

The Power Dynamic of Arrest: An Analysis of Factors Influencing Strip Searches and Behaviors at Arrest

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1. Introduction

1.1 Research Questions/Objective

Our society has become increasingly diverse; law enforcement and order maintenance have, almost inevitably, generated sharp conflicts of interest. Tensions between the police and members of various groups, such as young people in general, lesbians and gay men, and gypsy and traveler groups have been rising in recent years. (Steffensmeier, D., et al., 2017) Although the use of stop and search has gained widespread attention, less is being paid to the interactions between the police and members of various groups.

Based on existing research, we are intrigued by examining the correlation between a few representative factors concerning the influence the chance of being strip-searched, influence on the cooperative actions displayed at arrest and the influence on the mentally unstable actions displayed at arrest. Notably, individuals' demographic characteristics significantly impact on strip searches decisions made by police officers. For instance, studies show that race, gender, age, DNA and cultural background will make an influence on strip-searching (Lombroso, 2006).

Meanwhile, from the research paper, it is crucial to clarify that mental instability is not inherently linked to any particular race or sex. Mental health conditions affect people of all races, genders, and backgrounds. (Goff, et al., 2016) However, the perception of race or sex and cultural and societal factors might influence how law enforcement officers perceive and respond to an individual during an arrest. Additionally, biases and stereotypes may shape how people interpret someone's behaviour as indicative of mental instability.

For example, some studies have shown that racial minorities, particularly Black individuals, are more likely to be perceived as dangerous or threatening by law enforcement. This could lead to more aggressive responses and higher force use rates during arrests. (Marrast, L., Himmelstein, et al., 2016) Similarly, there might be gender differences in how mental health issues are perceived and responded to by law enforcement officers. It is essential to recognize that these observations do not suggest that race or sex directly causes mental instability or influences behaviour during the arrest. Instead, they highlight how societal biases and stereotypes can affect mental health and behaviour perceptions in these situations.

Ultimately, more research is needed to understand the complex relationships between race, sex, mental health, and behaviour during arrest fully. Law enforcement agencies must provide

appropriate training and adopt policies that minimize biases and ensure fair treatment for all individuals, regardless of race, sex, or mental health status.

From the perspective of police service, the results of this study provide valuable information on the quality of decisions that are made when it comes to strip searches. It can help police develop policies that are more effective while reducing the likelihood of unnecessary searches.

Hypothetically, we argue that race and sex will make an influence on being strip-searched. Meanwhile, race, age group, or sex have an influence on the cooperative actions displayed at arrest and mentally unstable actions displayed at arrest. Therefore, the following sections of the paper will include Research Hypothesis, Literature Review, Methodology, Results and Discussion, Limitations, and Conclusion to study the problem comprehensively.

1.1.1 Independent Variables

For the first research question, asking if race and sex influence the chance of being strip-searched, the independent variables are race and sex.

For the second research question, asking if race, age group, sex, or booking status have an influence on the cooperative actions displayed at arrest, the independent variables are race, age group, sex, or booking.

For the third research question, asking if race, sex, or booking have an influence on the mentally unstable actions displayed at arrest, the independent variables are race, sex, or booking.

1.1.2 Dependent Variables

For the first research question, asking if race and sex influence the chance of being strip-searched, the dependent variable is strip search.

For the second research question, asking if race, age group, sex, or booking status have an influence on the cooperative actions displayed at arrest, the dependent variable is cooperative actions at arrest.

For the third research question, asking if race, sex, or booking have an influence on the mentally unstable actions displayed at arrest, the dependent variables are mentally unstable actions at arrest.

1.1.3 Data Analysis

Our research objective is to explore the racial disparities and potential biases within the Toronto police system, with a particular focus on the likelihood of being strip searched and the impact of

race on actions taken at the time of arrest. By examining these factors, we aim to gain a deeper understanding of how race influences policing practices in Toronto and identify any underlying racial underpinnings that may exist. Our goal is to contribute to a more equitable and just police system in Toronto. The following research questions will serve as our guide as we conduct our research:

Research Question One: *Do race and sex influence the chance of being strip-searched as it is controlled by the strip reason indicator?*

Null Hypothesis (H0): There is no relationship between race, sex, and the chance of being strip-searched.

Alternative Hypothesis (H1): There is a relationship between race, sex, and the chance of being strip-searched.

Research Question Two: *Does the race, age group, sex, and booking of an individual influence the probability of cooperative behavior displayed at the time of their arrest?*

Null Hypothesis (H0): There is no relationship between race, age, sex, booking, and the number of cooperative actions at arrest.

Alternative Hypothesis (H1) : There is a relationship between race, age group, sex, booking, and the number of cooperative actions at arrest.

Research Question Three: *Does the race, sex, and booking of an individual affect the probability of their actions pertaining to mental instability at the time of their arrest?*

Null Hypothesis (H0): There is no relationship between race, sex, and the number of actions pertaining to mental instability at arrest.

Alternative Hypothesis (H1) : There is a relationship between race, sex, and the number of actions pertaining to mental instability at arrest.

1.2 Literature Review

The relationship between race, age group, sex, and the number of cooperative actions at arrest is a complex issue, and various factors can influence an individual's behaviour during an arrest. It is

essential to consider that any observed relationships could be influenced by a range of individual, social, and systemic factors rather than directly resulting from a person's race, age, or sex.

Some research suggests that there may be disparities in how law enforcement officers treat different demographic groups during arrests. These disparities may, in turn, influence the level of cooperation displayed by individuals during the arrest process. For example, Studies have shown that racial and ethnic minorities, particularly Black individuals, may be more likely to experience the use of force or aggressive tactics during an arrest. This could lead to a decreased level of cooperation among these groups. Recognizing that these disparities may be influenced by systemic issues and implicit biases rather than an individual's race is essential. (Engel, R. S., Smith, M. R., & Cullen, F. T. , 2021). Furthermore, there may be differences in how males and females are perceived and treated by law enforcement officers during arrests. For example, males may be more likely to be perceived as physically threatening, while females may be more often viewed as emotionally unstable. These perceptions could influence the level of force used during an arrest and, in turn, affect the individual's cooperation. (Steffensmeier, D., & Streifel, C. ,1991) Younger individuals may be more likely to display resistance or non-cooperation during an arrest due to factors such as impulsivity, immaturity, or lack of experience with law enforcement.

However, it is essential to consider the broader social and environmental factors that may contribute to these behaviors, rather than attributing them solely to age.(Engel, R. S., Smith, M. R., & Cullen, F. T. , 2021).

Criminal Man is widely regarded as the field of study that was founded by Cesare Lombroso. His theory about the origins of criminal behavior dominated the thinking of both Americans and Europeans during the late 19th century. Using evolutionary theories based on Darwinian principles, Lombroso proved that criminals are inferior to people who are honest, white, and women. He also reinforced the racial and sexual hierarchy prevailing in society. He proposed that the causes of crime are related to climate, ethnicity, culture, diet, heredity and age (Lombroso, 2006). His book, through several examples of tribal theft, illustrates the occurrence of crime must have ethnic influence at play. We cannot quantify these effects by specific numbers because one of the reasons is when we look at crime statistics, we find that there are always many complex causes of crime. For example, Spain, Lombardy, Dalmatia, Vvodina and Gorizia have very few cases of female criminality. But there are too many cases of women committing crimes in Slesa, Austria, and Russia's Baltic provinces (Lombroso, Cesare, et al., 2016). Though, in

these places, not only the influence of race but also the influence of custom; In areas where men and women are equally educated and where women intervene in men's struggles, female crime rates are similar to male crime rates. The Germanic peoples of the Austro-Hungarian Empire, especially the Salzbergs and Austrians, have been found to have a higher rate of juvenile delinquents than the Slavs, Italians, Gorizians, Tyrols, and Karnza, which can be explained in the same way (Lombroso, Cesare, et al., 2016).

