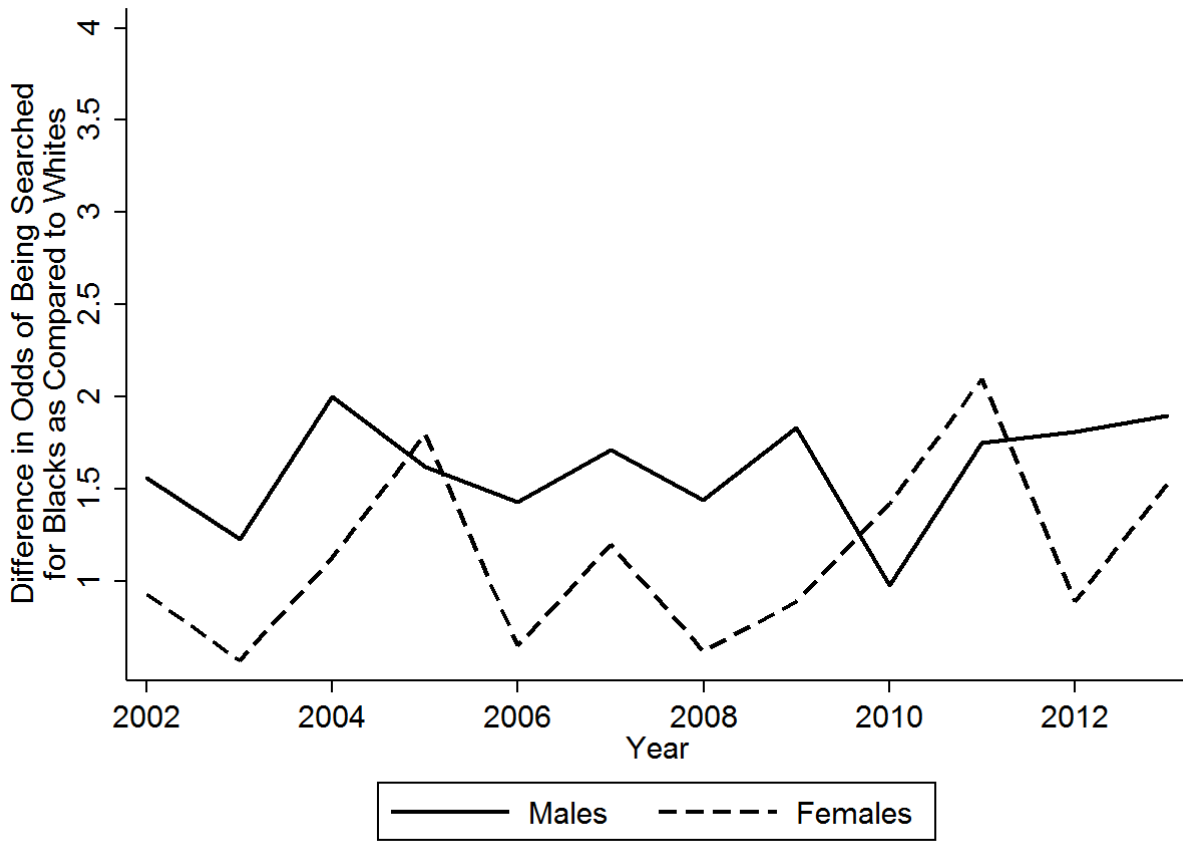
Note : The number of observations is smaller for Model 5 because the “hour of stop” variable is missing in some cases.

* = Significant at 0.05 p-value

† = Coded 1 for 13 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.

‡ = Coded 1 for 5 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.

