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Team 4

Bias in Policing: A Case Study of New Orleans

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Introduction

- Traffic stops are an important form of policing.
- Ensures public safety.
- 50,000 traffic stops in a typical day in the US.
- But are they without any flaws?

Dataset

- The data set we have is from the Stanford Open Policing Project.
- The location we are studying is New Orleans.
- The data is made available for public use.
- The time period for this dataset is from December 2009 to July 2018 with a little over 500,000 observations.
- Variables include gender, race, location, and the outcomes

Guiding Questions

- We will consider three dimensions of bias in policing: racial bias, gender bias, and location bias.
- We will analyze police behavior during the stop and after the stop.
- Does bias play a role in determining who gets stopped?
- Does bias play a role in how one is treated after they have been stopped?

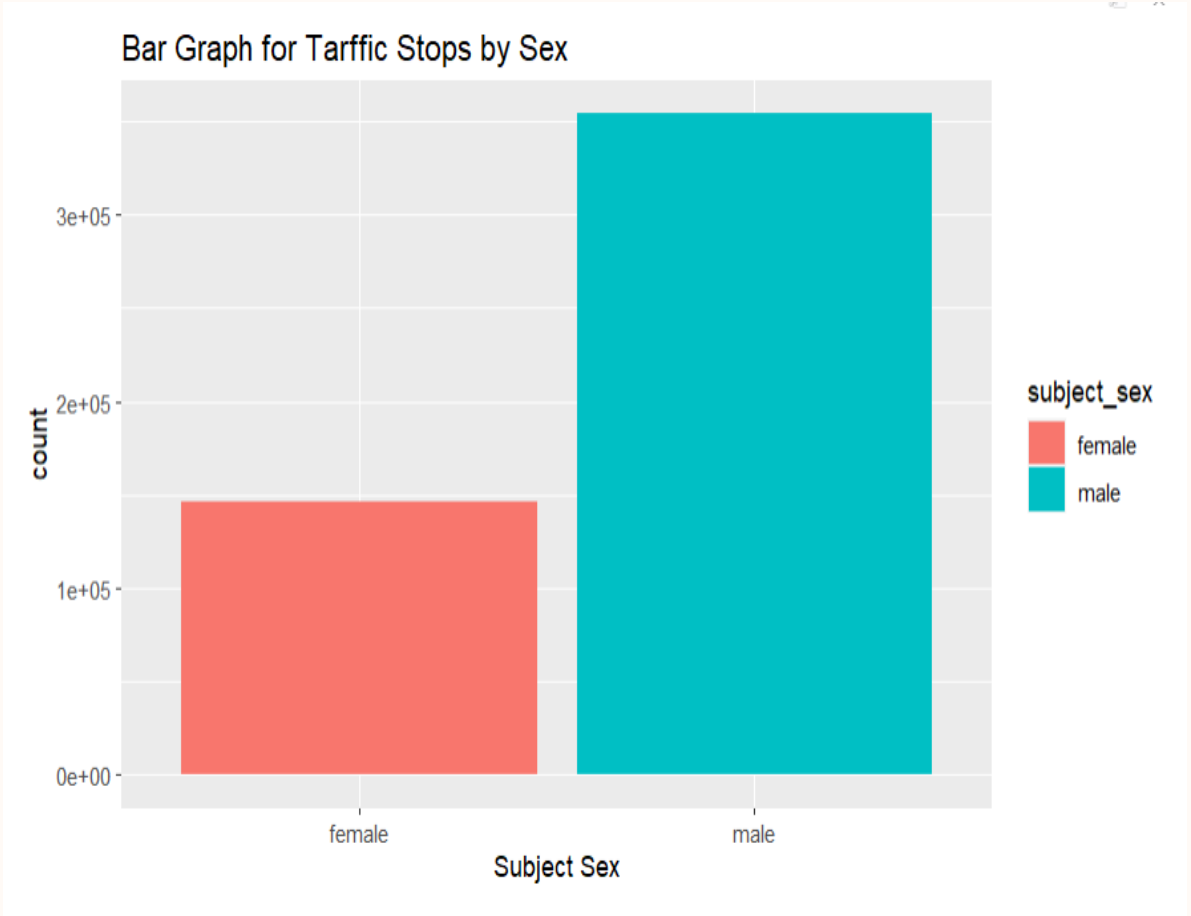
Issue 1

Bias in Police Stops

Bias by Gender

- More males stopped then females.
- Is there a bias?
- Proportions of male and female drivers