Newburn, T. et al. (2004) published a paper examining police power over strip search, which is a relatively unexamined issue. They use data collected from a single police force in north London from May 1999 to September 2000. Then analyze the racial difference in using strip searches during this period. Which presents that race and sex influence the chance of being strip-searched. The article written by Steffensmeier, D., & Streifel, C. (1991) proposed that criminology has long established that the involvement of people in crime decreases with age. It also states that males are more likely to offend at every age. His other research paper, *"Age and the Distribution of Crime,"* analyzes the distribution of age-related crime across different crime categories by using the FBI's crime reports database for the 1940s, 1960s, and 1980s to compare the various characteristics of the age-related crime curve. In this research, he suggests that the age-related crime curve will likely continue to change. One of the most significant changes was the increasing number of young offenders. The variations in the age distribution of crime types support a traditional sociological notion that the crime rate generally decreases throughout a person's life. However, it can also peak later or decline more slowly.

In summary, existing literature reveals that the core subjects of sociology and law and criminal justice are race, gender, ethnicity, and age. There is a wide range of studies on criminal sentencing that examine the joint and primary effects of gender and race (2017).

The goal of this study is to analyze the collective effects of various factors on the probability. The hypothesis proposed is **that race and sex influence the chance of being strip-searched & race, age group, booking status, and sex influence actions at arrest related to cooperation and mental instability.**

2. Exploratory Data Analysis

2.1 Descriptive Statistics

To ensure the accuracy of the outcomes, the researchers performed data cleaning on certain variables. Specifically, they made some changes to the age and booked variables. For the age variable, the category 'aged 17 years and under' was renamed to 'aged 17 years and younger' to maintain consistency in the age category. Additionally, 'age 65 and older' was renamed to 'aged 65 years and older'. The booked variable was renamed to 'arrested' for clarity. The categories were recoded to assign a value of 1 to 'yes' (i.e., if a person is booked) and a value of 0 to 'no' (i.e., if a person is not booked). Regarding the Sex category, the researchers decided to drop the 'U' variable due to its unclear representation and insufficient data to draw any meaningful conclusions. As for the Perceived_Race variable, they made the decision to retain the 'Unknown or Legacy' category, as it contained a considerable amount of data relevant to their research interests.

To investigate the influence that race has on the chance of being strip-searched, we produced Figure 1. The barplot graph shows that the searches for both black and white were much more frequent than those for other races (including east/southeast asian, indigenous, latino, middle-eastern, south asian, and unknown or legacy). White people have the highest number of strip searches, with over 20,000. Black people follow closely behind with a number of strip searches just below 15,000 for their demographic. Except for the unknown race groups ranked in third place, the totals of strip searches for East/Southeast Asian, Middle-Eastern, South Asian and Indigenous groups were similar.

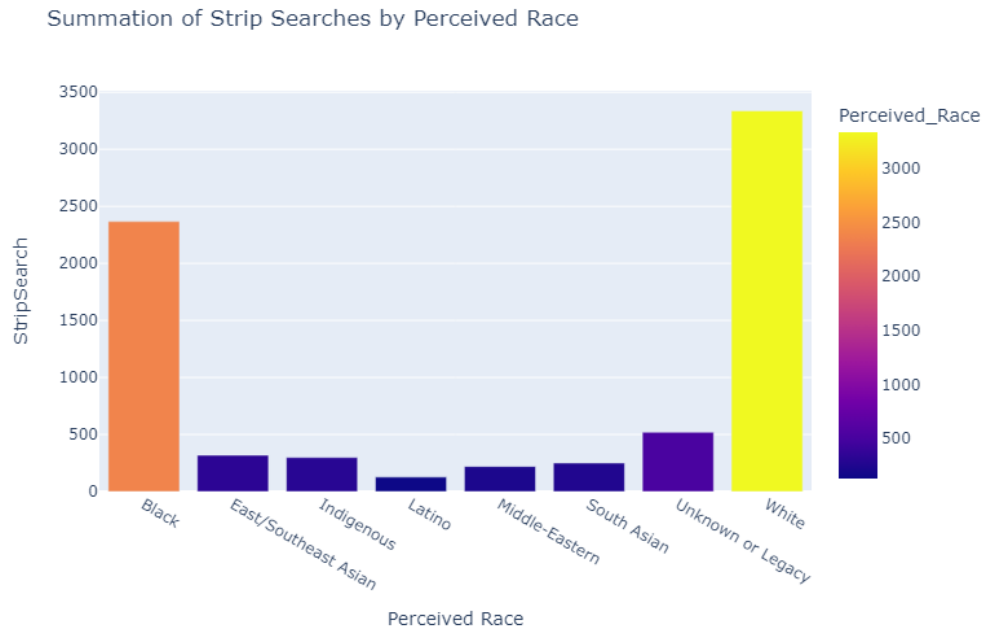


Figure 1: Barplot of Strip Searches by Race

To eliminate differences in the total number of actions by age, we produced Figure. 2. Regardless of sex, the group aged 25 to 34 years has the highest total number of people conducting actions when facing arrest. As the age increases, the total number of people conducting actions at the time of their arrest decreases. This difference may be influenced by the number of each age group. From Figure 2, the group of people aged 65 years and older has the lowest number of actions. That is to say, the older people get, the smaller the number of acts of resistance.

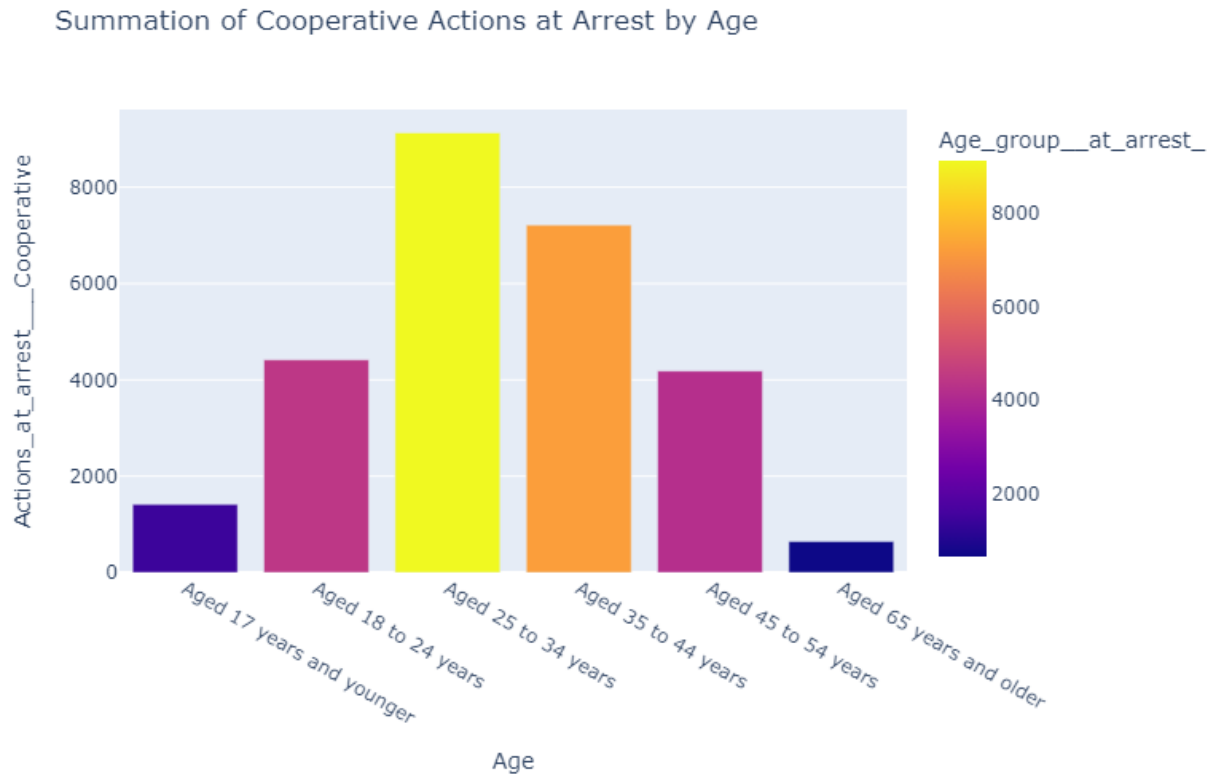


Figure 2: Barplot of Cooperative Actions at Arrest by Age

To explore differences in the total number of mentally unstable actions at arrest by race, we produced Figure. 3. Regardless of sex, both black and white were the highest total number of people conducting actions when facing arrest. White people have the highest number of actions at arrest, with over 900. Black people follow closely behind with a number of actions at arrest just below 600 for their demographic. Except for the Latino groups are ranked in lowest place, the totals of actions at arrest for, East/Southeast Asian, Unknown race, Middle-Eastern, South Asian and Indigenous groups were similar.

