

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

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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

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 | 408,516 |
| -2001 | 1 |
| -2014 | 16,213 |
| -Passengers | 3,099 |
| -Checkpoint stops | 82 |
| Total number of cases deleted | 19,231 |
| Stops for analysis | 389,285 |
| Searches | 7,678 |
| Percent of stops leading to search (search rate) | 1.97% |

Figure 1. Number of Traffic Stops per Year

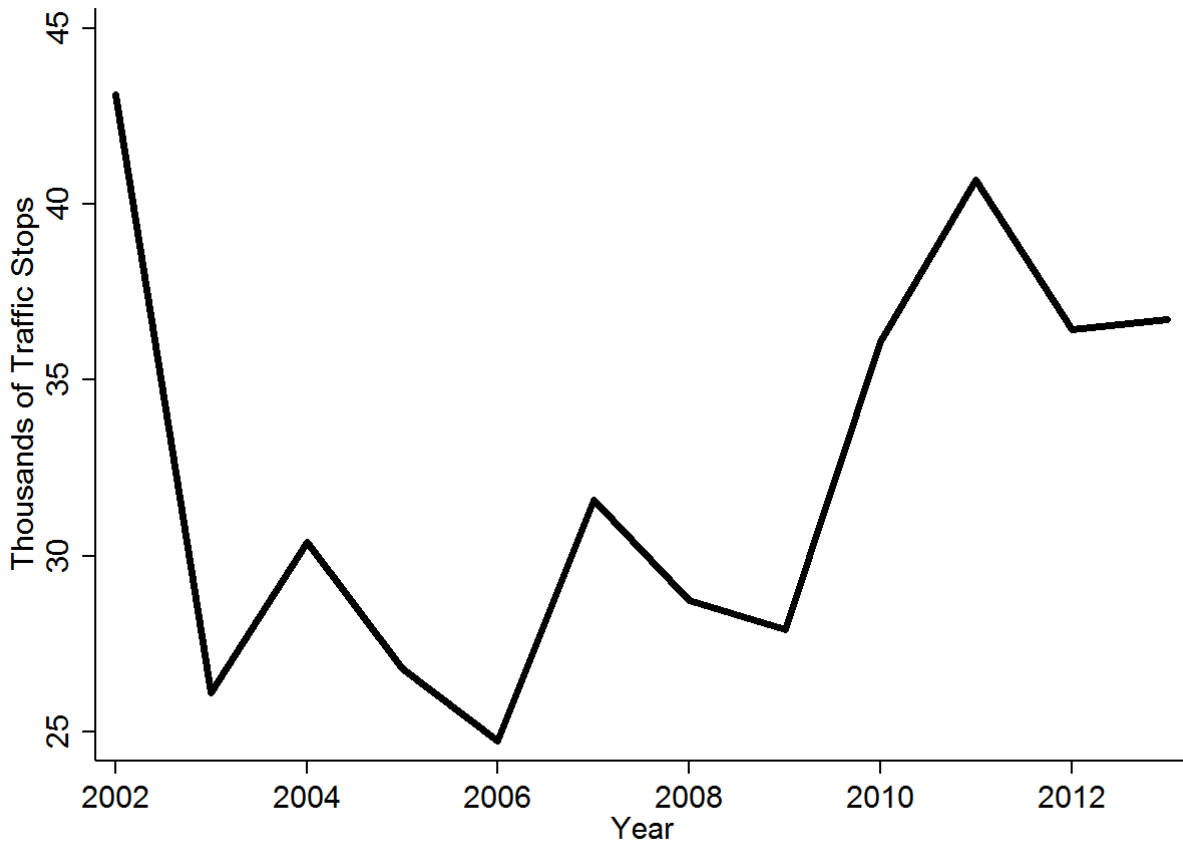


Figure 2. Racial Composition of Traffic Stops by Year

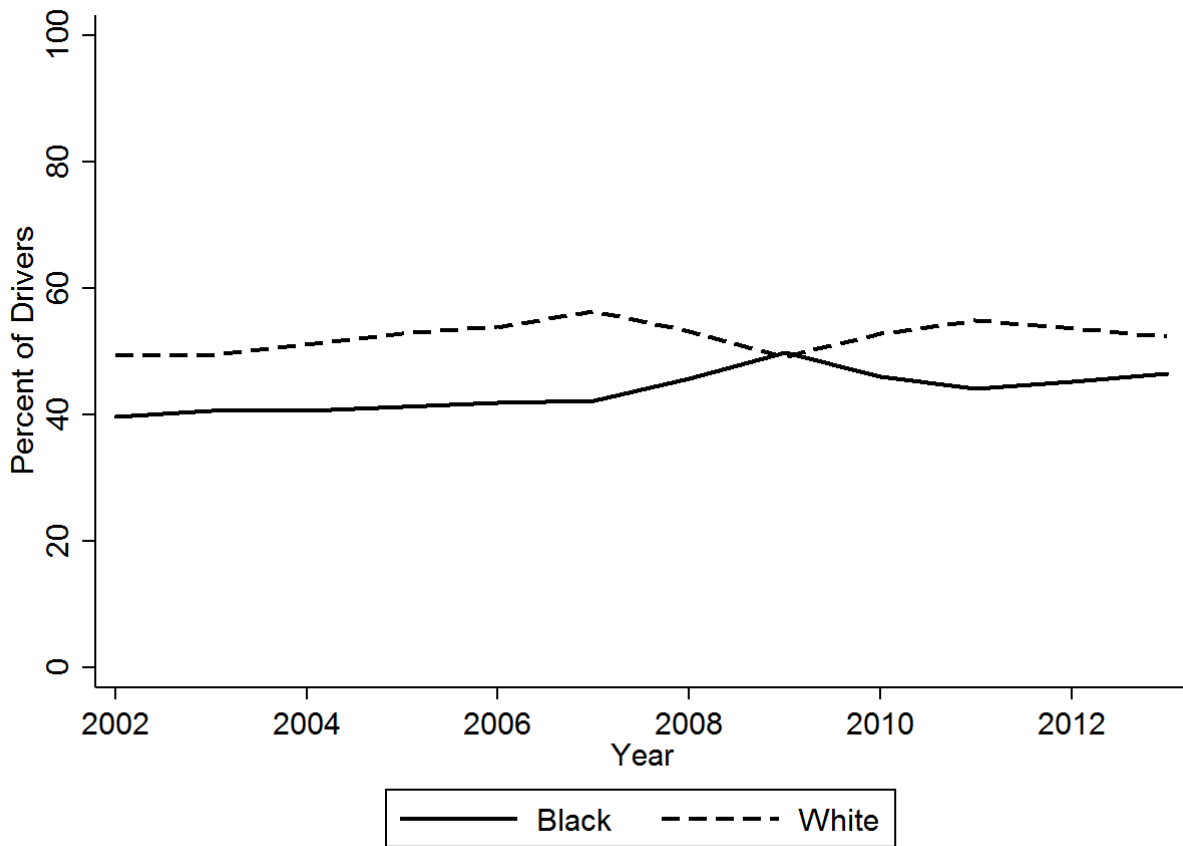


Table 2. Racial Composition of Traffic Stops by Purpose, Drivers

| Purpose | Number | Percent | |
|--------------------|---------|---------|-------|
| | | White | Black |
| Total Stops | 389,285 | 52.42 | 43.63 |
| Speed Limit | 130,771 | 60.46 | 35.26 |
| Stop Light/Sign | 28,652 | 52.57 | 42.13 |
| Driving Impaired | 3,027 | 58.21 | 31.57 |
| Safe Movement | 19,229 | 55.62 | 39.31 |
| Vehicle Equipment | 46,911 | 42.80 | 52.63 |
| Vehicle Regulatory | 109,399 | 48.54 | 49.03 |
| Seat Belt | 13,341 | 45.07 | 48.47 |
| Investigation | 11,109 | 48.29 | 51.08 |
| Other Vehicle | 26,846 | 48.11 | 47.15 |