Figure 14. Increased Odds of Search for Blacks, by Gender, 2002-2013



Appendix

Table A1. Racial Composition of Traffic Stops by Purpose, Passengers

Purpose	Number	Percent	
		White	Black
Total Stops	1,307	67.41	29.84
Speed Limit	206	63.11	34.95
Stop Light/Sign	61	47.54	50.82
Driving Impaired	121	84.30	14.05
Safe Movement	94	68.09	26.60
Vehicle Equipment	271	70.48	25.83
Vehicle Regulatory	170	67.65	30.00
Seat Belt	67	58.21	40.30
Investigation	234	64.53	32.05
Other Vehicle	76	73.68	25.00

Table A2. Percent of Men Searched by Race and Purpose of Stop

Purpose	Number	% Total	% White	% Black	Ratio
					Black:White
Total Stops	107,881	-	73.73	17.10	-
Total Searches	2,825	2.62	2.61	3.58	1.37
Speed Limit	42,468	1.47	1.46	2.14	1.47
Stop Light/Sign	7,829	1.67	1.73	2.39	1.38
Driving Impaired	1,204	32.14	36.21	17.98	0.50
Safe Movement	5,849	4.68	5.41	4.00	0.74
Vehicle Equipment	15,540	3.36	3.30	4.42	1.34
Vehicle Regulatory	21,545	1.84	1.58	3.52	2.23
Seat Belt	6,210	1.27	1.08	2.54	2.35
Investigation	3,405	7.81	7.24	11.57	1.60
Other Vehicle	3,831	3.73	3.65	5.56	1.52

Table A3. Percent of Women Searched by Race and Purpose of Stop

Purpose	Number	% Total	% White	% Black	Ratio
					Black:White
Total Stops	76,652	-	73.17	18.82	-
Total Searches	509	0.66	0.67	0.80	1.19
Speed Limit	35,378	0.29	0.28	0.37	1.32
Stop Light/Sign	5,468	0.42	0.45	0.62	1.38
Driving Impaired	492	20.12	22.25	10.13	0.46
Safe Movement	3,533	1.81	2.00	1.92	0.96
Vehicle Equipment	8,661	0.91	0.94	1.03	1.10
Vehicle Regulatory	16,829	0.37	0.34	0.61	1.79
Seat Belt	2,819	0.60	0.64	0.65	1.02
Investigation	1,274	3.06	2.63	4.35	1.65
Other Vehicle	2,198	1.09	0.94	1.63	1.73

Table A4. Type of Search by Race: Men

Search Type	Number	% Total	% White	% Black	Ratio Black:White
Total Stops	107,881	-	73.73	17.10	-
Total Searches	2,825	2.62	2.61	3.58	1.37
Consent	1,090	1.01	0.97	1.53	1.58
Search Warrant	11	-	-	-	-
Probable Cause	488	0.45	0.39	0.86	2.21
Incident to Arrest	1,211	1.12	1.21	1.16	0.96
Protective Frisk	25	0.02	0.02	0.03	1.50

Table A5. Type of Search by Race: Women

Search Type	Number	% Total	% White	% Black	Ratio Black:White
Total Stops	76,652	-	73.17	18.82	-
Total Searches	509	0.66	0.67	0.80	1.19
Consent	166	0.22	0.22	0.23	1.05
Search Warrant	0	-	-	-	-
Probable Cause	101	0.13	0.11	0.24	2.18
Incident to Arrest	239	0.31	0.33	0.31	0.94
Protective Frisk	3	0.00	0.00	0.01	