Summation of Mentally Unstable Actions at Arrest by Race

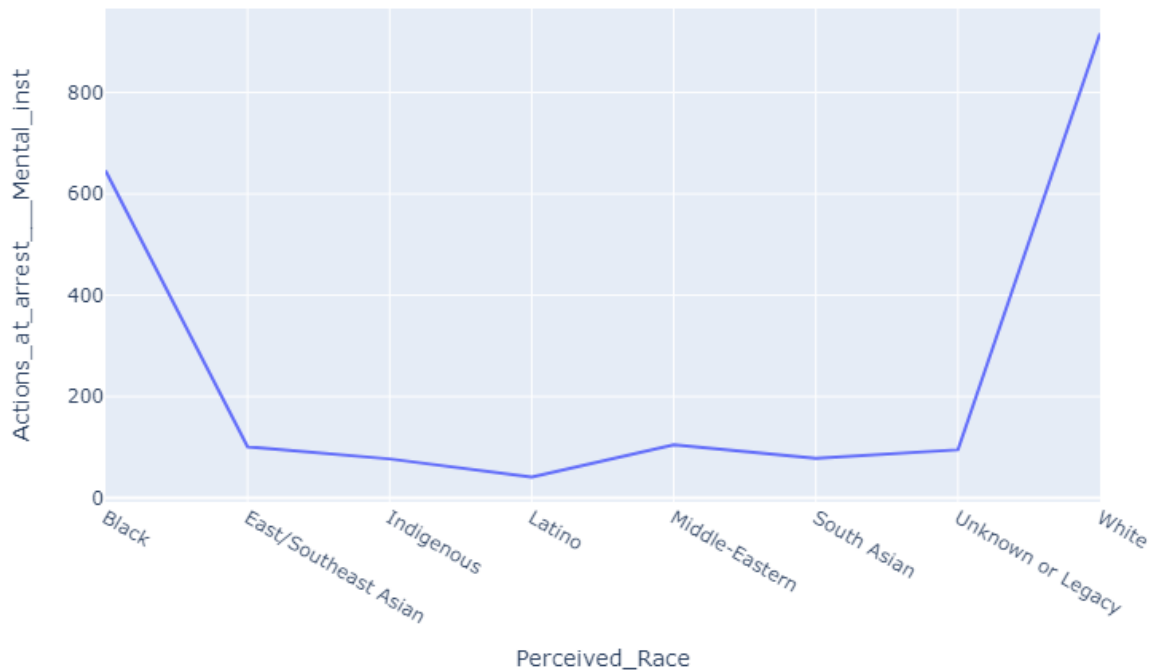


Figure 3: Line Graph of Mental Inst. Action at Arrest by Race

To compare the differences in the total number of cooperative actions at arrest by race, we produced Figure. 4. From the barplot, both black and white were the highest total number of people conducting cooperative actions when facing arrest. White people have the highest number of actions at arrest, with over 11,000. Black people follow closely behind with a number of actions at arrest just around 7,000 for their demographic. Except for the Latino groups and Indigenous who are ranked in lowest place, the total number of cooperative actions at arrest for East/Southeast Asian, Unknown race, Middle-Eastern and South Asian groups were similar.

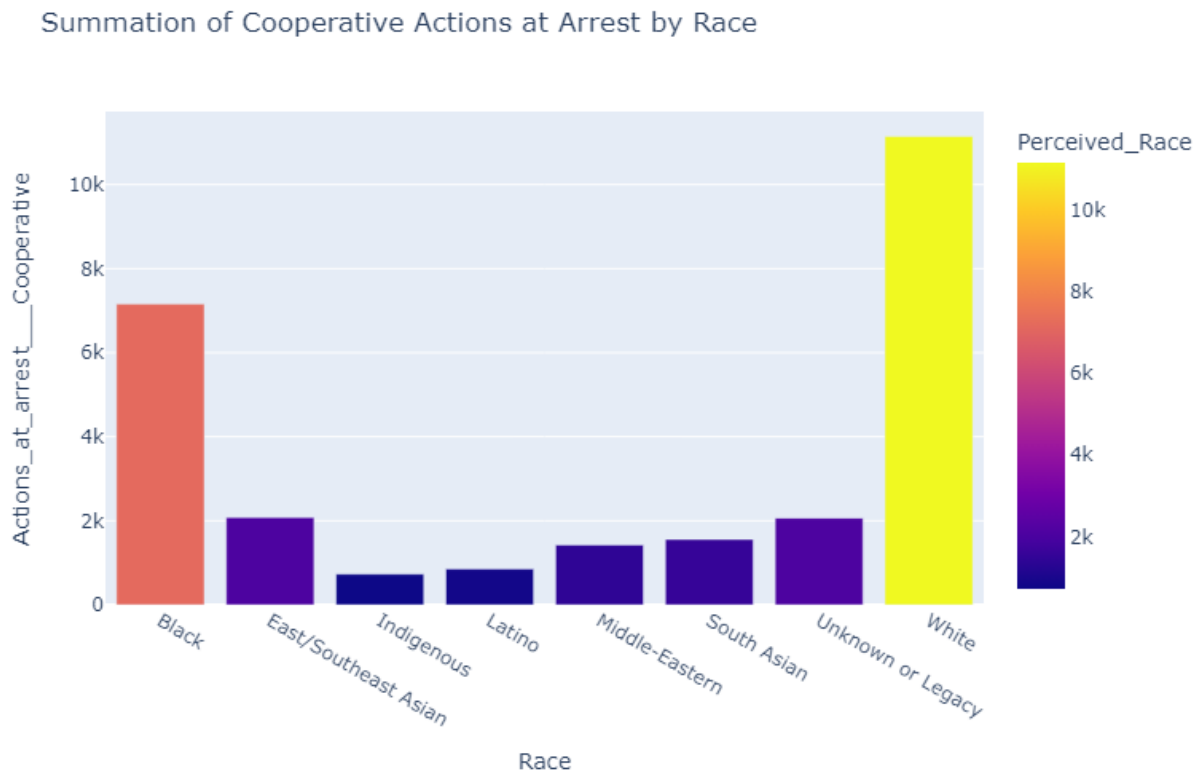


Figure 4: Cooperative Actions at Arrest by Race

To investigate the influence that race and sex have on the chance of being strip-searched, we produced Figure 5. The histogram chart shows that the searches for both black and white were much more frequent than those for other races (including east/southeast asian, indigenous, latino, middle-eastern, south asian, and unknown or legacy). White males have the highest number of strip searches, with over 30,000. Black males follow closely behind with a number of strip searches just below 25,000 for their demographic. Except for the unknown race groups ranked in third place, the totals of strip searches for East/Southeast Asian, Middle-Eastern, South Asian and Indigenous groups were similar.