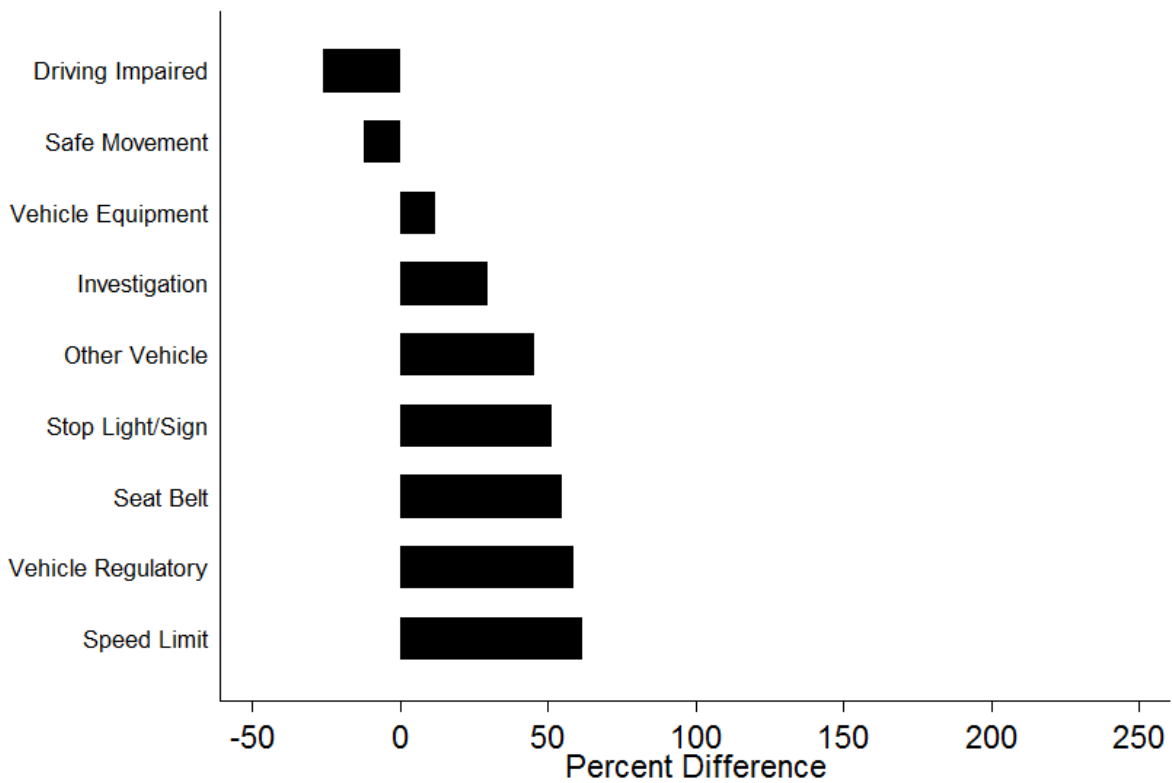
Note: Includes only drivers. Excludes 82 checkpoint stops. Excludes 3,099 passengers.

Table 3. Percent Searched by Race and Purpose of Stop

| Purpose | Number | % Total | % White | % Black | Ratio |
|--------------------|---------|---------|---------|---------|-------------|
| | | | | | Black:White |
| Total Stops | 389,285 | - | 52.42 | 43.63 | - |
| Total Searches | 7,678 | 1.97 | 1.76 | 2.18 | 1.24 |
| Speed Limit | 130,771 | 0.82 | 0.66 | 1.07 | 1.62 |
| Stop Light/Sign | 28,652 | 1.40 | 1.13 | 1.71 | 1.51 |
| Driving Impaired | 3,027 | 38.62 | 42.22 | 31.22 | 0.74 |
| Safe Movement | 19,229 | 5.04 | 5.29 | 4.64 | 0.88 |
| Vehicle Equipment | 46,911 | 2.34 | 2.22 | 2.48 | 1.12 |
| Vehicle Regulatory | 109,399 | 1.26 | 0.98 | 1.55 | 1.58 |
| Seat Belt | 13,341 | 1.93 | 1.55 | 2.40 | 1.55 |
| Investigation | 11,109 | 5.74 | 4.96 | 6.43 | 1.30 |
| Other Vehicle | 26,846 | 2.57 | 2.08 | 3.03 | 1.46 |

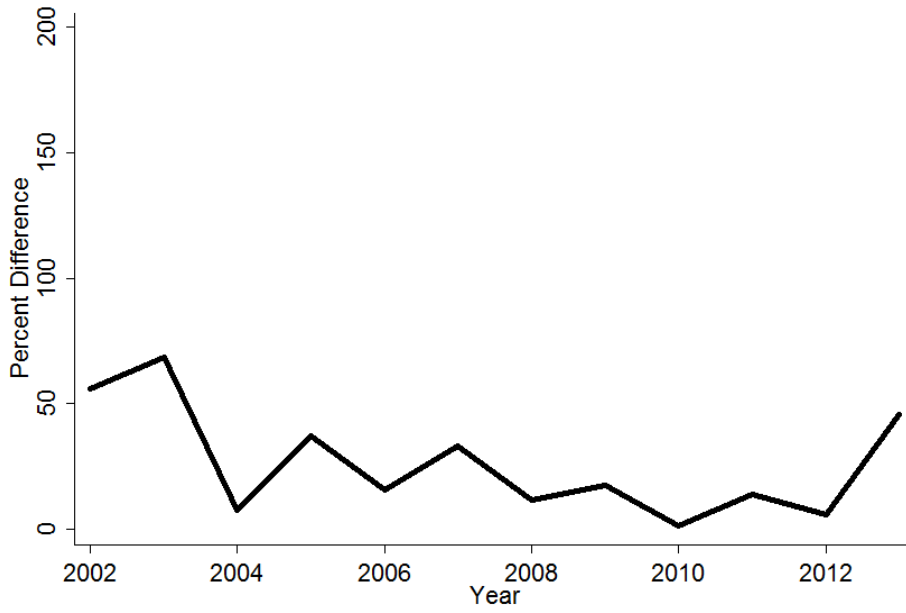
Note: See the appendix for this same table broken down for Men and Women.