Figure A6. Stops by Day of the Week

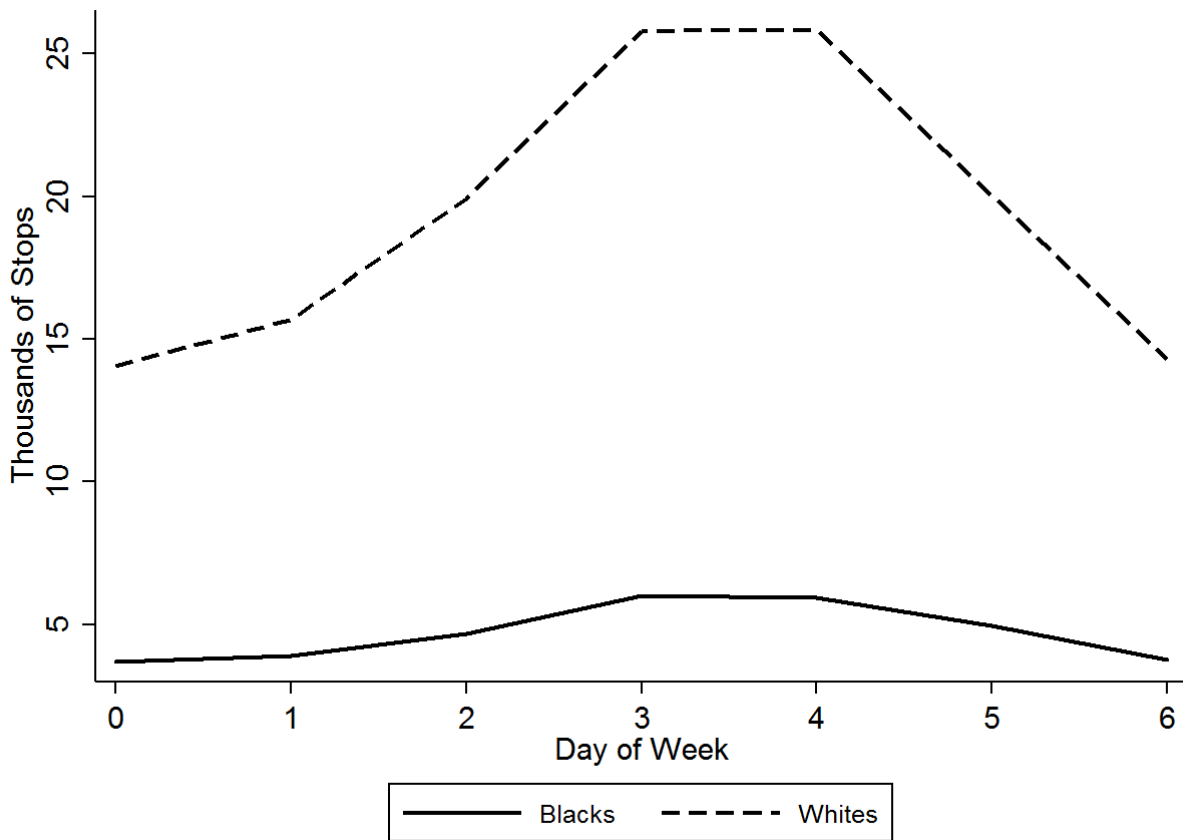