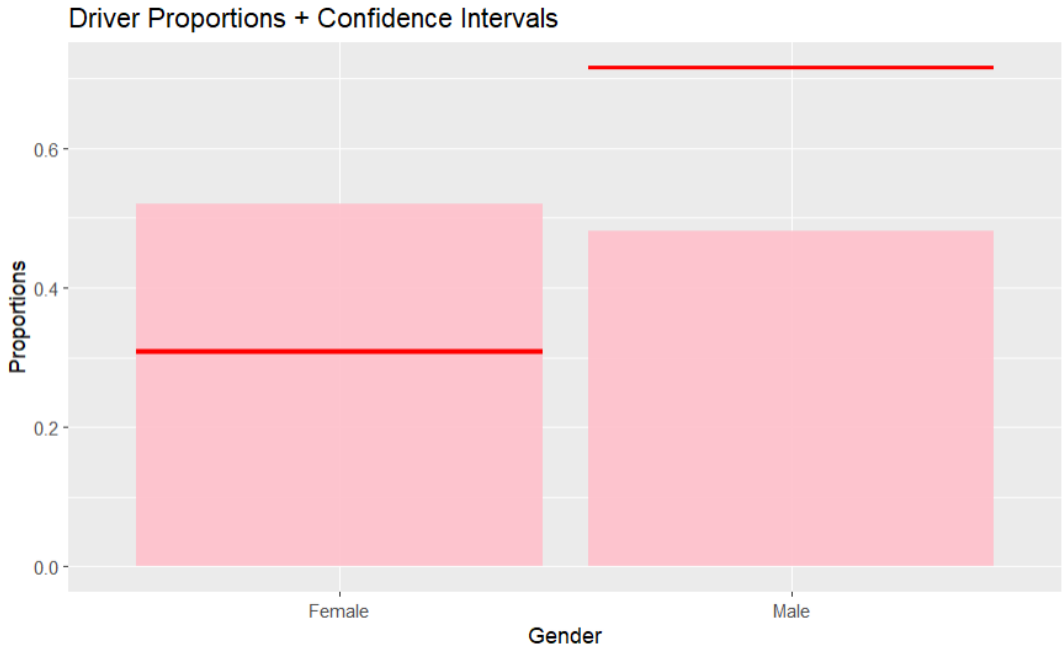
Actual Gender Proportions	
Gender	**Proportion**
Male	48.06%
Female	51.94%



Hypothesis and Analysis

$$H_0 : P_{genders_{actual}} - \widehat{P}_{genders_{data}} = 0 \ (There\ is\ no\ bias\ based\ on\ gender)$$
$$H_A : P_{genders_{actual}} - \widehat{P}_{genders_{data}} \neq 0 \ (There\ is\ bias\ based\ on\ gender)$$