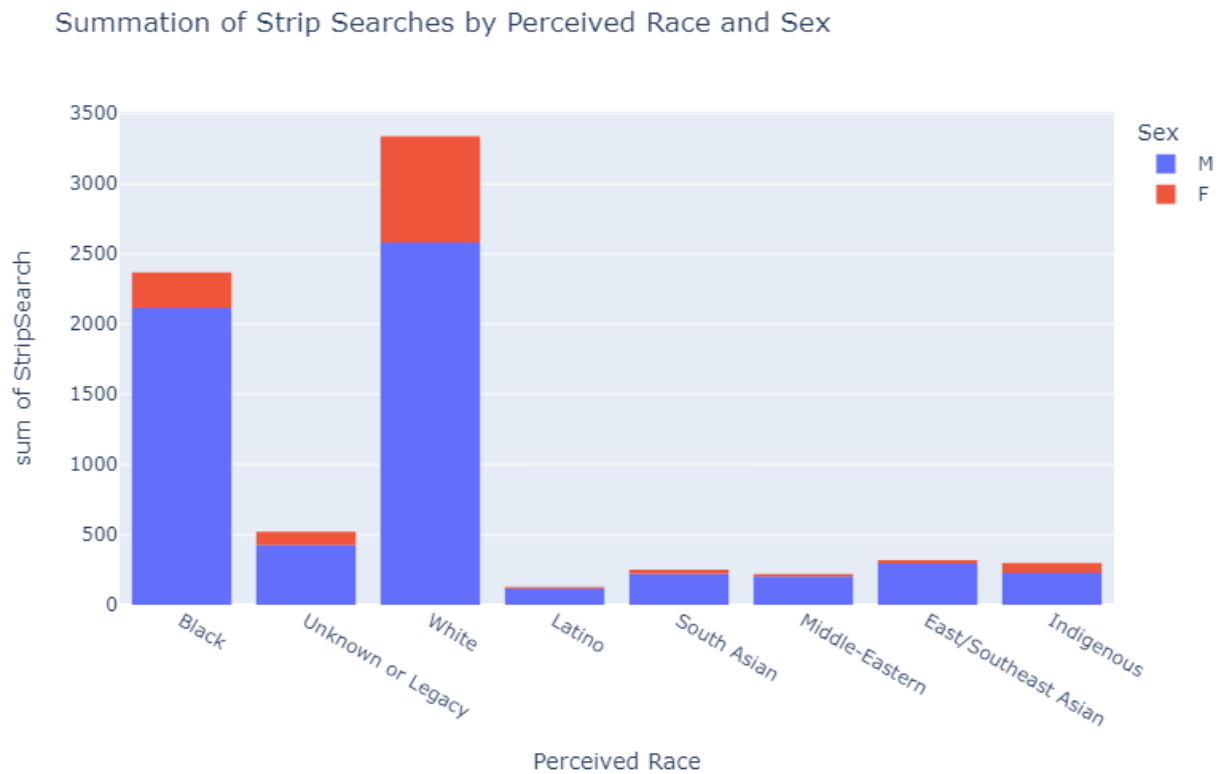


Figure 5: Histogram of Number of Strip Searches by Race and Sex

To compare the differences in the total number of cooperative actions at arrest by age and sex, we produced Figure 6. We can easily find that the number of actions for men is surprisingly high, nearly four times as likely as women when facing arrest. The age group with the highest number of actions at arrest in both females and males are those aged 25 to 34 years. After this peak, a decline in actions at arrest occurs as individuals get older. Though, while ages 35 to 44 is less than the peak of ages 25 to 34 years, it is still the second highest age category that tends to display resistive actions at arrest across both sexes. After these two peaks, resistive actions decline as individuals get older.

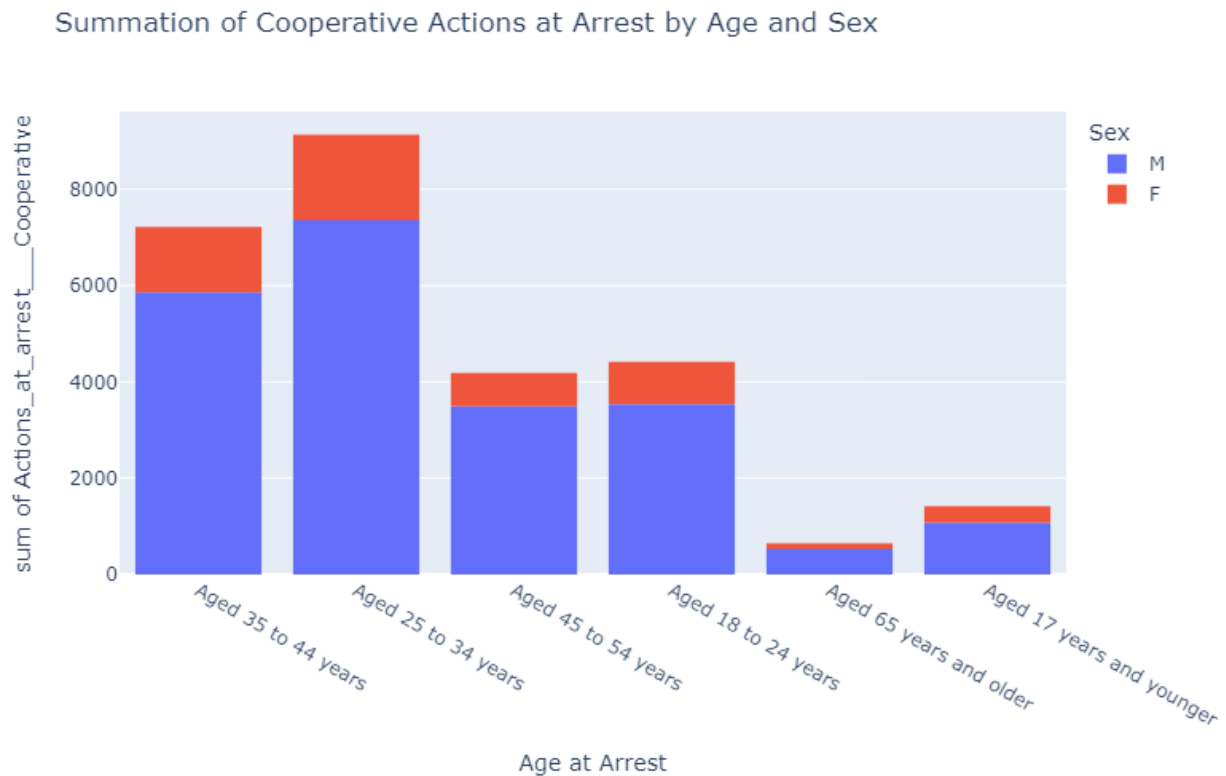


Figure 6: Histogram of Number of Cooperative Actions by Age and Sex

To eliminate differences in the total number of mentally unstable actions at arrest by race and sex, we produced Figure. 7. Regardless of sex, the histogram chart shows that the actions for both black and white were much more frequent than those for other races (including east/southeast asian, indigenous, latino, middle-eastern, south asian, and unknown or legacy).

White males have the highest number of actions, Black males follow closely behind. Except for the Latino groups ranked in lowest place, the totals of mentally unstable actions at arrest for Unknown, East/Southeast Asian, Middle-Eastern, South Asian and Indigenous groups were similar.

Summation of Mentally Unstable Actions at Arrest by Race and Sex

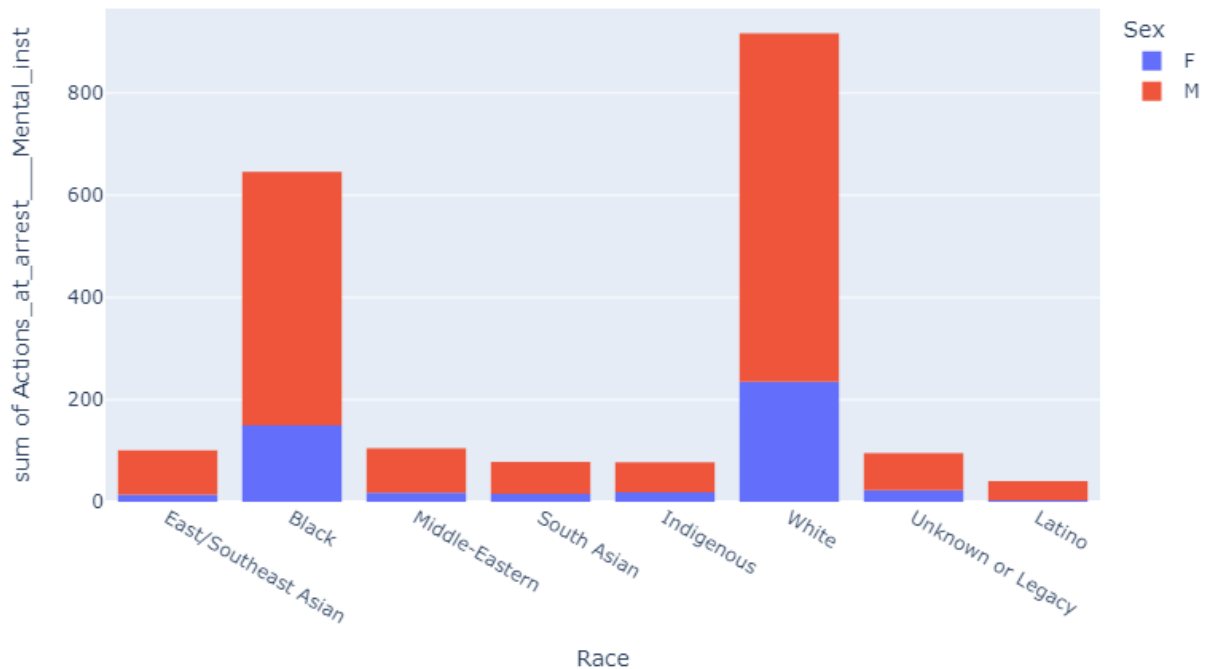


Figure 7: Histogram of Number of Mentally Unstable Actions by Race and Sex

2.2 T-Tests

2.2.1 T-Tests on Independent Variables by Strip Search

2.2.1.1 Strip Search by Black and White Races

Null Hypothesis (H0): There is no relationship between sex and the chance of being strip-searched.