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



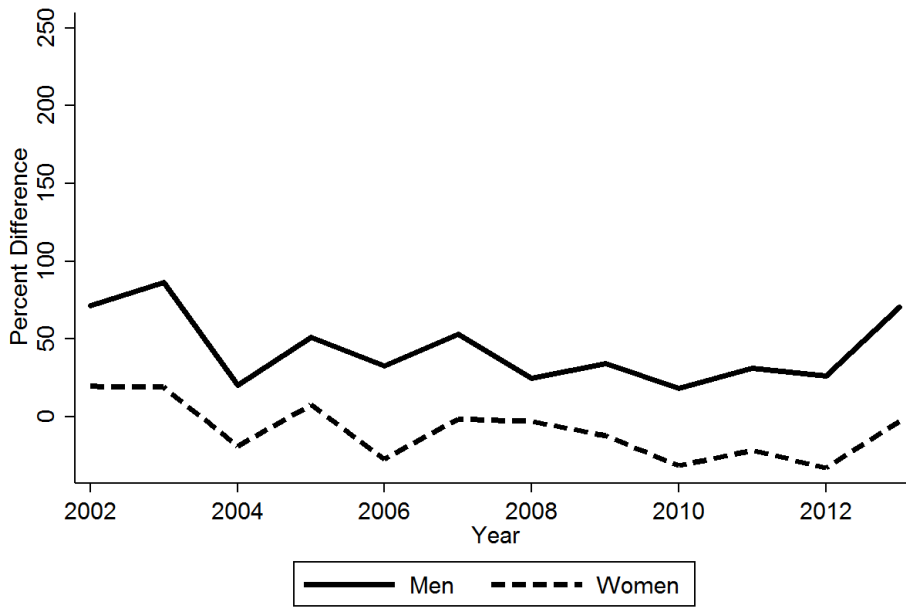
The figure shows the percentage difference in the likelihood of Blacks being searched as compared to Whites by purpose of stop.

Figure 4. Racial Differences in the Likelihood of Search



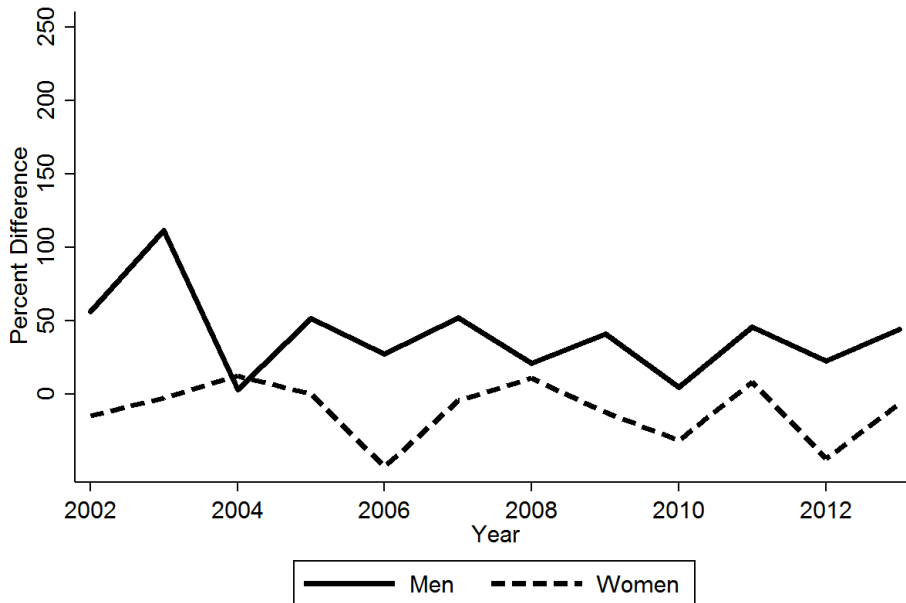
The figure shows the percentage difference in the likelihood of Blacks being searched as compared to Whites.

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



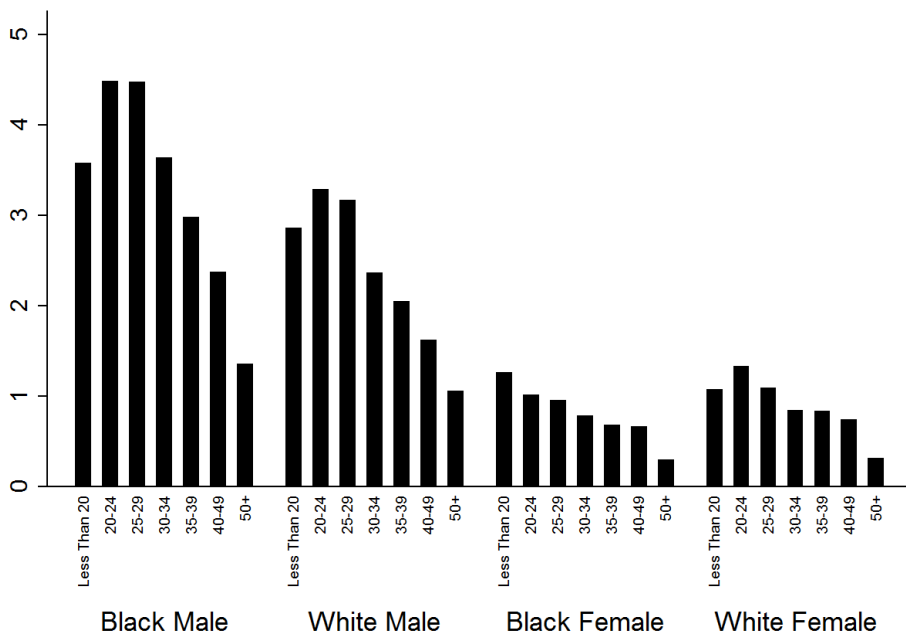
The figure shows the percentage difference in the likelihood of Blacks being searched as compared to Whites by gender.

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



Based on 389,285 traffic stops from 2002 through 2013, and 7,678 searches. Overall rate of search: 1.97 percent.

Black men under the age of 30 are searched at rates of about 6 percent whereas white men of that age see rates of about 4 percent, and women in general are typically below 2 percent. The figure makes clear how race, gender, and age 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