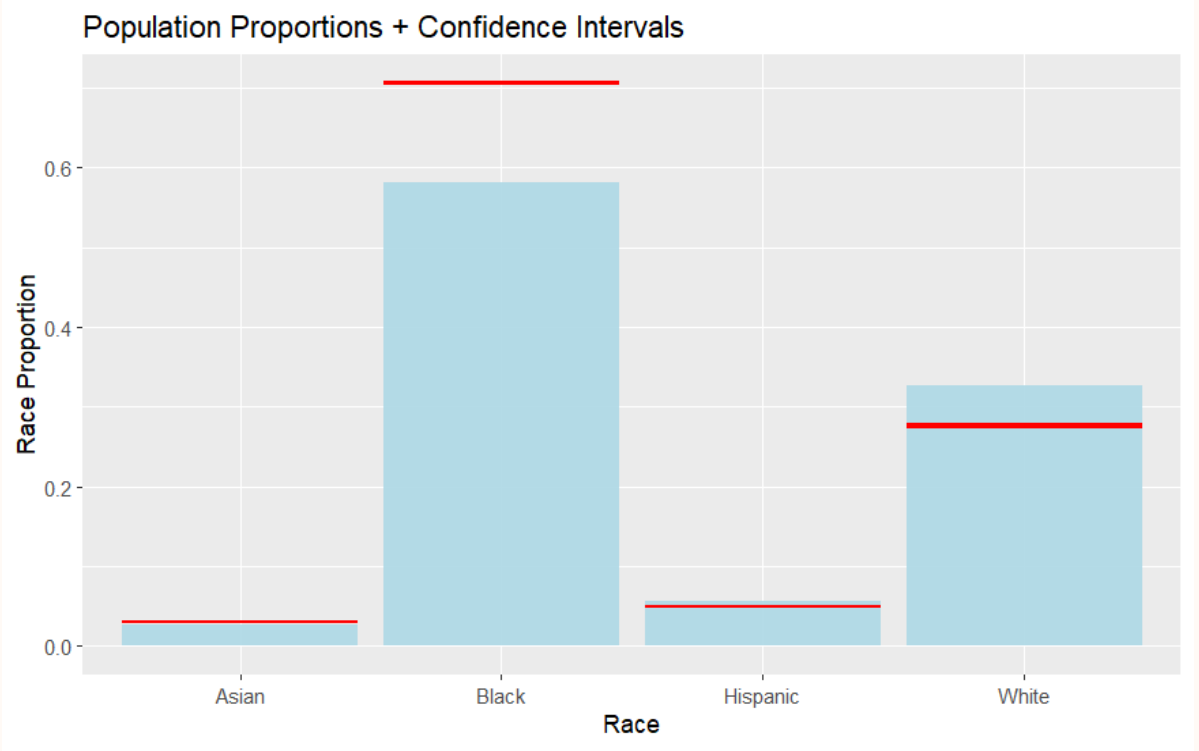
- Conducted a prop test.
- P-Values way less than 0.05
- Reject the null Hypothesis in favor of the alternate.
- There is apparent bias in Traffic Stops based on gender