Alternative Hypothesis (H1): There is a relationship between sex and the chance of being strip-searched.

Based on the t-test results comparing the means of strip searches between black and white races, we found that the mean strip search rate for black individuals was significantly higher than that for white individuals. This indicates that black individuals are more likely to be subjected to strip searches than white individuals. The statistical significance was determined by setting alpha to 0.05 and obtaining a p-value of 0.0259, which is below the significance level. The 95%

confidence interval for the mean difference between the two groups was [0.00091, 0.01435]. Therefore, we reject the null hypothesis and conclude that there is a significant relationship between race and strip search, specifically between black and white races.

2.2.1.2 Strip Search by Black Race and Both Sexes

Null Hypothesis (H0): There is no relationship between race, sex and the chance of being strip-searched.

Alternative Hypothesis (H1): There is a relationship between race, sex and the chance of being strip-searched.

The t-test results comparing the means of strip searches between black males and black females indicate that the mean strip search rate for black males is significantly higher than that for black females. This finding suggests that black males are more likely to be subjected to strip searches than black females. The statistical significance was determined by setting alpha to 0.05 and obtaining a very small p-value of 3.785e-27, which is far below the significance level. The 95% confidence interval for the mean difference between the two groups was [-0.077, -0.053]. Therefore, we reject the null hypothesis and conclude that there is a significant relationship between strip search and both black males and females.

2.2.1.3 Strip Reason by Race (Black and White)

Null Hypothesis (H0): There is no relationship between race and strip reason.

Alternative Hypothesis (H1): There is a relationship between race and strip reason.

The t-test results comparing the means of strip reasons between black and white races suggest that there are slightly more strip reasons for black individuals than for white individuals, based on the higher mean strip reason for black individuals. However, the statistical significance of this difference is not clear as the p-value obtained (0.143) is greater than the alpha value of 0.05. The 95% confidence interval for the mean difference between the two groups was [-0.005, 0.037], indicating that the true difference in means could potentially range from no difference to a small difference in favor of black individuals. Therefore, we cannot reasonably reject the null hypothesis, and we conclude that there is only a weak or non-significant relationship between race and strip reason.

2.2.2 T-Tests on Independent Variables by Cooperative Actions at Arrest

2.2.2.1 Cooperative Actions at Arrest by Race (Black and White)

Null Hypothesis (H0): There is no relationship between race and the number of cooperative actions at arrest.

Alternative Hypothesis (H1): There is a relationship between race and the number of cooperative actions at arrest.

The results of the t-test comparing the means of cooperative actions at the time of arrest for black and white individuals reveal that white individuals exhibit slightly more cooperative behavior than black individuals. This is supported by the higher mean rate of cooperative actions among white individuals. The statistical significance of this difference was assessed by setting alpha to 0.05, and the obtained p-value was 0.0001, indicating that the difference is highly significant. The 95% confidence interval for the mean difference between the two groups was [-0.0287, -0.0094], indicating that the true difference in means is likely to be a moderately small to moderate effect size favoring white individuals. Therefore, we can confidently reject the null hypothesis and conclude that there is a significant relationship between race and cooperative actions at arrest.

2.2.2.2 Cooperative Actions at Arrest by 25 to 34 Age Group and Sex

Null Hypothesis (H0): There is no relationship between age, sex, and the number of cooperative actions at arrest.

Alternative Hypothesis (H1): There is a relationship between age, sex, and the number of cooperative actions at arrest.

The t-test results comparing the means of cooperative actions at arrest by age and sex indicate that males between the ages of 25 to 34 are marginally more likely to display cooperative actions than females in the same age group. Considering the alpha is 0.05, the p-value (0.014) offers that these variables are statistically significant as it is lower than 0.05, 95% CI [-0.037, -0.004]. Therefore, we can reject the null hypothesis as there is a relationship between cooperative actions at arrest and males and females aged 25 to 34 years old.

2.2.2.3 Cooperative Actions at Arrest by Sex

Null Hypothesis (H0): There is no relationship between sex and the number of cooperative actions at arrest.

Alternative Hypothesis (H1): There is a relationship between sex and the number of cooperative actions at arrest.

The results of the t-test comparing the means between sex and the number of cooperative actions at arrest indicate that the mean of cooperative actions of males (0.448) is slightly higher than that of females (0.431). Considering that alpha is fixed at 0.05, this is not a statistically significant difference as the p-value (0.0009) because it is greater than 0.05, with a 95% CI [-0.0266, -0.0067]. Therefore, we can reasonably reject the null hypothesis as there is sufficient evidence that suggests there is a relationship between cooperative actions and sex.

2.2.2.4 Cooperative Actions by Arrest

Null Hypothesis (H0): There is no relationship between arrests/bookings and cooperative actions at arrest.

Alternative Hypothesis (H1): There is a relationship between arrests/bookings and the number of cooperative actions at arrest.

The t-test comparing the means of cooperative actions at arrest and arrests/bookings reveals a strong relationship between the two variables. The t-test suggests that there is a larger number of people being booked while displaying cooperative actions at arrest. The p-value indicates $2.027e-42$, which means it is statistically significant, with a 95% CI [0.0472, 0.0629]. With this being said, we can reject the null hypothesis as there is a relationship between arrests/bookings and cooperative actions at arrest.

2.2.3 T-Tests on Independent Variables by Mentally Unstable Actions at Arrest

2.2.3.1 Mentally Unstable Actions at Arrest by Black and White Races

Null Hypothesis (H0): There is no relationship between black and white races and the number of mentally unstable actions at arrest.

Alternative Hypothesis (H1): There is a relationship between black and white races and the number of mentally unstable actions at arrest.

This t-test indicates a weak relationship between mentally unstable actions at the time of arrest as compared with black and white races. Despite the weak relationship, the means indicate that black races do tend to display more mentally unstable actions at the time of arrest as compared with white races. With a p-value of 0.33, this indicates it is not statistically significant, with a CI of [-0.0018, 0.0055]. Due to the findings, we cannot reasonably reject the null hypothesis and can conclude there is little to no relationship between black and white races and the display of mentally unstable actions at the time of their arrest.

2.2.3.2 Mentally Unstable Actions at Arrest by Black Race and Sex

Null Hypothesis (H0): There is no relationship between black males and black females and the number of mentally unstable actions at arrest.

Alternative Hypothesis (H1): There is a relationship between black males and black females and the number of mentally unstable actions at arrest.

This t-test shows an interesting relationship between black males and black females and the number of mentally unstable actions at arrest. With a p-value of 0.0001, these variables are statistically significant with one another, with a CI of [0.0037, 0.011]. The means between black females and black males indicate that black females tend to display more mentally unstable actions at the time of their arrest compared with black males. Overall, it is with confidence that the null hypothesis is rejected, as there is a relationship between black males and black females and the mentally unstable actions displayed at arrest.

2.2.3.3 Mentally Unstable Actions by Arrest

Null Hypothesis (H0): There is no relationship between arrests/bookings and mentally unstable actions at arrest.

Alternative Hypothesis (H1): There is a relationship between arrests/bookings and the number of mentally unstable actions at arrest.

This t-test shows that those who display mentally unstable actions at the time of arrest are more likely to be booked/arrested than not. This is supported by the means in the t-test with yes at 0.05 and no at 0.015. The p-value is also significant as it is 2.201e-133, with a CI [0.0324, 0.038]. With this being said, we can reject the null hypothesis as there is a relationship between displays of mentally unstable actions and the likelihood of being arrested.