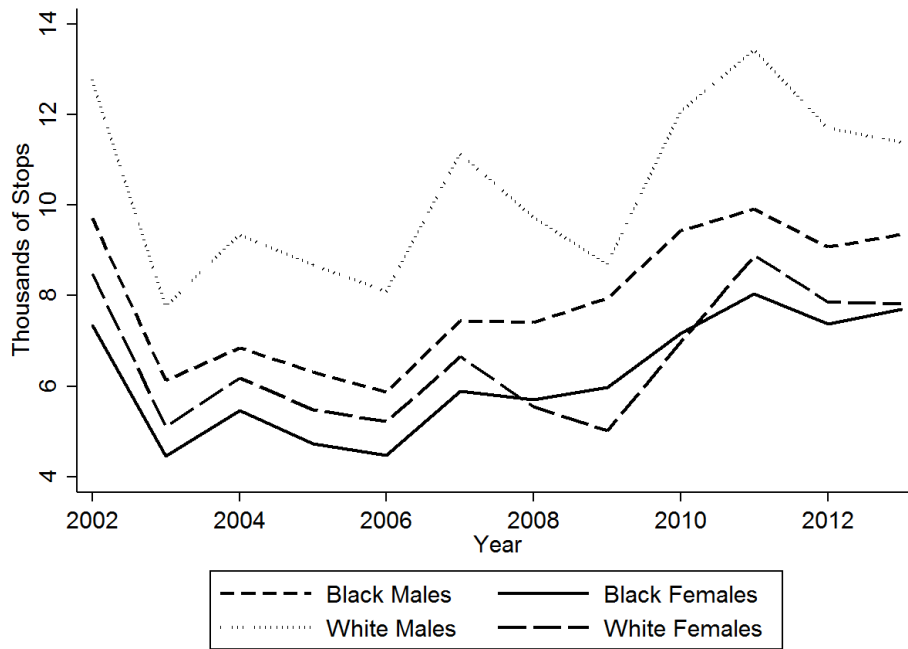


Figure 9. Percent of Stops Resulting in a Search, by Race and Gender

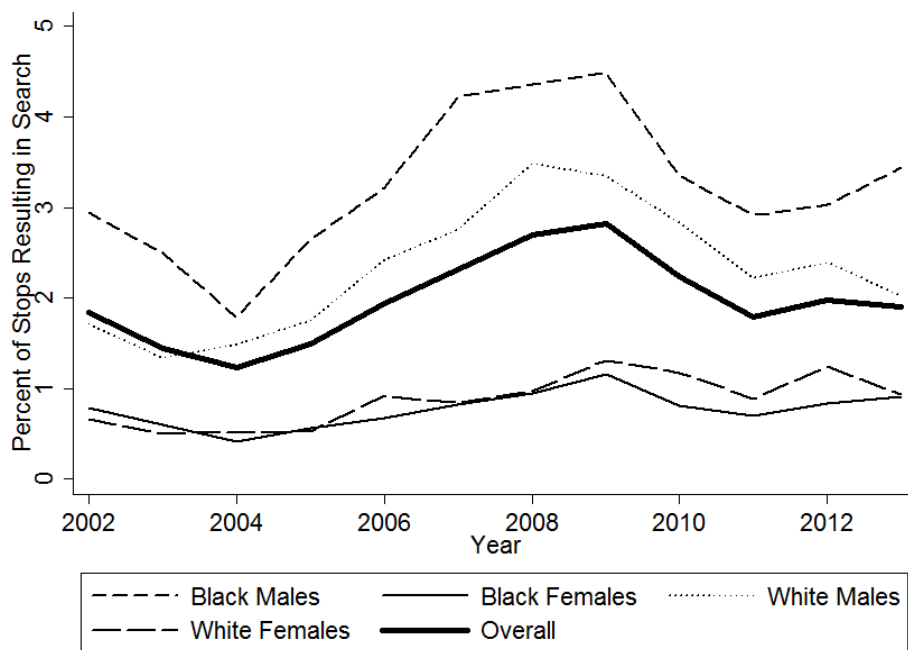


Table 4. Type of Search by Race

| Search Type | Number | % Total | % White | % Black | Ratio |
|--------------------|---------|---------|---------|---------|-------------|
| | | | | | Black:White |
| Total Stops | 389,285 | - | 52.42 | 43.63 | - |
| Total Searches | 7,678 | 1.97 | 1.76 | 2.18 | 1.24 |
| Consent | 2,081 | 0.53 | 0.45 | 0.64 | 1.42 |
| Search Warrant | 3 | - | - | - | - |
| Probable Cause | 1,509 | 0.39 | 0.25 | 0.58 | 2.32 |
| Incident to Arrest | 4,015 | 1.03 | 1.05 | 0.93 | 0.89 |
| Protective Frisk | 70 | 0.02 | 0.02 | 0.02 | 1.00 |

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 | 2,424 | 51.77 | 51.77 | 0.15 | 0.15 |
| 2 – 10 | 1,020 | 21.79 | 73.56 | 0.37 | 0.52 |
| 11 - 100 | 473 | 10.10 | 83.66 | 3.39 | 3.91 |
| 101 – 1,000 | 689 | 14.72 | 98.38 | 45.04 | 48.95 |
| 1,001 + | 76 | 1.62 | 100.00 | 51.05 | 100.00 |
| Total | 4,682 | 100 | - | 100 | - |

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

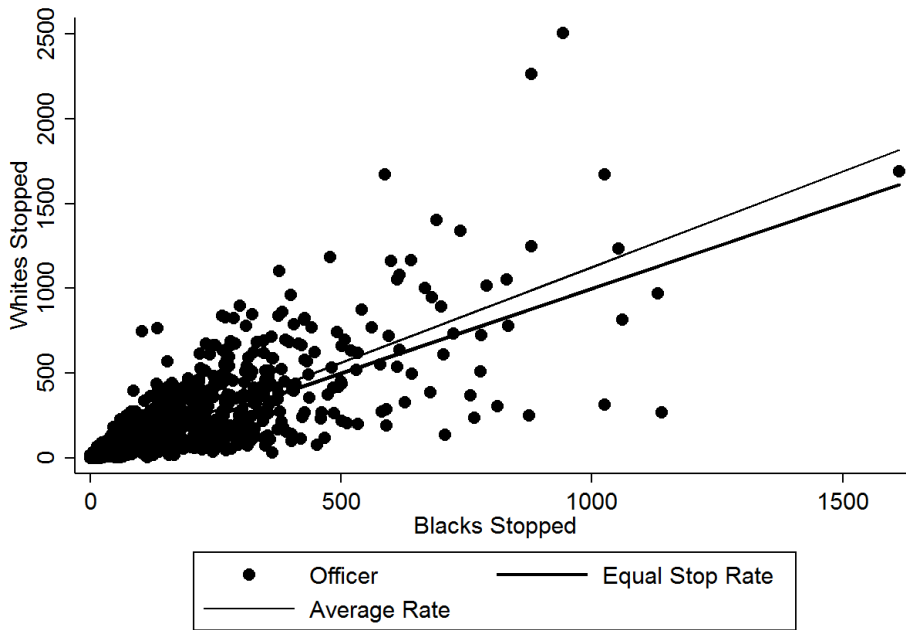


Figure 11. Number of Black and White Motorists Searched, by Officer

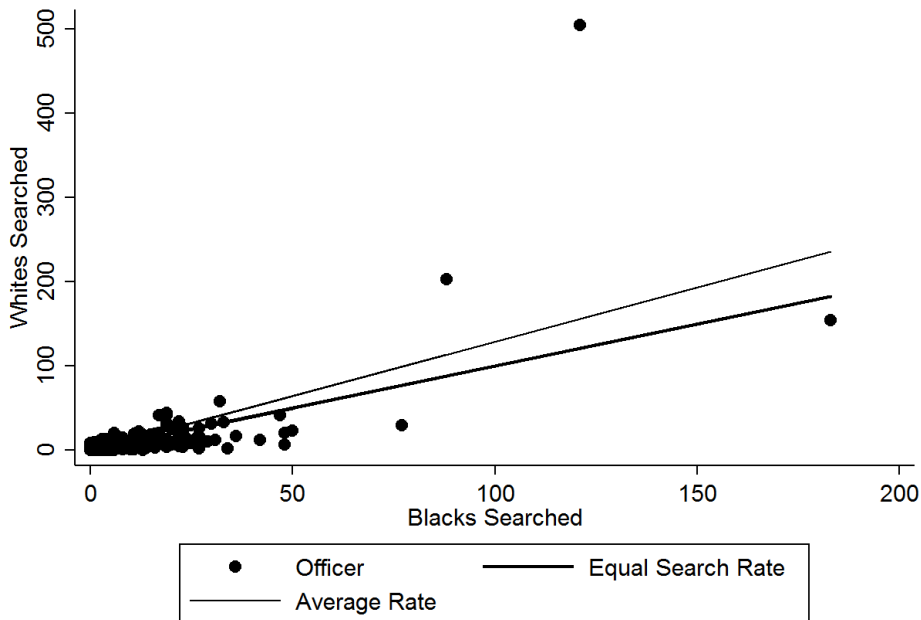
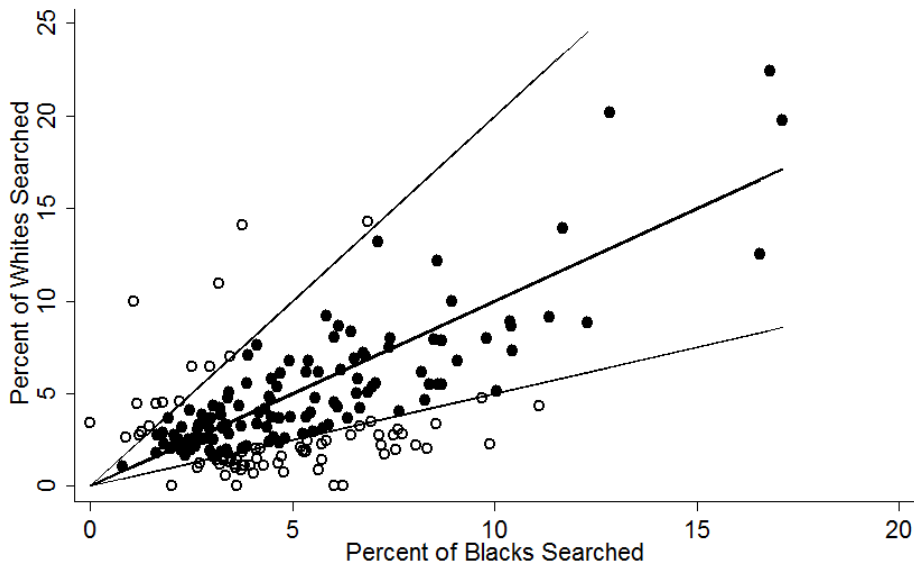