Stop Bias by Race - Overview

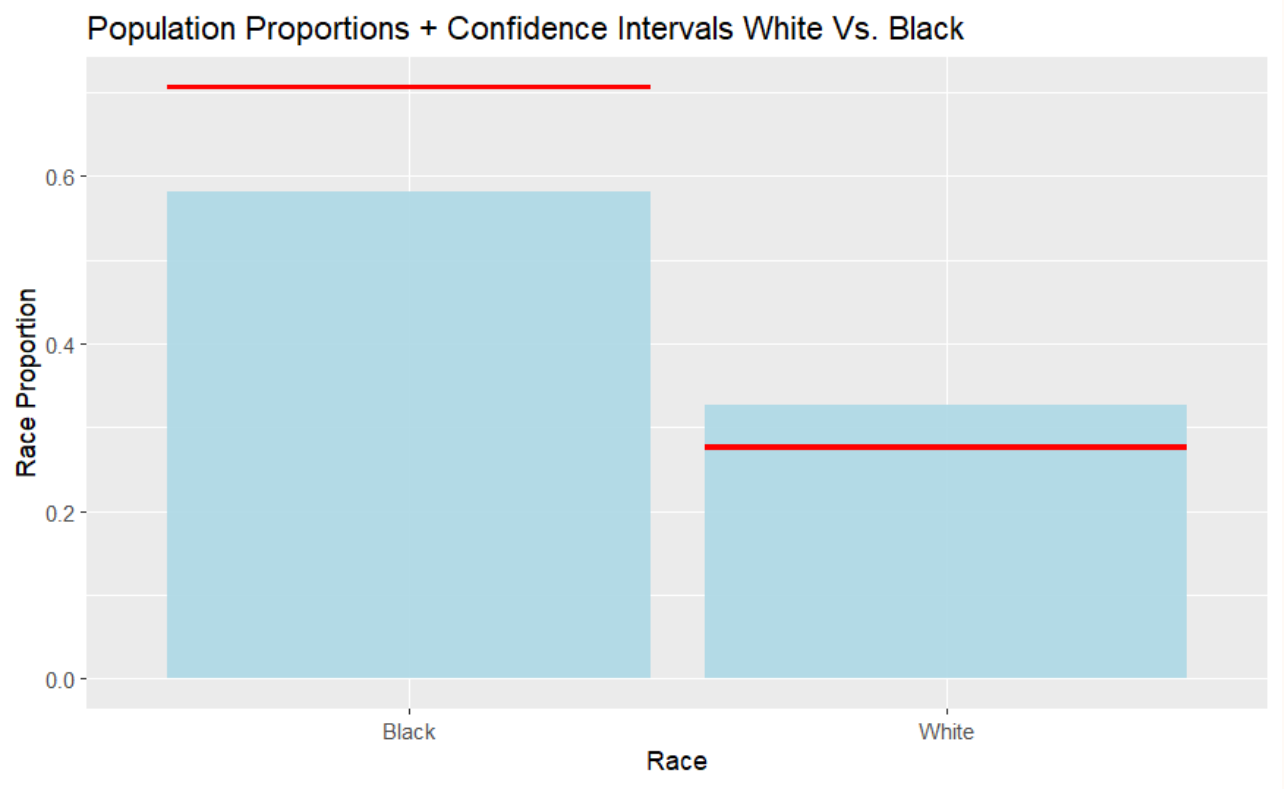
$$H_0 : \hat{p}_{race_{data}} - p_{race_{actual}} = 0$$
$$H_a : \hat{p}_{race_{data}} - p_{race_{actual}} \neq 0$$

- **Conducted one-sample proportion tests**
- **All P-Values less than 0.05**
- **Reject the null Hypothesis in favor of the alternate.**
- **There is apparent bias in traffic stops based on race**