3. Methods

3.1 Dataset

This dataset was pulled from the Public Safety Data Portal of the Toronto Police Service. This website report provides a collection of arrest-related information for the years 2020 and 2021, called “*Arrests and Strip Searches (RBDC-ARR-TBL-001)*”. The dataset was published on November 10, 2022. It provides arrest-related data from years 2020 and 2021, which consists of 24 variables and 65,276 observations.

The following observations will be used as independent variables for this research. Under the Sex category, there are 48,723 male counts and 11,928 female counts. The Age_group__at_arrest_ variable shows a count of 3,042 for those aged 17 years and younger, 20,944 for those aged 25 to 34 years, 16,240 for those aged 35 to 44 years, 10,038 for those aged 18 to 24 years, 9,065 for those aged 45 to 54 years, and 1,322 for those aged 65 years and older. In the Perceived_Race category, there are 16,851 counts for Black race, 25,129 for White, 4,689 for Unknown or Legacy, 4,029 for East/Southeast Asian, 3,368 for South Asian, 3,061 for Middle-Eastern, 1,845 for Indigenous, and 1,679 for Latino. The variable, stripreason, was created as an independent control variable for ANCOVA testing, with a total count of 60,651 and a range of [0.0, 5.0]. The arrested variable is an independent variable, with a count of 31,798 for ‘yes’ (1) and 28,853 for ‘no’ (0).

The following observations will be used as dependent variables for this research. The dependent variable cooperative_act has a count of 33,641 for ‘no’ (0) and 27,010 for ‘yes’ (1). Next, the dependent variable mental_act has a count of 58,591 for ‘no’ (0) and 2,060 for ‘yes’ (1). Finally, the stripsearch variable shows a count of 53,213 for ‘no’ and 7,438 for ‘yes’ (coded as 0 and 1 respectively).

3.2 Measurement

3.2.1 Variables

Within the scope of this analysis, we will be using variables *sex*, *perceived race*, *age group*, *booked*, *strip reason*, *strip search*, *cooperative actions at arrest*, and *mentally unstable actions at arrest*.

Sex refers to the arrestee's biological sex. Sex and gender should not be used interchangeably. In the data processing component, we decided to remove the data with sex, 'U', because this data volume was too small and they had no actions at the time of being arrested or strip searched. Sex is separated into two (2) categories, male and female.

Perceived Race refers to a person's race as categorized by another individual, in this case a police officer at the Toronto Police. The race categories include eight (8) components, including black, east/southeast asian, indigenous, latino, middle-eastern, south asian, unknown or legacy, and white. Unknown or legacy was kept in this category considering it has a significant number of strip searches associated with it. It is an assumption that the unknown/legacy category is a part of the BIPOC community.

Age Group at Arrest refers to the age of the individual at the time of being arrested. Age categories '17 and under' and '65 and older' were renamed to state years in their titles to be consistent with the other age group categories. Age group consists of seven (7) categories, aged 17 years and younger, aged 18 to 24 years, aged 25 to 34 years, aged 35 to 44 years, aged 45 to 54 years, and aged 65 years and older.

Booked/Arrested refers to whether an individual was booked or not. It has two possible outcomes: "yes" indicates that the individual was booked or arrested, while "no" indicates that the individual was not arrested or booked. The terms booked and arrested are used synonymously in this context.

Strip Reason reflects the score of the composite strip reason, where a lower score indicates a less harmful or less powerful reason for the strip search, while a higher score indicates a more harmful or more powerful reason for the strip search. Please see the limitations section, where a downfall of coding this variable is noted.

Strip Search refers to a type of police procedure involving the officer taking off an individual's clothes and visually inspecting their body.

Cooperative Actions at Arrest refers to the behavior of individuals at the time of their arrest that is indicative of cooperation. This variable is coded as 'yes' if a person was cooperative at the time of their arrest, and 'no' if they were not cooperative.

Mentally Unstable Actions at Arrest refers to the behavior of individuals at the time of their arrest that is indicative of being mentally unstable. This variable is coded as 'yes' if a person was mentally unstable at the time of their arrest, and 'no' if they were not mentally unstable.

3.2.2 Testing Methods

3.2.2.1 ANCOVA Test

In this study, two one-way ANCOVA tests were performed to examine the differences in means between groups while controlling for the effects of one or more continuous variables (covariates). The variables used in this analysis included two categorical independent variables (Sex and Perceived_Race) and one continuous independent variable (stripreason), all predicting a continuous dependent variable (StripSearch). Two ANCOVA tests were performed to delve deeper into the two independent variables. This statistical test was chosen to determine if there were significant differences in the dependent variable among the different groups, while controlling for the effects of the covariates.

3.2.2.2 Logistic Regression

Logistic regression is a statistical method used to examine the relationship between one or more independent variables and a categorical dependent variable. In this study, we used logistic regression to analyze two separate models. The first model examined the relationship between the variables of race, age group, sex, and booking status on the likelihood of an individual displaying cooperative actions at the time of arrest. The second model examined the relationship between the variables of race, sex, and booking status on the likelihood of an individual displaying mentally unstable actions at the time of arrest. To ensure the accuracy and effectiveness of our logistic regression models, we calculated odds ratios, confidence intervals, accuracy scores, and a confusion matrix. By using logistic regression, we were able to examine the effects of multiple independent variables on the categorical dependent variable assessing the significance of different actions at arrest.

3.3 Power Analysis

Power analysis is utilized in this study to gauge the minimum sample size required to detect an effect of a given size. To calculate this, researchers in this study use measures such as Cohen's d and effect (sample) size, and assess the actual size of the effect. In the context of this study, a Cohen's d of 0.2 will be considered a small sample size, 0.5 will be considered a medium sample size, and 0.8 or greater will be considered a large sample size. If the sample size is too small, the study may not have enough power to draw meaningful conclusions. Conversely, if the sample size is too big, the study would not have enough variables to draw conclusions and the researcher would have to collect more data. The latter would be more costly and time consuming.

3.3.1 Power Analysis on Independent Variables by Strip Search

3.3.1.1 Strip Search by Black and White Races

The effect size (Cohen's d) for StripSearch between black and white races is 0.022, which is considered a very small effect size. This suggests that there is only a very small difference between the likelihood of being searched for black and white races in the sample population.

The power analysis shows that a sample size of approximately 26,435 participants would be needed to achieve a sufficient level of power to detect the small effect size between black races in StripSearch. However, the actual sample size of black participants (ss_{bl}) is 16,851, which is smaller than the required sample size. The actual sample size of white participants (ss_{wh}) is 25,129, which is also smaller than the required sample size (39,420).

This indicates that the study may not have enough statistical power to detect the small effect size between black and white races in StripSearch. With smaller sample sizes than required, the study may not be able to detect a true difference between the two groups, even if such a difference exists. It is possible that the effect size may have been underestimated due to the small sample sizes. As a result, the conclusions drawn from this study may not be as reliable as they would be with a larger sample size.

3.3.1.2 Strip Search by Black Race and Both Sexes

The effect size (Cohen's d) for StripSearch between black females and black males is -0.189, which is considered a small to medium effect size. This indicates that there is a difference between the likelihood of being searched for black females and black males in the sample population, with black males having a higher likelihood of being searched.

The sample size of strip search of black females is 267, while the actual size is 2926. The sample size of strip search of black males is 1273, and the actual size is 13925. Considering the sample size is considerably smaller than their actual size counterparts, this suggests that the study has sufficient statistical power to detect the effect size between black females and black males in StripSearch.

3.3.1.3 Strip Reason by Race (Black and White)

The researchers in this study were interested in comparing strip reason to race, although strip reason is not the dependent variable being studied. The power analysis revealed a small effect size of 0.015, suggesting a small difference between strip reason and race. One potential explanation for this small effect size is that strip reason is an index with a large number of zero observations, making it difficult to measure outside of an ANCOVA context.

With this being said, the sample size of the black race and strip reason is 61,376, while the actual size is 16,851. For the white race and strip reason, the sample size is 91,528, and the actual size is 25,129. In both regards, the sample size is significantly more large than the actual size of black and white races. The large sample sizes required for this analysis suggest that strip reason may not be the best variable to use for examining differences between racial groups.

3.3.2 Power Analysis on Independent Variables by Cooperative Actions at Arrest

3.3.2.1 Cooperative Actions at Arrest by Race (Black and White)

The power analysis for Cooperative Actions at Arrest reveals an effect size of -0.038, which indicates a small difference between black and white races in terms of cooperative actions at the time of arrest.