Figure A7. Searches by Day of the Week

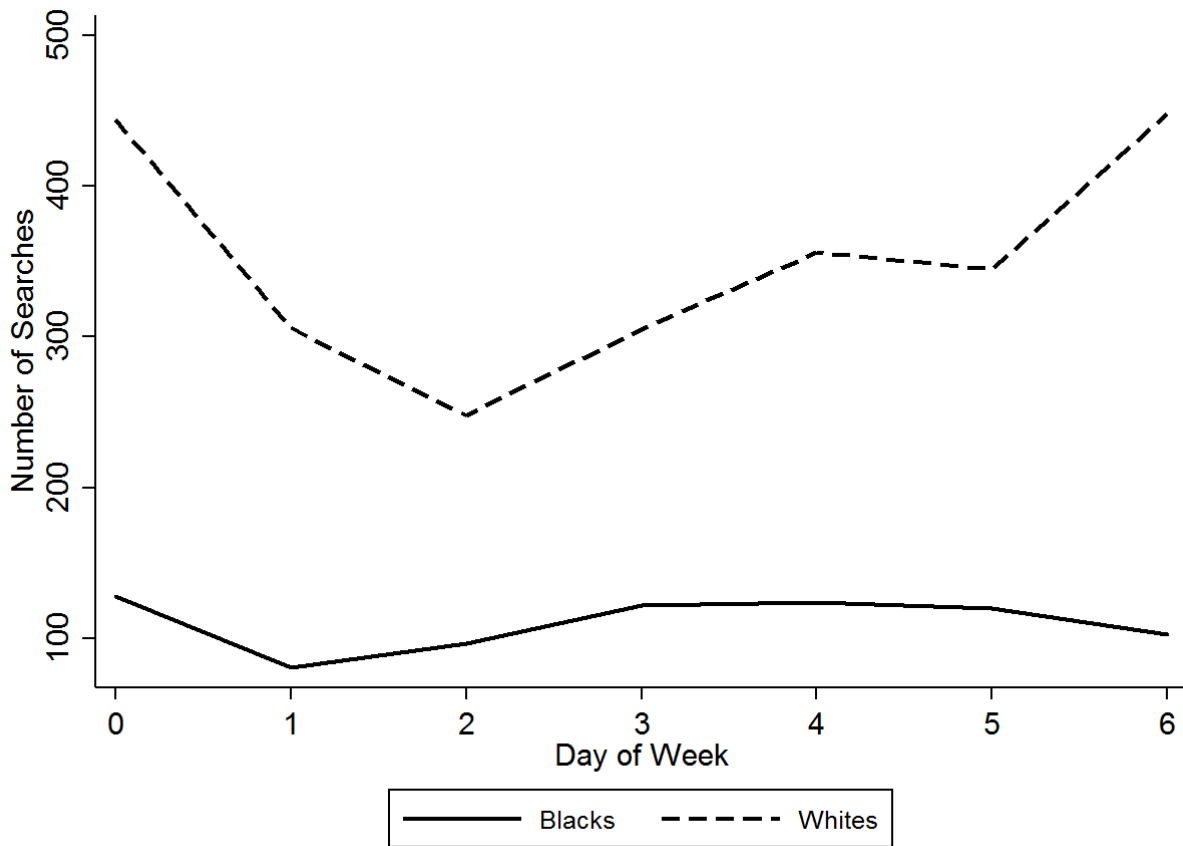