Figure 12. Percent of White and Black Drivers Searched, by Officer



Includes 191 officers with a minimum of 50 White stops, 50 Black stops, and a search rate above the department average of 1.97. The hollow circles indicate high disparity officers. 16 officers search Whites at more than twice the rate that they search Blacks. 54 officers search Blacks at more than twice the rate that they search Whites.

Table 6. Predicting the Occurrence of a Search, Male Drivers

| Variable | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
|------------------------------|-------------|-------------|--------------|--------------|--------------|
| Demographics | | | | | |
| Race | 1.64*(0.05) | 1.61*(0.05) | 1.56*(0.05) | 1.54*(0.05) | 1.42*(0.05) |
| Hispanic | 1.96*(0.08) | 1.76*(0.07) | 1.30*(0.06) | 1.28*(0.06) | 1.24*(0.06) |
| Age | - | 0.97*(0.00) | 0.97*(0.00) | 0.97*(0.00) | 0.97*(0.00) |
| Stop Purpose | | | | | |
| Speed Limit | - | - | - | - | - |
| Stop Light | - | - | 1.65*(0.11) | 1.64*(0.11) | 1.64*(0.12) |
| Impaired | - | - | 64.17*(3.72) | 62.00*(3.62) | 44.66*(3.04) |
| Movement | - | - | 5.72*(0.30) | 5.60*(0.29) | 5.29*(0.30) |
| Equipment | - | - | 2.43*(0.12) | 2.39*(0.12) | 2.01*(0.11) |
| Regulatory | - | - | 1.58*(0.07) | 1.56*(0.07) | 1.46*(0.08) |
| Seat Belt | - | - | 2.05*(0.16) | 2.04*(0.16) | 2.76*(0.25) |
| Investigation | - | - | 6.08*(0.35) | 5.99*(0.35) | 5.18*(0.32) |
| Other | - | - | 2.67*(0.15) | 2.67*(0.15) | 2.14*(0.14) |
| Officer Type | | | | | |
| Black Disparity [†] | - | - | - | 1.86*(0.08) | 1.77*(0.09) |
| White Disparity [†] | - | - | - | 1.65*(0.14) | 1.61*(0.15) |
| Time | | | | | |
| Hour of Day | - | - | - | - | Included |
| Day of Week | - | - | - | - | Included |
| Constant | 0.02*(0.00) | 0.05*(0.00) | 0.03*(0.00) | 0.03*(0.00) | 0.04*(0.00) |
| N | 220,243 | 220,243 | 220,243 | 220,243 | 168,858 |
| Pseudo R² | 0.00 | 0.00 | 0.12 | 0.12 | 0.13 |

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.

* $p < 0.05$

† See Figure 12 for an explanation of the identification of high disparity officers.

Table 7. Predicting the Occurrence of a Search, Female Drivers

| Variable | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
|------------------------------|-------------|-------------|----------------|----------------|--------------|
| Demographics | | | | | |
| Race | 0.85*(0.05) | 0.83*(0.05) | 0.80*(0.05) | 0.78*(0.05) | 0.72*(0.05) |
| Hispanic | 0.57*(0.09) | 0.52*(0.08) | 0.40*(0.06) | 0.39*(0.06) | 0.39*(0.07) |
| Age | - | 0.97*(0.00) | 0.97*(0.00) | 0.97*(0.00) | 0.98*(0.00) |
| Stop Purpose | | | | | |
| Speed Limit | - | - | - | - | - |
| Stop Light | - | - | 2.01*(0.29) | 2.02*(0.29) | 1.95*(0.31) |
| Impaired | - | - | 122.47*(14.18) | 114.84*(13.38) | 54.22*(7.40) |
| Movement | - | - | 8.84*(0.96) | 8.58*(0.93) | 6.67*(0.79) |
| Equipment | - | - | 3.63*(0.38) | 3.57*(0.38) | 2.13*(0.26) |
| Regulatory | - | - | 1.76*(0.17) | 1.72*(0.17) | 1.52*(0.17) |
| Seat Belt | - | - | 2.25*(0.46) | 2.23*(0.46) | 3.64*(0.89) |
| Investigation | - | - | 10.36*(1.27) | 10.23*(1.26) | 7.20*(0.93) |
| Other | - | - | 3.65*(0.46) | 3.65*(0.46) | 2.46*(0.36) |
| Officer Type | | | | | |
| Black Disparity [†] | - | - | - | 1.96*(0.18) | 1.91*(0.20) |
| White Disparity [†] | - | - | - | 1.69*(0.31) | 1.58*(0.34) |
| Time | | | | | |
| Hour of Day | - | - | - | - | Included |
| Day of Week | - | - | - | - | Included |
| Constant | 0.01*(0.00) | 0.03*(0.00) | 0.01*(0.00) | 0.01*(0.00) | 0.02*(0.00) |
| N | 153,635 | 153,635 | 153,635 | 153,635 | 117,192 |
| Pseudo R² | 0.00 | 0.01 | 0.01 | 0.13 | 0.16 |