The power analysis shows that the sample size of black race displaying cooperative actions is 8867, and the actual size is 16,851. On the other hand, white races show a sample size of 13,223, and actual size of 25,129. Considering that the actual sample sizes are larger than the required sample sizes suggests that the study may have sufficient statistical power to detect any true differences between the groups. However, it is important to note that the effect size is small, which may limit the practical significance of any observed differences. Additionally, it is important to consider other factors that may impact cooperative actions at arrest, such as the behavior of the arresting officer and the circumstances surrounding the arrest. This will be discussed more in the limitations section.

3.3.2.2 Cooperative Actions at Arrest by 25 to 34 Age Group and Sex

Based on this power analysis, the researchers analyzed cooperative actions at arrest of females and males in the age category of 25 to 34. The calculated Cohen's d of -0.04 indicates a small effect size, which means that the difference in cooperative actions between females and males in this age group is not practically significant.

However, the sample sizes for females ($n = 5597$) and males ($n = 22,118$) in this age group are much larger than the actual sizes (female actual size = 4230 and male actual size = 16,714). This suggests that the study may not have enough statistical power to draw meaningful conclusions about cooperative actions at arrest in this particular age group and sex category. Ultimately, the findings suggest that age and sex may not be strong variables to study cooperative actions at arrest. Future studies may need to consider other variables that could be more meaningful in explaining the differences in cooperative actions.

3.3.2.3 Cooperative Actions at Arrest by Sex

The effect size of cooperative actions at arrest by sex (female and male) is -0.034. This is considered a low effect size, which means there is a small difference between the means of females and males when comparing cooperative actions during their arrest. Although this effect size is considered low, it could still be statistically significant with a large enough sample size.

With this, the sample size of females is 8660, while the actual size is 11,928. The sample size of males is 35,374, while the actual size is 48,723. This suggests that the study may have enough statistical power to detect the small effect size, but it also means that the sample size may be larger than necessary.

3.3.2.4 Cooperative Actions by Arrest

The effect size for cooperative actions at arrest by booking status is medium at 0.11, indicating a moderate difference between those who were arrested and those who were not in terms of cooperative actions during their arrest.

The sample size for those arrested require a sample size of 1340, and an actual size of 31,798. The sample size for those not arrested requires a sample size of 1215, and an actual size of 28,853. As both actual sizes are significantly larger than the required sample sizes, this study has sufficient power to detect the effect size and draw meaningful conclusions.

3.3.3 Power Analysis on Independent Variables by Mentally Unstable Actions at Arrest

3.3.3.1 Mentally Unstable Actions at Arrest by Black and White Races

The effect size of studying mentally unstable actions compared to black and white races sits at a low 0.0097.

In this regard, the sample size of black races is 138,185, and the actual size is 16,851. The sample size of white races is 206,068, and the actual size is 25,129. As the required sample sizes are much larger than the actual sizes, the power to draw a strong conclusion about the relationship between mental instability and race is low. The large discrepancy between the

required sample sizes and the actual sizes suggests that the power to draw a strong and accurate conclusion about the relationship between mental instability and race is low. One possible explanation for this could be the subjectivity involved in assessing mental instability.

3.3.3.2 Mentally Unstable Actions at Arrest by Black Race and Sex

The effect size of mental instability at arrest compared with black females and black males is 0.04. This is considered a low effect size, which suggests that there are little differences between the means of black females and black males in this context.

With this being said, the sample size of black females is 5542, while the actual size is 11,928. The sample size of black males is 22,640, while the actual size is 48,723. The sample size in both regards is lower than the actual size of the variables, which means that there is sufficient data to draw powerful conclusions. In the given power analysis, the fact that the actual sample sizes are larger than the required sample sizes is a good thing, as it suggests that the study has sufficient data to draw powerful conclusions.

3.3.3.3 Mentally Unstable Actions by Arrest

The effect size for mentally unstable actions at arrest between those who were arrested and those who were not is moderate, with a Cohen's d of 0.195. This indicates a significant difference between the means of the two groups.

The required sample size for those who were arrested is 433, while the actual size is 31,798. The required sample size for those who were not arrested is 393, while the actual size is 28,853. Since the actual sample sizes are much larger than the required sample sizes, the power to draw a strong conclusion is high. Therefore, we can confidently conclude that there is a significant difference in mentally unstable actions at arrest between those who were arrested and those who were not.

3.3.4 Results of Power Curve

As illustrated in Figure 8 below, we performed a power analysis for a two-sample t-test, with the aim of determining the necessary sample size to detect a given effect size with a certain level of

power and significance. The effect size is calculated using Cohen's d, and the significance level is set to $\alpha = 0.05$. The desired power is set to 0.8, and the ratio of the sample sizes for the two groups is calculated as the ratio of the lengths of the two input arrays `bl_sr` and `wh_sr`. The variables used do not influence the curve that significantly. The `TTestIndPower` function from the `statsmodels` library is used to solve for the required sample size for the given parameters. Finally, a power curve is plotted using the `plot_power` function from the `TTestIndPower` object, which shows how the power of the test changes with different sample sizes and effect sizes. The effect sizes are set to 0.2, 0.5, and 0.8, while the sample sizes range from 50 to 500 in increments of 50.

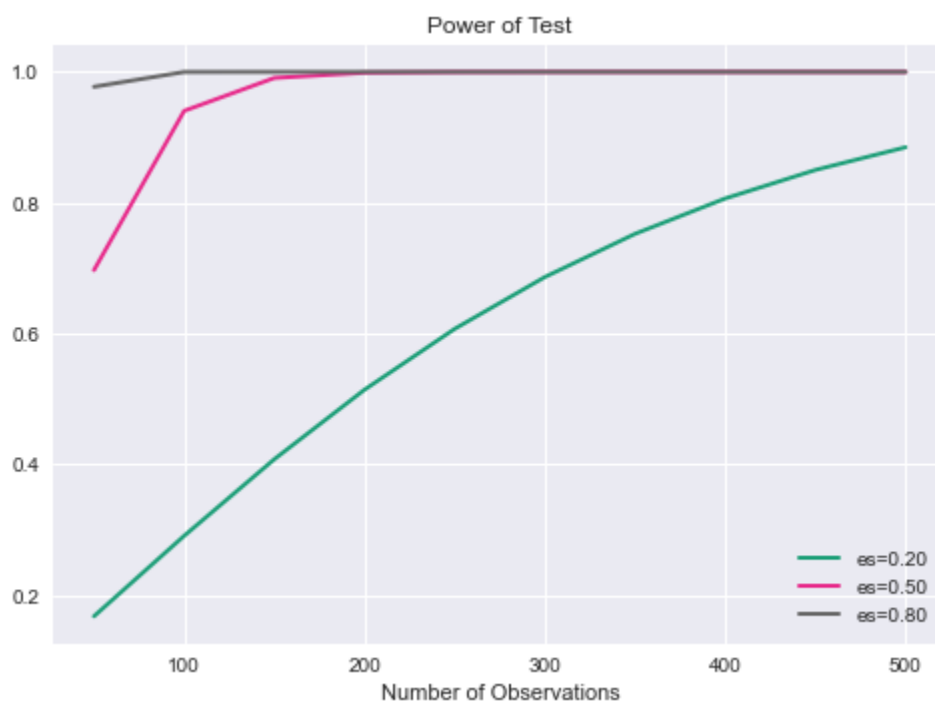


Figure 8: Power Curve Summary

4.0 Results and Discussion

4.1 ANCOVA: Research Question One

4.1.1 Strip Search by Race

Null Hypothesis (H0): There is no relationship between race and the chance of being strip-searched.

Alternative Hypothesis (H1): There is a relationship between race and the chance of being strip-searched.