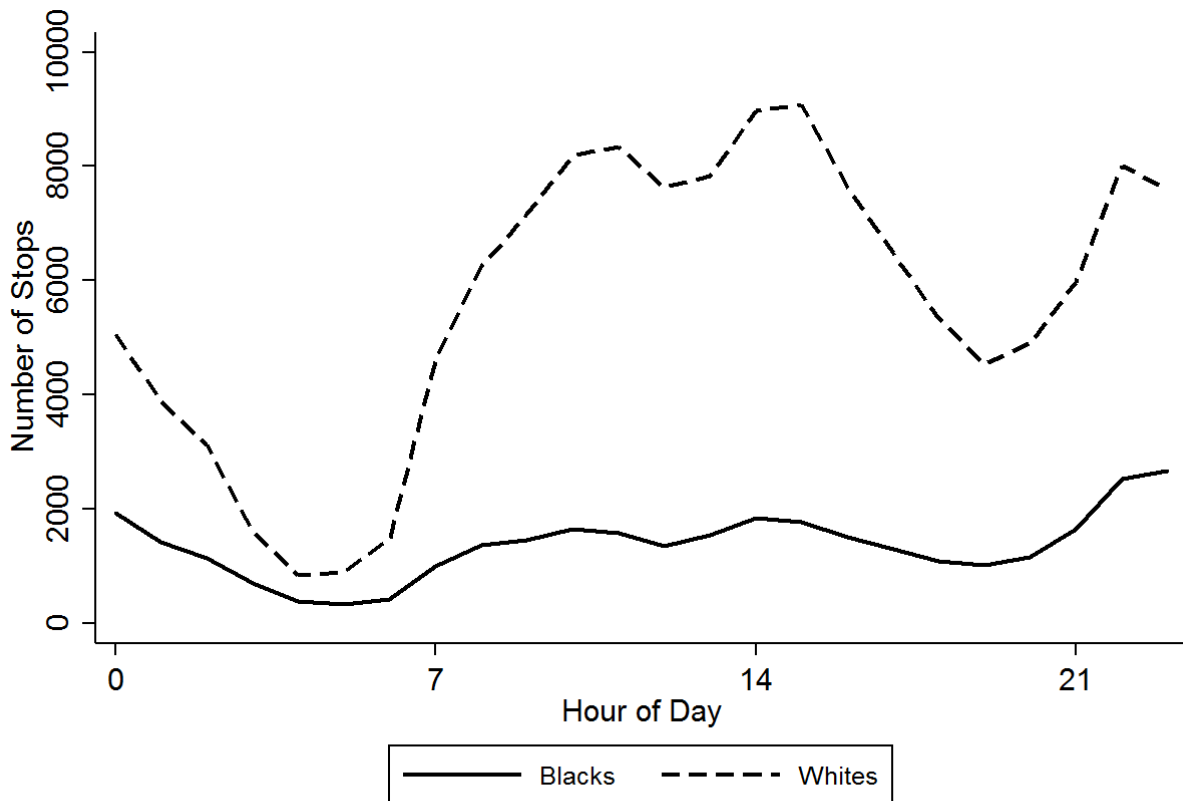
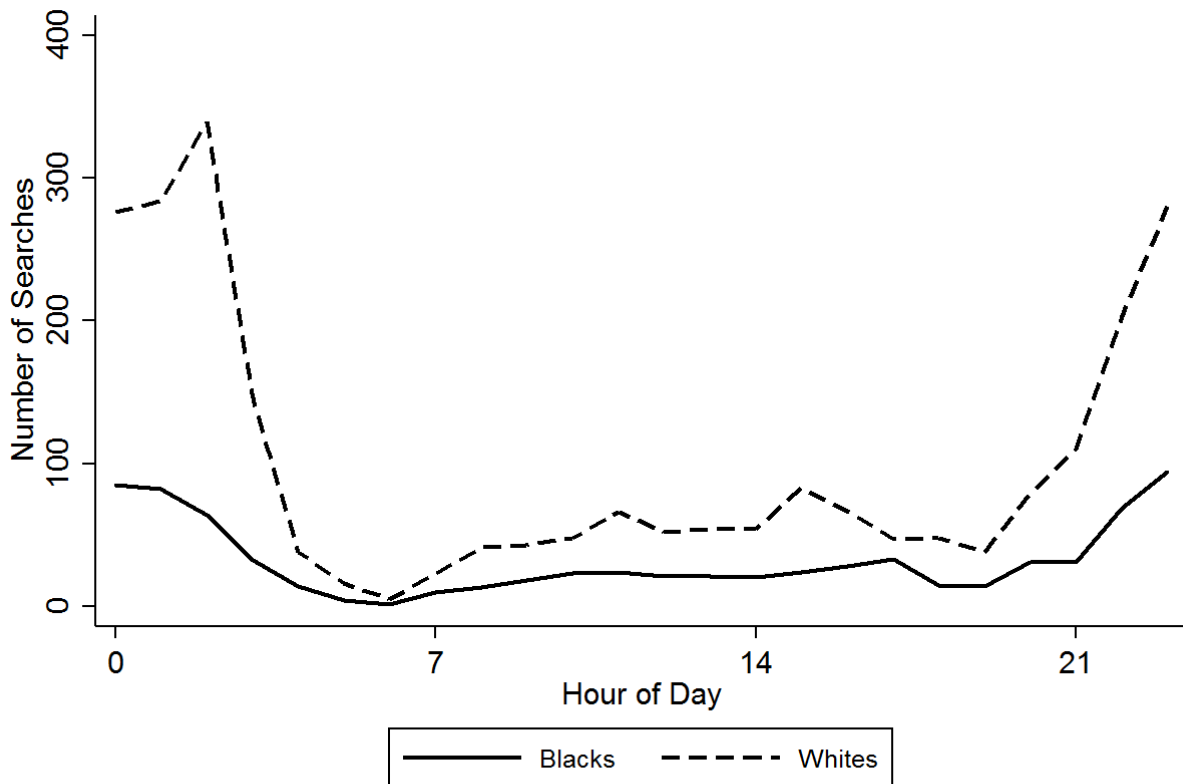