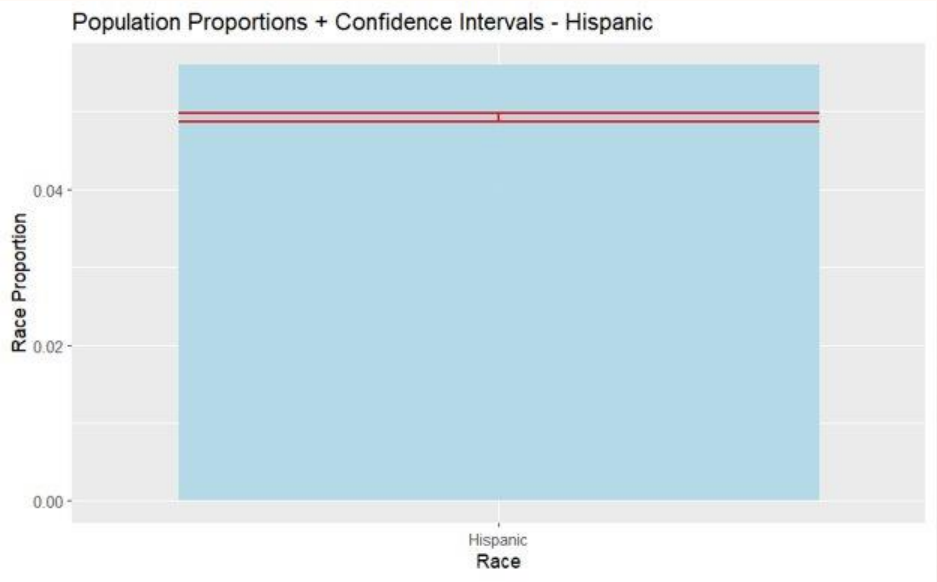
Stop Bias by Race - White and Black

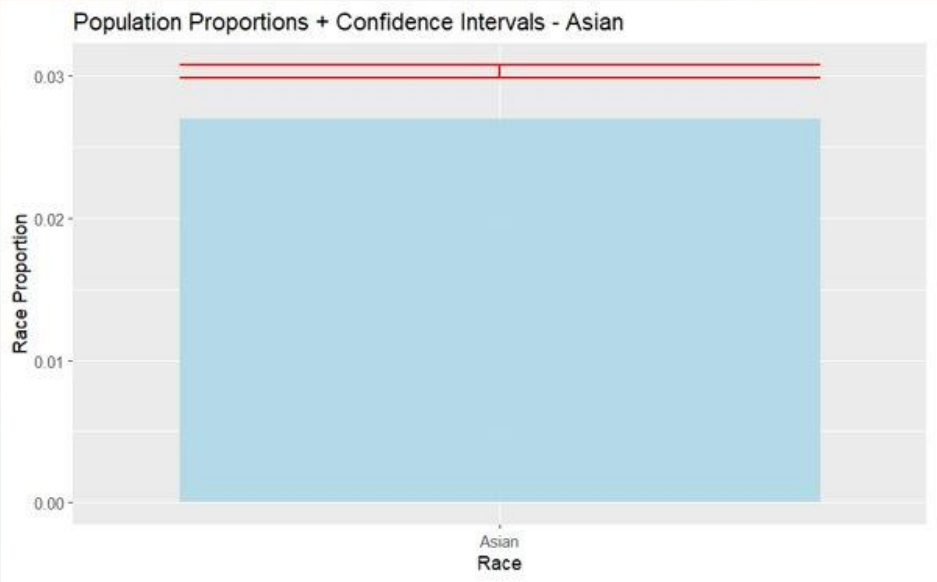
- **Actual race population proportion in blue**
- **95% confidence interval stop proportion from our data in red**
- **More black people stopped than expected value**
- **Less White people stopped than expected value**



Stop Bias by Race – Hispanic and Asian

- More Asian people stopped than expected value
- Less Hispanic people stopped than expected value