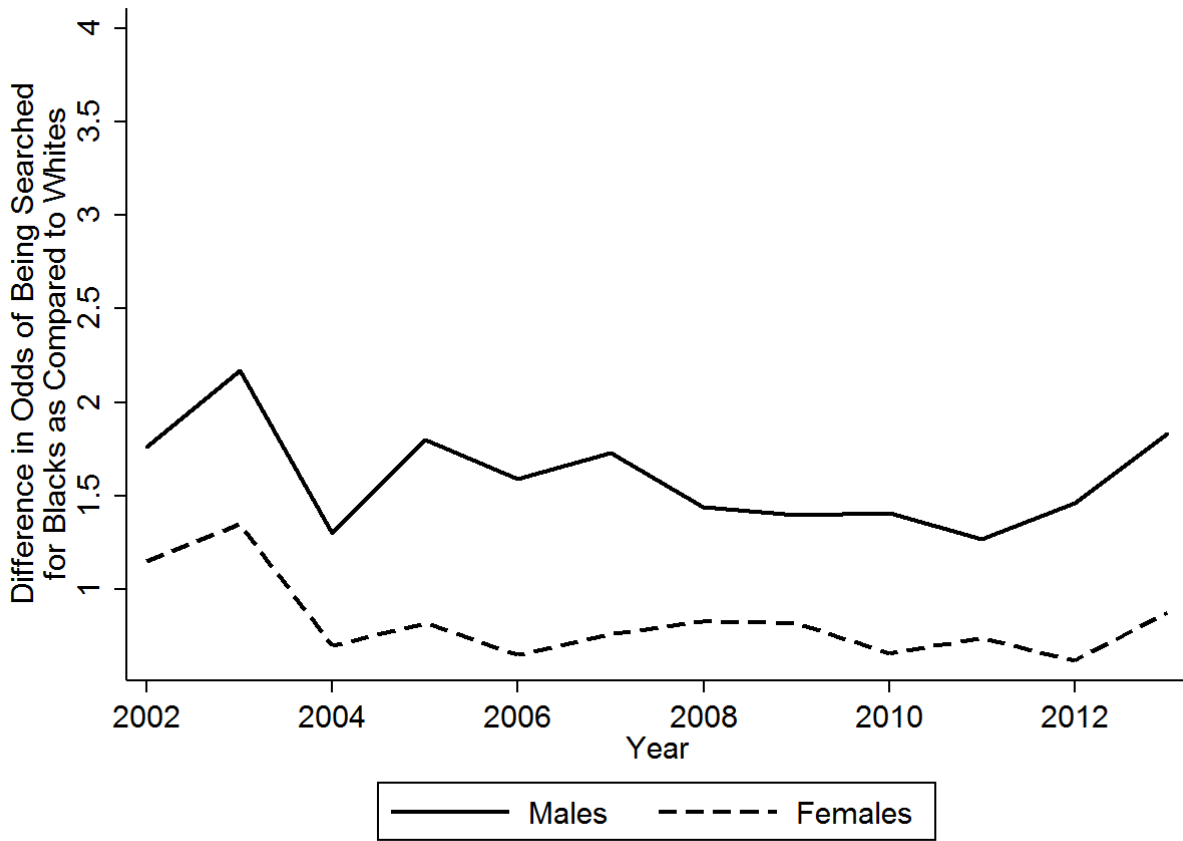
Note: Entries are odds-ratios, with standard errors in parenthesis.

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

* $p < 0.05$

† See Figure 12 for an explanation of the identification of high disparity officers.

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 | 3,099 | 38.30 | 58.70 |
| Speed Limit | 392 | 38.52 | 58.67 |
| Stop Light/Sign | 129 | 28.68 | 65.89 |
| Driving Impaired | 146 | 58.22 | 28.08 |
| Safe Movement | 334 | 49.10 | 46.11 |
| Vehicle Equipment | 549 | 35.52 | 61.57 |
| Vehicle Regulatory | 687 | 34.93 | 63.61 |
| Seat Belt | 164 | 40.24 | 59.15 |
| Investigation | 370 | 37.57 | 61.89 |
| Other Vehicle | 328 | 33.54 | 63.41 |

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

| Purpose | Number | % Total | % White | % Black | Ratio |
|--------------------|---------|---------|---------|---------|-------------|
| | | | | | Black:White |
| Total Stops | 232,053 | - | 53.77 | 41.14 | - |
| Total Searches | 6,384 | 2.75 | 2.32 | 3.26 | 1.41 |
| Speed Limit | 75,633 | 1.19 | 0.89 | 1.73 | 1.94 |
| Stop Light/Sign | 17,018 | 1.96 | 1.51 | 2.51 | 1.66 |
| Driving Impaired | 2,320 | 42.20 | 45.30 | 35.72 | 0.79 |
| Safe Movement | 12,497 | 6.39 | 3.25 | 6.52 | 2.01 |
| Vehicle Equipment | 29,681 | 3.05 | 2.77 | 3.40 | 1.23 |
| Vehicle Regulatory | 61,005 | 1.85 | 1.34 | 2.43 | 1.81 |
| Seat Belt | 9,302 | 2.46 | 1.88 | 3.20 | 1.70 |
| Investigation | 7,238 | 7.23 | 5.82 | 8.70 | 1.49 |
| Other Vehicle | 17,359 | 3.39 | 2.67 | 4.18 | 1.57 |

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

| Purpose | Number | % Total | % White | % Black | Ratio |
|--------------------|---------|---------|---------|---------|-------------|
| | | | | | Black:White |
| Total Stops | 157,232 | - | 50.42 | 47.29 | - |
| Total Searches | 1,294 | 0.82 | 0.88 | 0.78 | 0.89 |
| Speed Limit | 55,138 | 0.32 | 0.33 | 0.32 | 0.97 |
| Stop Light/Sign | 11,634 | 0.58 | 0.55 | 0.67 | 1.22 |
| Driving Impaired | 707 | 26.87 | 33.11 | 17.37 | 0.52 |
| Safe Movement | 6,732 | 2.54 | 3.44 | 1.60 | 0.47 |
| Vehicle Equipment | 17,230 | 1.11 | 1.16 | 1.11 | 0.96 |
| Vehicle Regulatory | 48,394 | 0.52 | 0.47 | 0.57 | 1.21 |
| Seat Belt | 4,039 | 0.72 | 0.77 | 0.68 | 0.88 |
| Investigation | 3,871 | 2.97 | 2.97 | 2.95 | 0.99 |
| Other Vehicle | 9,487 | 1.05 | 0.94 | 1.19 | 1.27 |

Table A4. Type of Search by Race: Men

| Search Type | Number | % Total | % White | % Black | Ratio |
|--------------------|---------|---------|---------|---------|-------------|
| | | | | | Black:White |
| Total Stops | 232,053 | - | 53.77 | 41.14 | - |
| Total Searches | 6,384 | 2.75 | 2.32 | 3.26 | 1.41 |
| Consent | 1,747 | 0.75 | 0.61 | 0.97 | 1.59 |
| Search Warrant | 3 | - | - | - | - |
| Probable Cause | 1,250 | 0.54 | 0.33 | 0.87 | 2.64 |
| Incident to Arrest | 3,323 | 1.43 | 1.36 | 1.39 | 1.02 |
| Protective Frisk | 61 | 0.03 | 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 | 157,232 | - | 50.42 | 47.29 | - |
| Total Searches | 1,294 | 0.82 | 0.88 | 0.78 | 0.89 |
| Consent | 334 | 0.21 | 0.22 | 0.22 | 1.00 |
| Search Warrant | 0 | - | - | - | - |
| Probable Cause | 259 | 0.16 | 0.12 | 0.22 | 1.83 |
| Incident to Arrest | 692 | 0.44 | 0.54 | 0.34 | 0.63 |
| Protective Frisk | 9 | 0.01 | 0.01 | 0.01 | 1.00 |