Figure A8. Stops by Hour of the Day



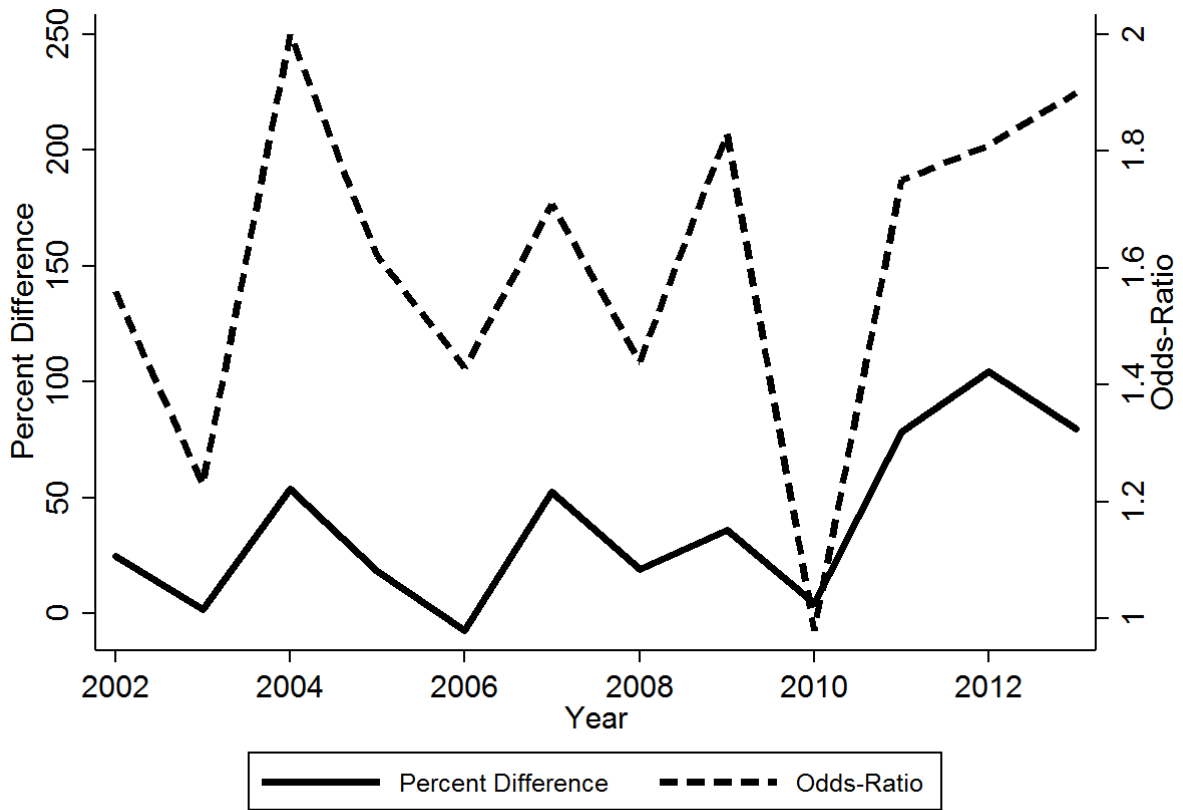
The figure excludes cases where the hour and minute was exactly 0:00. These cases were presumed to be missing data.