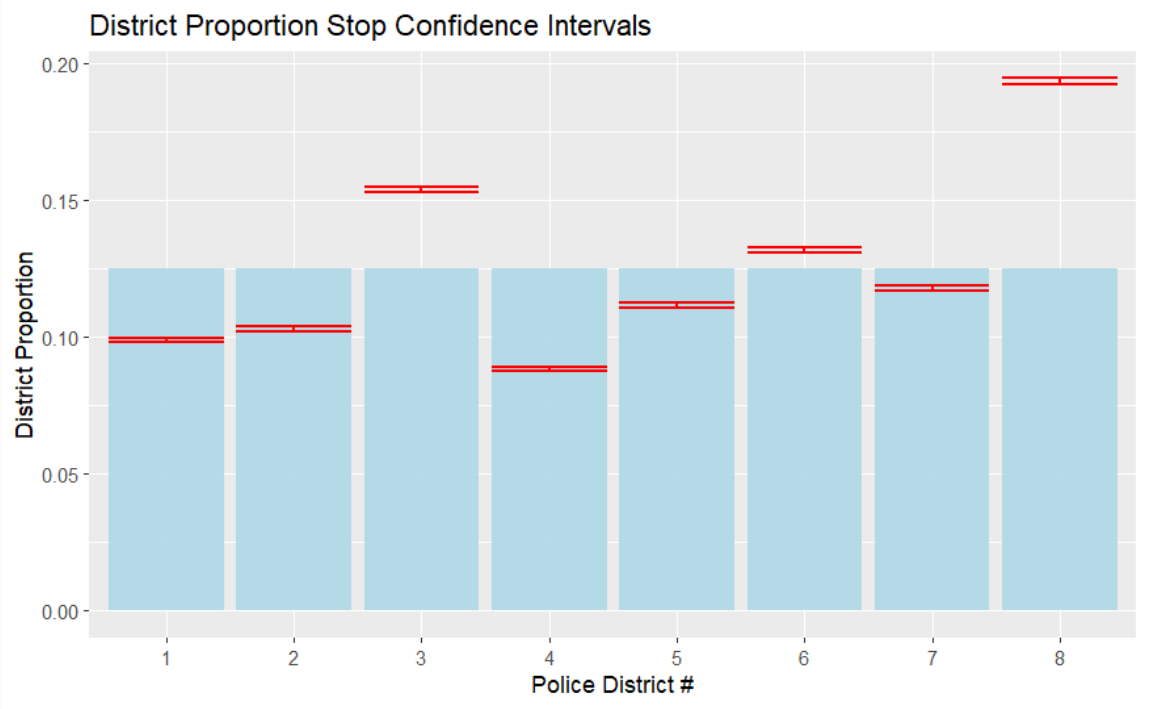


Stop Bias by District

$$H_0 : \hat{p}_{district} = 1/8$$

$$H_a : \hat{p}_{district} \neq 1/8$$

- Conducted one sample prop tests
- P-Values less than 0.05
- Districts 3, 6, and 8 have higher stop rates with the other districts lower than an equally spread proportion
- There is a difference in stop rate among districts, but analysis limited without data



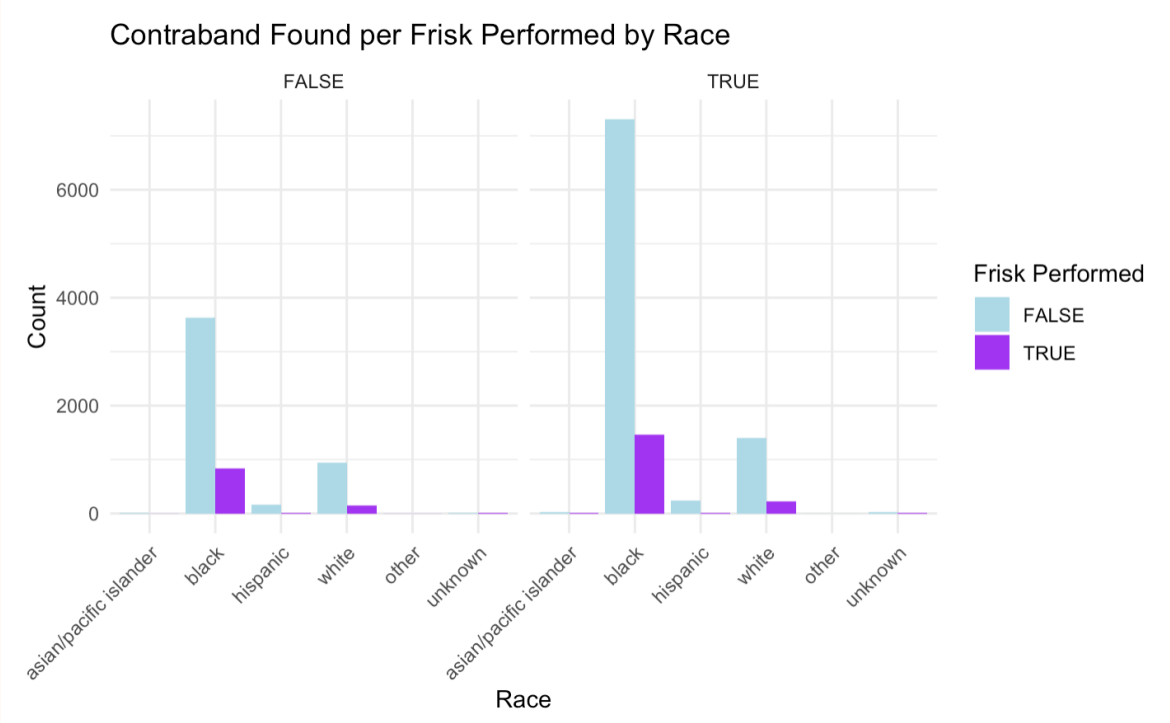
⟶ Issue 1: Analytical Considerations

- **Driver demographics would provide a more reliable expected value than population demographics**
- **Multiracial/ambiguous people not considered**
- **Temporal changes in data**
- **Missing demographic data by district**

