The Association Between Race and Reason for Traffic Stop in Connecticut

Calder Burke, Applied Data Analysis, Wesleyan University

Introduction

- On average in America, decisions by police officers about which drivers to pull over are biased against black and Hispanic drivers (Pierson et al., 2020).
- Legislative intervention, such as the legalization of recreational marijuana, can reduce racial disparities in traffic stops (Pierson et al., 2020).
- Legislation has been passed in cities such as Philadelphia to forbid police officers from stopping drivers for minor vehicle offenses, like broken taillights. In Philadelphia, this legislation led to a black men being pulled over for minor vehicle violations 54% less than they had prior to the legislation (Caiola, 2023; Walsh, 2021).

Research Questions

- Does the race of driver affect the reason for a traffic stop by police in the state of Connecticut?
- Does gender of subject affect the proportion of subjects by race stopped for minor vehicle offenses?

Methods

Sample

- This analysis utilizes every incidence of traffic stop by police officer in the state of Connecticut in the year 2022, as compiled in the 2022 Connecticut Traffic Stops Study.
- The study includes the details of each stop, including the date, time, and location of each stop, the demographics of each driver, and the reason for each traffic stop.

Measures

- The independent variable **race** was created using the **SubjectRaceCode** and **SubjectEthnicityCode** variables. Any subject with the ethnicity code “H,” indicating Hispanic race, was given the **race** code “Hisp,” while any subject with the ethnicity code “N,” or not of Hispanic background, was given a **race** code corresponding to their original **SubjectRaceCode** of ”Asian,” “Black,” “Native,” or ”White,” for a total of five **race** codes, “Asian,” “Black,” ”Native,” “White,” and “Hispanic.”
- The dependent variable **ReasonforStop** has 15 possible codes, each representing a reason for traffic stop, such as “Defective Lights,” ”Display of Plates,” and ”Seatbelt.”
- The second explanatory variable **SubjectSexCode** represents the gender of each subject and is coded “M” for male and “F” for female.
- The variable **race** was constructed to more accurately represent racial demographics in the state of Connecticut
- The variable **ReasonforStop** was selected to identify possible biases in reasons for traffic stops in CT
- The secondary explanatory variable **SubjectSexCode** was selected to investigate possible discrepancies in the rate at which men and women of the same race are pulled over for various reasons.

Results

Bivariate

- Chi-Square analysis showed that subject race was significantly associated with reason for traffic stop ($p < 2.2e\text{-}16$).
- Investigating Pearson residuals, black and Hispanic subjects have large, positive Pearson residuals for “Display of Plates” and “Window Tint,” while white and Asian subjects have large, negative Pearson residuals for the same codes.
- Logistic analysis revealed that Black (OR 3.79, $p < 2e\text{-}16$), Hispanic (OR 3.22, $p < 2e\text{-}16$), Native (OR 1.74, $p = 0.000332$), and White (OR 1.45, $p= 0.000658$) subjects were all significantly more likely to be stopped for “Display of Plates” than the baseline (Asian drivers), with Black and Hispanic subjects being much more likely to be stopped than Native American, White, or Asian subjects.
- Even stronger findings appear from logistic analysis of Window Tint:
  Black (OR 9.48, $p < 2e\text{-}16$)
  Hispanic (OR 8.72, $p < 2e\text{-}16$)
  Native (OR 2.30, $p = 0.00625$)
  White (OR 1.84, $p = 0.00842$)
- For the code Defective Lights, black subjects were statistically more likely to be pulled over than the baseline Asian subjects, but Hispanic, Native American, and white subjects were not:
  Black (OR 1.11, $p = 0.0485$)
  Hispanic, Native, White ($p > 0.1$)

Multivariate

- Logistic analysis of the association between subject race and likelihood of being stopped for minor vehicle offenses (Display of Plates, Defective Lights, and Window Tint) with the interaction variable of subject sex did not yield significant results: in Connecticut in 2022, subject gender did not significantly affect the level at which subjects of each race were stopped by police for minor vehicle offenses.

trafficstop$race trafficstop$ReasonforStop	Asian	Black	Hisp	Native	White
Administrative Offense	-9.7972445	29.7191787	34.4215133	-5.3635572	-32.5534066
Cell Phone	-3.6157968	-16.8781175	-0.2236054	-3.1790766	10.5839729
Defective Lights	-1.1602101	2.5885108	-0.2916342	0.3666978	-1.1038949
Display of Plate	-0.3598065	1.8048484	0.8927082	-0.2725006	-1.3763343
Display of Plates	-7.2692923	27.9151394	17.9695063	-2.0408933	-23.5448579
Equipment Violation	-2.7258512	-2.5090483	7.0026167	-2.1228386	-1.6107650
Moving Violation	4.4417489	8.0472134	2.8135444	6.2371469	-7.7120640
Other	0.9410023	3.5053352	8.6702987	0.5815731	-6.9227975
Registration	-3.5676409	-4.9024486	-2.6141080	-1.0002961	4.9507445
Seatbelt	-7.6405090	8.0135577	7.6443077	-4.5364919	-6.4972022
Speed Related	4.6600678	-19.1804161	-25.7591286	3.1600914	23.2987670
STC Violation	3.3874775	-6.0134794	-4.9778111	4.5803875	4.7374559
Stop Sign	6.2101730	-8.3440096	-7.1340775	-2.4819948	7.6777263
Traffic Control Signal	1.7830279	11.4860071	4.7203729	-1.6480651	-9.0180972
Unlicensed Operation	-4.1267490	3.7887701	34.2820172	-1.5518816	-19.7733870
Window Tint	-7.0543626	29.6041974	24.8291005	-3.3041989	-28.0759460