Figure A6. Stops by Day of the Week

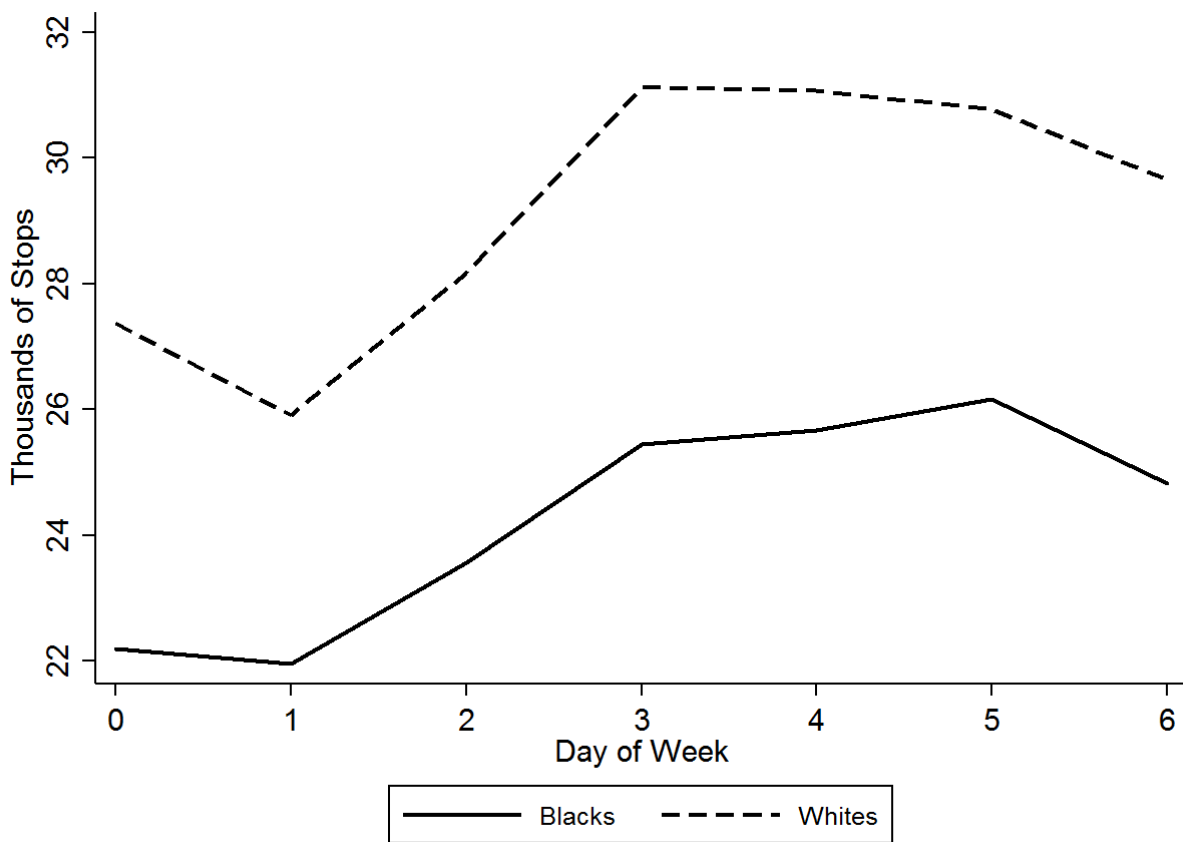


Figure A7. Searches by Day of the Week

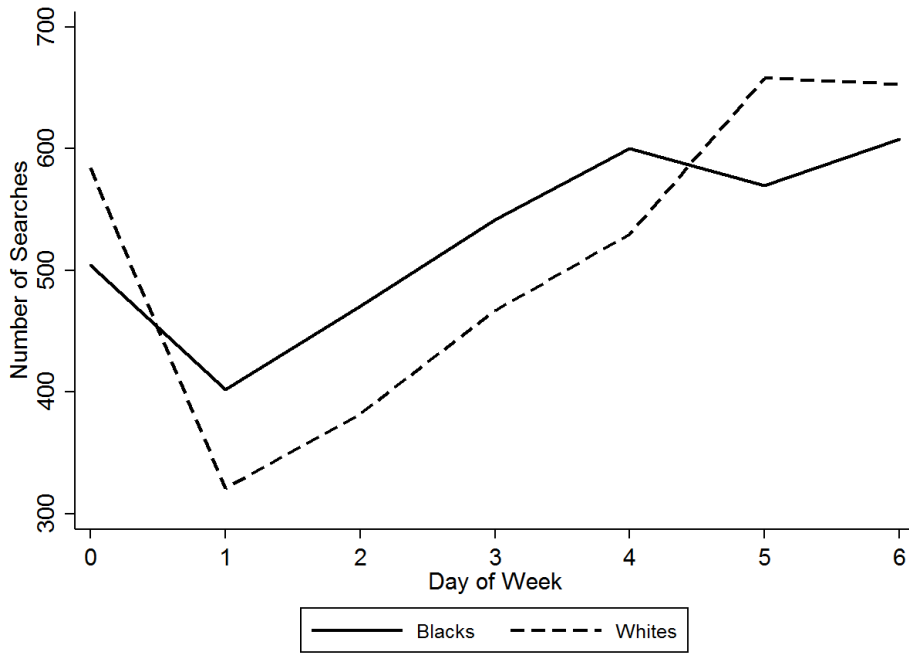
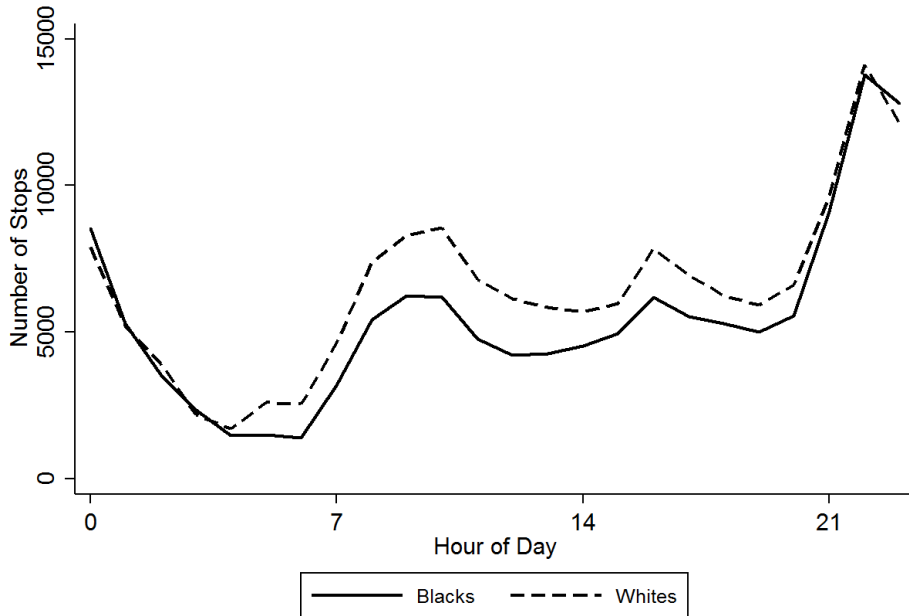
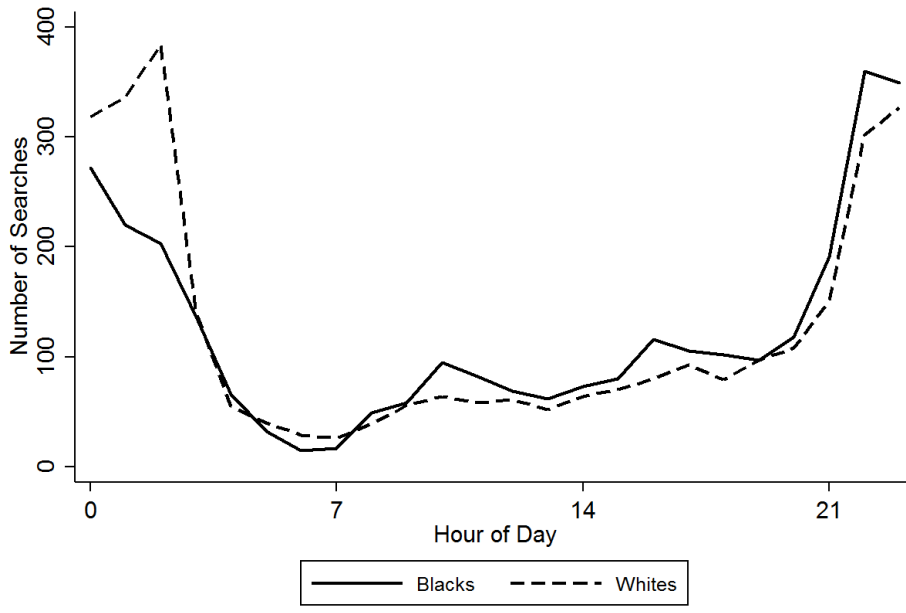