Issue 2

Bias Post-Stop

Issue 2: Data Visualization



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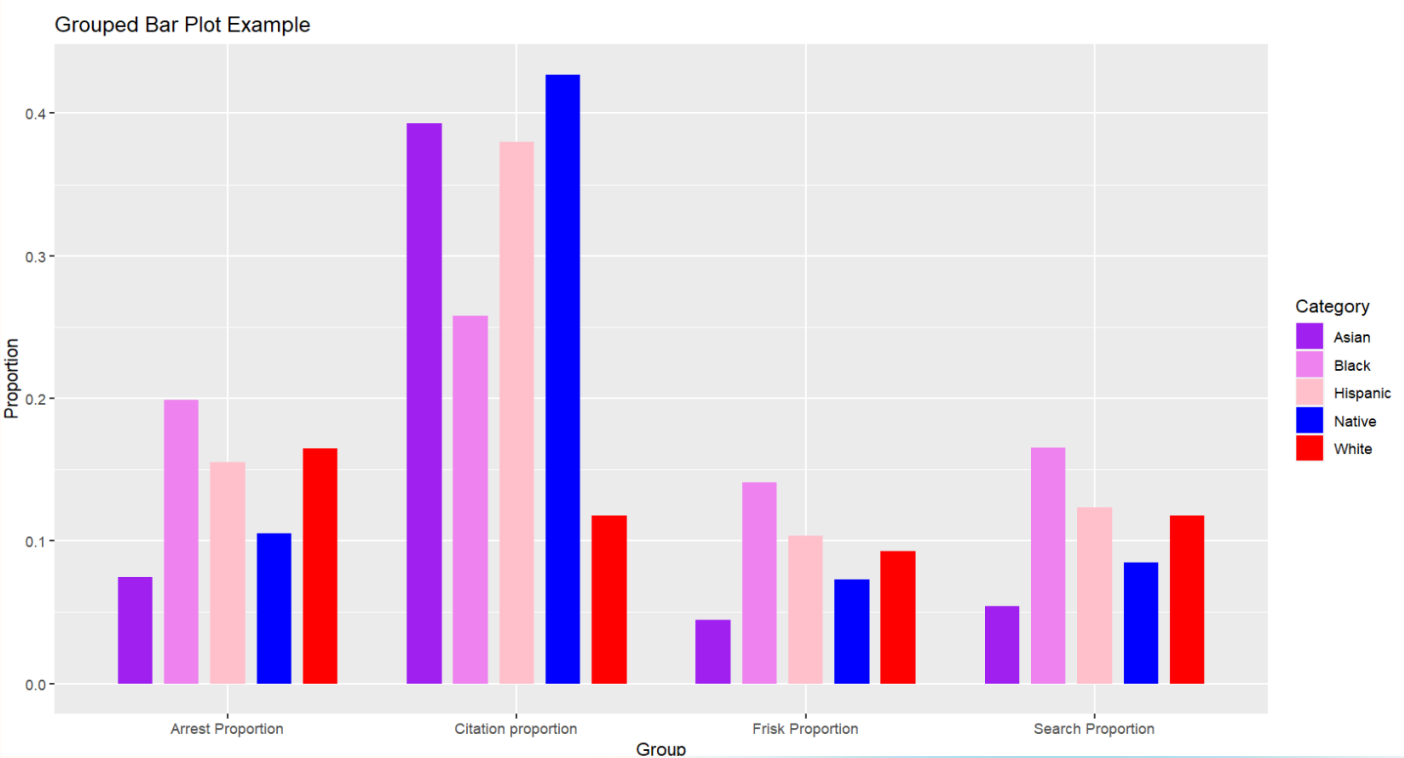