Figure A9. Searches by Hour of the Day



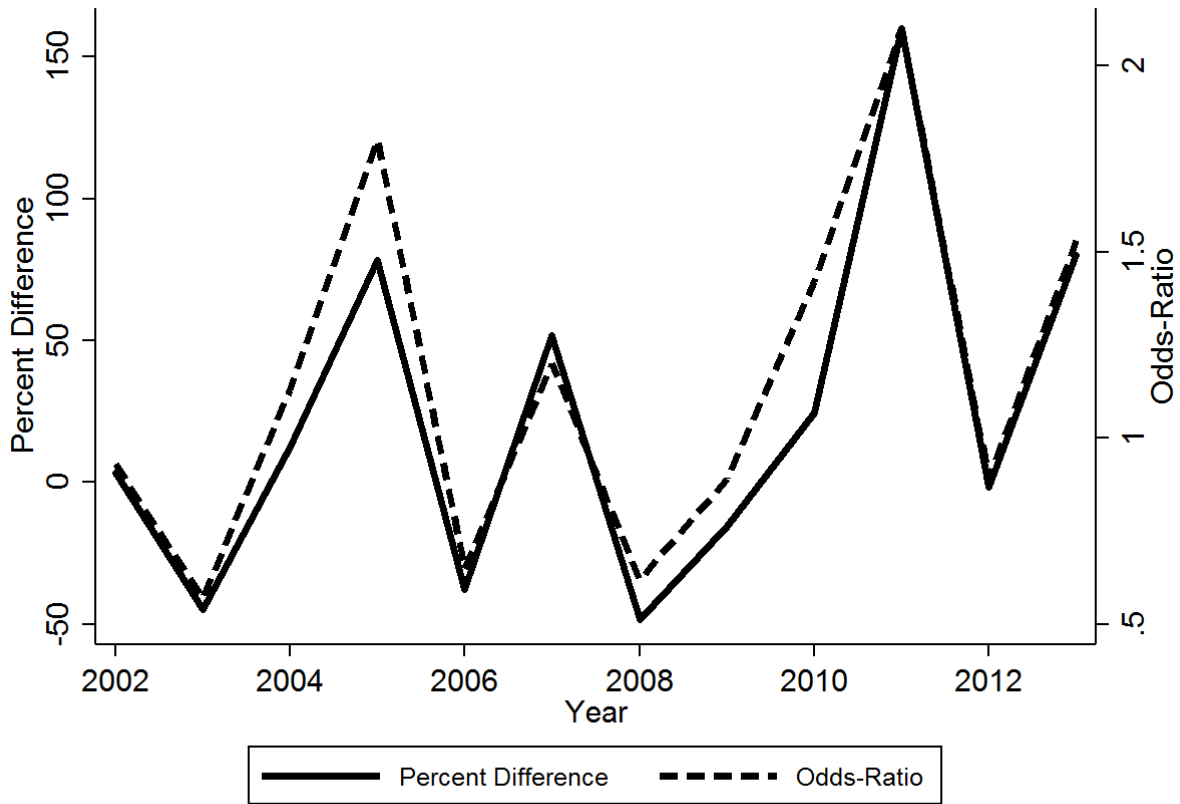
The figure excludes cases where the hour and minute was exactly 0:00. These cases were presumed to be missing data.

Figure A10. Correlation Between Percent Difference in Likelihood of Black Men being Searched as Compared to Whites and Odds-Ratios from Logistic Regression