Figure A8. Stops by Hour of the Day



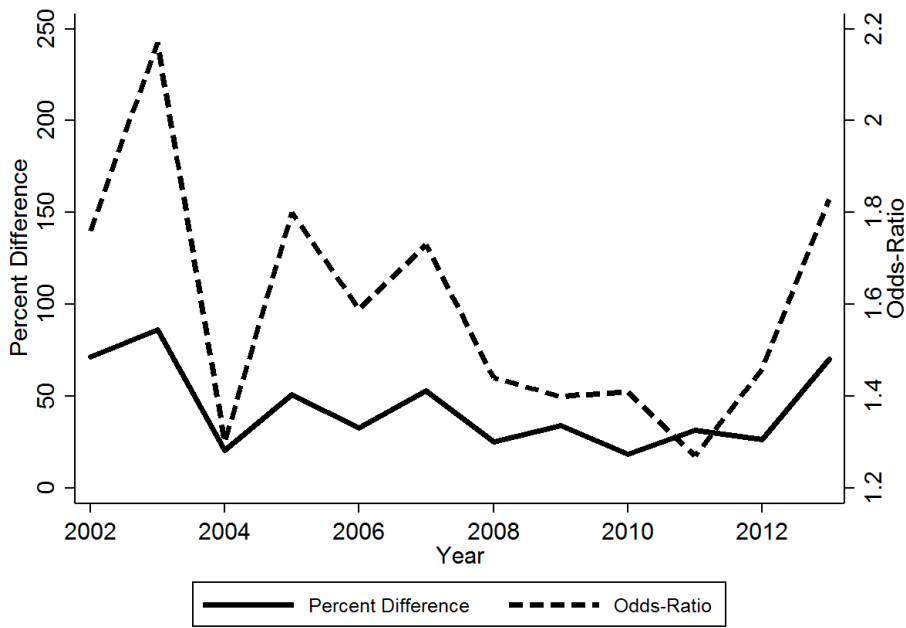
The figure excludes cases where the hour and minute was exactly 0:00. These cases were presumed to be missing data.

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: 0.918

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

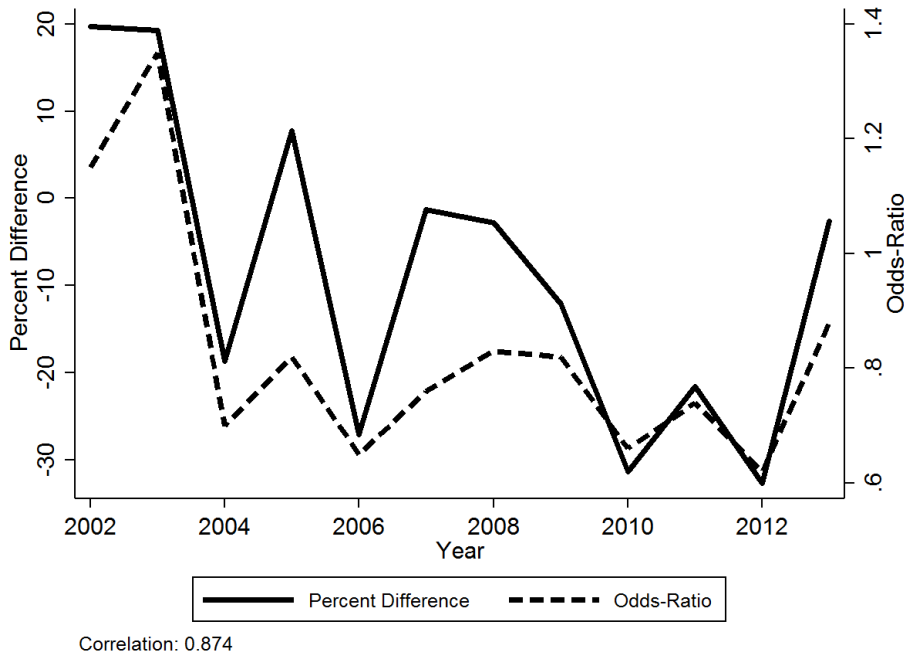


Figure A12. Racial Differences in the Likelihood of Search: Consent Searches Only

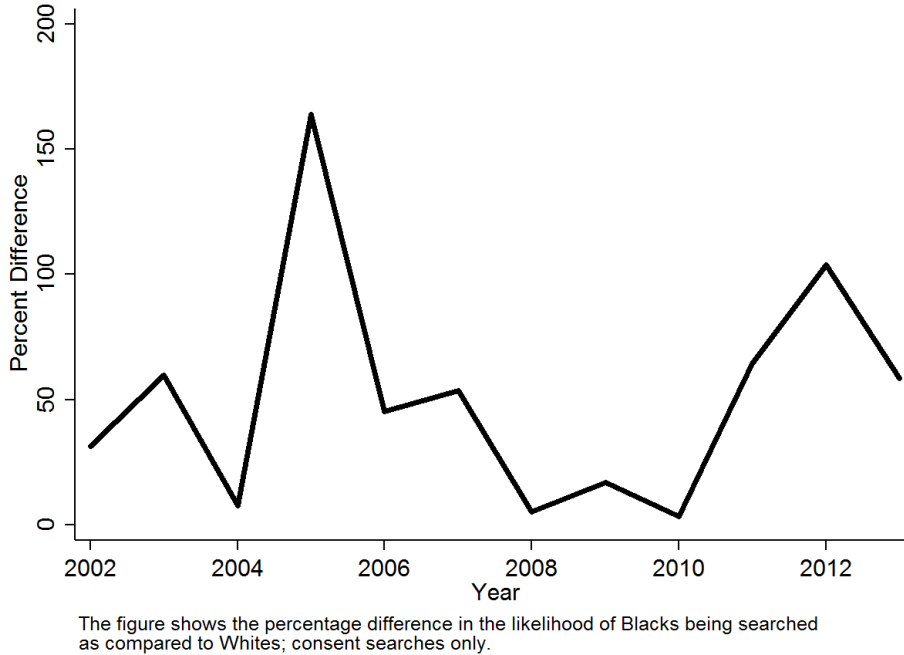


Table A6. Likelihood of Finding Contraband Given a Search, by Race

| Contraband | Number | % Total | % White | % Black |
|------------|--------|---------|---------|---------|
| Yes | 2,130 | 27.74 | 25.37 | 31.78 |
| No | 5,548 | 72.26 | 74.63 | 68.22 |
| Total | 7,578 | 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 | 200,455 | 1.79 | 19.00 | 5.49 | 73.18 | 0.54 | 100.0 |
| Black | No | 166,131 | 2.39 | 22.68 | 5.01 | 69.39 | 0.53 | 100.0 |
| Total | No | 381,607 | 2.03 | 20.28 | 5.44 | 71.72 | 0.54 | 100.0 |
| White | Yes | 3,595 | 0.81 | 4.53 | 3.76 | 32.02 | 58.89 | 100.0 |
| Black | Yes | 3,697 | 1.22 | 5.71 | 3.00 | 47.09 | 42.98 | 100.0 |
| Total | Yes | 7,678 | 1.00 | 5.11 | 3.27 | 38.85 | 51.77 | 100.0 |