Figure 1. Pearson residual values for Chi-Square analysis of the association between race and reason for traffic stop

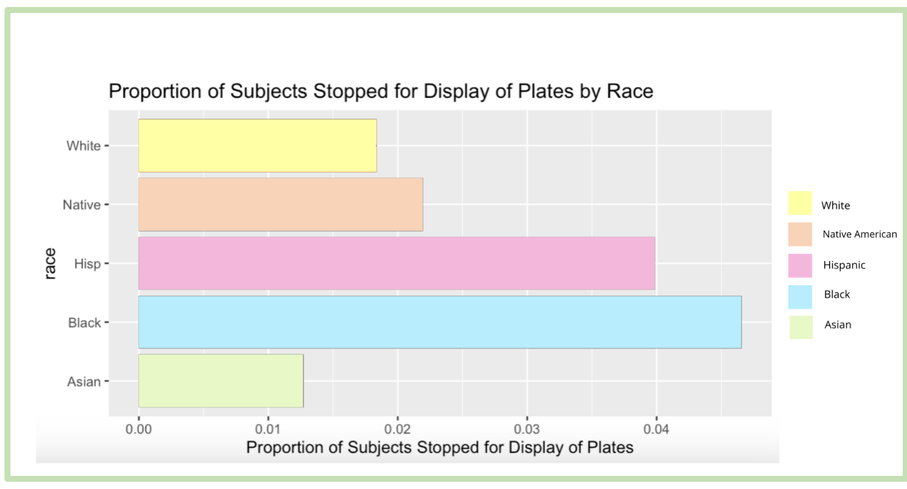

Figure 2. Bar graph representing the proportion of subjects stopped for Display of Plates by race in Connecticut in 2022

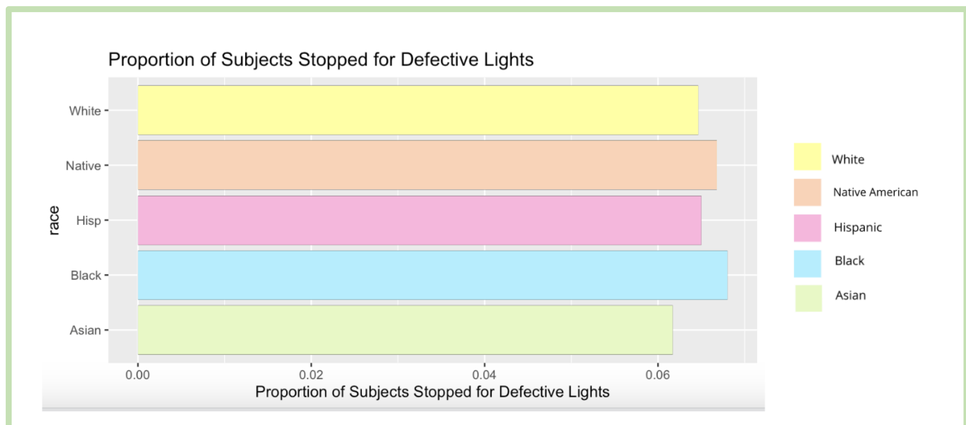

Figure 3. Bar graph representing the proportion of subjects stopped for Defective Lights by race in Connecticut in 2022

(Only the proportion of black subjects is significantly disproportionate)

Discussion

- The race of a driver in Connecticut may have an effect on the specific reason that they are targeted for a traffic stop.
- For the minor vehicle offenses of tinted windows and display of license plates, black, Hispanic, Native American, and white drivers may all be more likely to be stopped than Asian drivers, although black and Hispanic drivers may be considerably more likely than Native American and white drivers.
- These ratios may be indicative of biased practices used by police officers to initiate traffic stops against black and Hispanic drivers.
- These findings may contribute toward identifying these biases, and toward creating legislature to curb these biases.
- Further research is needed to determine when and where these possible biased practices may be taking place, and to determine exactly how to curb these biases through legislature or other methods.

References

Caiola, S. (2023, March 6). Data shows Philly traffic stops involving Black men are down 54%. *WHYY*.

Pierson, E., Simoiu, C., Overgoor, J., Corbett-Davies, S., Jenson, D., Shoemaker, A., Ramachandran, V., Barghouty, P., Phillips, C., Shroff, R., & Goel, S. (2020). A large-scale analysis of racial disparities in police stops across the United States. *Nature Human Behaviour*, *4*, 736–745.

Walsh, S. C. (2021, October 14). Philly has become the first big city to ban minor traffic stops said to criminalize ‘driving while Black.’ *The Philadelphia Inquirer*.