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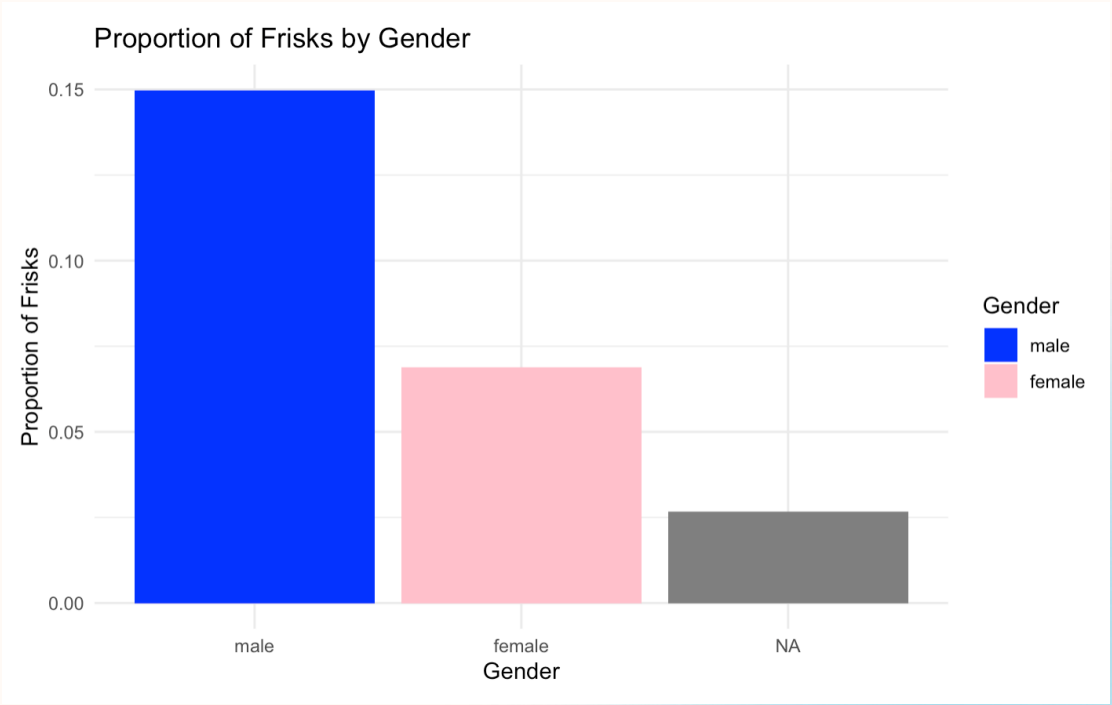

→ Issue 2: Data Analysis

Overarching Hypothesis

Null: Bias (based on race, gender, and location) is not present in police behavior post-stop
Alternative: Bias (based on race, gender, and location) is present in police behavior post-stop

Method: Test of independence

Null: A subject's race and the likelihood of a frisk being performed are independent of each other
Alternative: A subject's race and the likelihood of a frisk being performed are not independent of each other

```
        Pearson's Chi-squared test

data:  contingency_table
X-squared = 47.422, df = 12, p-value = 0.000003939
```

Issue 2: Data Analysis

Method: Test of independence

Null: The district where a stop takes place and the likelihood of a frisk being performed are independent of each other
Alternative: The district where a stop takes place and the likelihood of a frisk being performed are not independent of each other

```
        Pearson's Chi-squared test

data:  contingency_table2
X-squared = 62.467, df = 16, p-value = 0.0000002
```

→ Issue 2: Data Analysis

Method: Test of independence

Null: The subject's sex and the likelihood of a frisk being performed are independent of each other
Alternative: The subject's sex and the likelihood of a frisk being performed are not independent of each other

```
        Pearson's Chi-squared test

data:  contingency_table2
X-squared = 22.303, df = 4, p-value = 0.0001744
```

⟶ Conclusion

- Females are stopped less than males
- Black and Asian/Pacific Islanders are stopped more than expected
- Drivers in Districts 3, 6, and 8 are disproportionately stopped
- There is bias post-stop based on race, location, and gender
- We can infer (based on visualizations) that this biased behavior is directed toward black and male drivers

Thanks for listening!