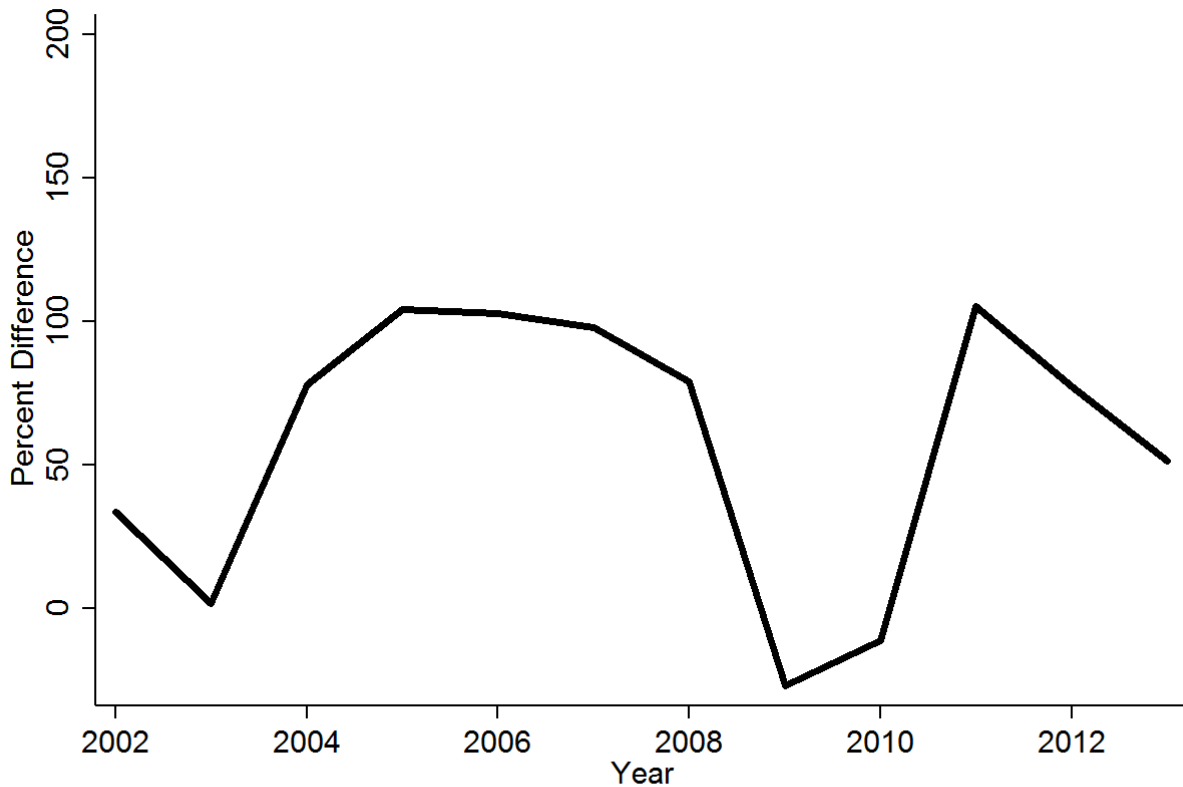
Correlation: 0.742

Figure A11. Correlation Between Percent Difference in Likelihood of Black Women being Searched as Compared to Whites and Odds-Ratios from Logistic Regression



Correlation: 0.965

Figure A12. Racial Differences in the Likelihood of Search: Consent Searches Only



The figure shows the percentage difference in the likelihood of Blacks being searched as compared to Whites; consent searches only.

Table A6. Likelihood of Finding Contraband Given a Search, by Race

Contraband	Number	% Total	% White	% Black
Yes	2,452	21.27	20.60	23.61
No	775	78.73	79.40	76.39
Total	3,334	100.00	100.00	100.00

Table A7. Differential Outcomes by Whether or not a Search Occurs

Race	Search Occur	N	No Action	Verbal Warning	Written Warning	Citation Issued	Arrest	Total
White	No	133,180	1.33	47.52	281	47.80	0.54	100.0
Black	No	32,095	1.54	53.10	2.41	42.27	0.69	100.0
Total	No	181,199	1.36	48.92	2.69	46.49	0.54	100.0
White	Yes	2,452	1.18	16.52	0.69	29.36	52.24	100.0
Black	Yes	775	1.68	21.29	1.55	33.16	42.32	100.0
Total	Yes	3,334	1.35	17.82	0.90	30.17	49.76	100.0