Figure 9: One-Way ANCOVA, Strip Search by Race and Controlled by strepreason

| Variables | SS | DF | F | p-unc | np2 |
|----------------|-------------|-------|------------|----------|----------|
| Perceived_Race | 2.546968 | 7 | 12.48996 | 4.29E-16 | 0.00144 |
| strepreason | 4720.642257 | 1 | 162045.409 | 0.00E+00 | 0.727681 |
| Residual | 1766.598562 | 60642 | NaN | NaN | NaN |

The interpretation of the uncorrected p-value (p-unc) for race is less than alpha (0.05), as it shows it is 4.29e-16 in Figure 9. With this, since the p-value is smaller than alpha, we can reject the null hypothesis. We can conclude that there is a relationship between race and the chance of being strip searched when controlling for the reason behind the strip search. These results raise interesting questions, especially given the ongoing discussions around racial biases in law enforcement and the potential impacts on policing practices. The finding that perceived race is a significant predictor of the likelihood of being strip searched, even when controlling for other factors, suggests that there may be underlying racial biases in the police system that contribute to the use of strip searches. However, further research is needed to investigate these issues in greater detail, including examining potential mechanisms that may contribute to these biases and exploring strategies for addressing them.

4.1.2 Strip Search by Sex

Null Hypothesis (H0): There is no relationship between sex and the chance of being strip-searched.

Alternative Hypothesis (H1): There is a relationship between sex and the chance of being strip-searched.

Figure 10: One-Way ANCOVA, Strip Search by Sex and Controlled by strepreason

| Variables | SS | DF | F | p-unc | np2 |
|-------------|-------------|-------|------------|----------|----------|
| Sex | 0.078788 | 1 | 2.701038 | 0.100288 | 0.000045 |
| strepreason | 4752.12864 | 1 | 162914.767 | 0 | 0.72872 |
| Residual | 1769.066742 | 60648 | NaN | NaN | NaN |

As shown in Figure 10, the p-unc for the sex variable is larger than alpha (0.05), with a p-unc of 0.1003. We cannot reject the null hypothesis that sex is a strong indicator of strip search, despite controlling for reasons for strip search. Although we initially hypothesized that there might be a relationship between sex and strip searches, the results suggest that sex alone is a weak predictor

of this outcome. However, it is possible that when sex is combined with other variables, it can still contribute to stronger results. Further research may be needed to explore this possibility, as well as to investigate other potential factors that may influence the likelihood of being strip searched.

4.2 Logistic Regression: Research Question Two

Figure 11: Logit Regression Summary for Research Question Two

| Variables | coef | std err | z-score | P> z | [0.025 | 0.975] |
|--|---------|---------|---------|-------|--------|--------|
| Intercept | -0.3346 | 0.042 | -8.021 | 0 | -0.416 | -0.253 |
| Perceived_Race[T.East/Southeast Asian] | 0.3832 | 0.035 | 10.833 | 0 | 0.314 | 0.453 |
| Perceived_Race[T.Indigenous] | -0.1086 | 0.05 | -2.153 | 0.031 | -0.207 | -0.01 |
| Perceived_Race[T.Latino] | 0.336 | 0.051 | 6.539 | 0 | 0.235 | 0.437 |
| Perceived_Race[T.Middle-Eastern] | 0.1691 | 0.04 | 4.273 | 0 | 0.092 | 0.247 |
| Perceived_Race[T.South Asian] | 0.1632 | 0.038 | 4.286 | 0 | 0.089 | 0.238 |
| Perceived_Race[T.Unknown or Legacy] | 0.0781 | 0.033 | 2.335 | 0.02 | 0.013 | 0.144 |
| Perceived_Race[T.White] | 0.0804 | 0.021 | 3.904 | 0 | 0.04 | 0.121 |
| Age_group_at_arrest_[T.Aged 18 to 24 year] | -0.1467 | 0.042 | -3.512 | 0 | -0.229 | -0.065 |
| Age_group_at_arrest_[T.Aged 25 to 34 year] | -0.1628 | 0.039 | -4.149 | 0 | -0.24 | -0.086 |
| Age_group_at_arrest_[T.Aged 35 to 44 year] | -0.1347 | 0.04 | -3.362 | 0.001 | -0.213 | -0.056 |
| Age_group_at_arrest_[T.Aged 45 to 54 year] | -0.0608 | 0.043 | -1.431 | 0.152 | -0.144 | 0.022 |
| Age_group_at_arrest_[T.Aged 65 years and over] | 0.0526 | 0.066 | 0.791 | 0.429 | -0.078 | 0.183 |
| Sex[T.M] | 0.032 | 0.021 | 1.531 | 0.126 | -0.009 | 0.073 |
| arrested | 0.2368 | 0.017 | 14.301 | 0 | 0.204 | 0.269 |

Figure 11 presents a summary of the logistic regression analysis conducted to answer research question two. The results of logistic regression can be difficult to interpret, so we have also calculated the odds ratio to help draw conclusions more easily. In general, an odds ratio closer to 1 indicates that the independent variable has little to no effect on the outcome. An odds ratio greater than 1 indicates that the odds of the outcome occurring are higher when the independent variable is present, while an odds ratio less than 1 indicates that the odds of the outcome occurring are lower when the independent variable is present.

Figure 12: Odds Ratio Summary for Research Question 2

| Variables | Lower CI | Upper CI | OR |
|--|----------|----------|----------|
| Intercept | 0.65941 | 0.776571 | 0.715597 |
| Perceived_Race[T.East/Southeast Asian] | 1.368702 | 1.57227 | 1.466959 |
| Perceived_Race[T.Indigenous] | 0.812657 | 0.99029 | 0.897087 |
| Perceived_Race[T.Latino] | 1.265242 | 1.547562 | 1.3993 |
| Perceived_Race[T.Middle-Eastern] | 1.09588 | 1.279794 | 1.184272 |
| Perceived_Race[T.South Asian] | 1.092622 | 1.268566 | 1.177312 |
| Perceived_Race[T.Unknown or Legacy] | 1.012619 | 1.154457 | 1.081215 |
| Perceived_Race[T.White] | 1.04086 | 1.128385 | 1.083739 |
| Age_group__at_arrest_[T.Aged 18 to 24 years] | 0.795695 | 0.937227 | 0.863567 |
| Age_group__at_arrest_[T.Aged 25 to 34 years] | 0.7869 | 0.917714 | 0.849794 |
| Age_group__at_arrest_[T.Aged 35 to 44 years] | 0.80796 | 0.945361 | 0.873965 |
| Age_group__at_arrest_[T.Aged 45 to 54 years] | 0.865739 | 1.02274 | 0.94097 |
| Age_group__at_arrest_[T.Aged 65 years and older] | 0.925204 | 1.200639 | 1.053962 |
| Sex[T.M] | 0.99109 | 1.075619 | 1.03249 |
| arrested | 1.226732 | 1.308999 | 1.267198 |

Based on the odds ratios presented in Figure 12, we observed that the odds of individuals belonging to the races of East/Southeast Asian increases by 1.467 times, Latino increases by 1.3993 times, and Middle Eastern increases by 1.1843 times. These races are more likely to display cooperative actions at the time of their arrest. Conversely, the odds of Black decreases by 0.7156 times, Indigenous decreases by 0.8971 times, and Unknown/Legacy decreases by 1.0812 times. These racial groups are less likely to display cooperative actions at the time of their arrest. These findings point to the presence of racial bias in law enforcement, and are supported by numerous cases of police brutality and excessive force against people of color, particularly Black individuals. It is reasonable to assume that such bias could impact police behavior during arrests and other interactions with the public.

According to the odds ratios, it appears that younger age groups tend to exhibit less cooperative behavior at the time of their arrest. Specifically, the lowest odds ratio was observed for individuals aged 24 to 34 years (0.8498). In contrast, the odds ratio for individuals aged 65 years and older was above 1 (1.0540), suggesting that older individuals are 1.054 times more likely to be cooperative at the time of their arrest. This finding supports our previous claims that age is a

significant factor in predicting cooperative behavior during an arrest, with older individuals generally displaying more cooperation than younger individuals, and vice versa.

The arrested column shows an OR that increases 1.2672 times, which is quite interesting. Since the OR is larger than one, those are likely to be booked when they display cooperative actions at the time of arrest.

4.2.1 Test Accuracy

The test accuracy score of 0.558 means that the machine learning model correctly predicted the outcome of 55.8% of the instances in the test set. In other words, the model made the correct prediction for a little over half of the instances in the test set.

4.2.2 Confusion Matrix

As shown in Figure 13, the model correctly predicted 6,299 instances as negative (i.e., individuals who do not display actions indicating cooperation during arrest) and 473 instances as positive (i.e., individuals who display such actions). However, the model incorrectly predicted 4,921 instances as negative when they were actually positive (i.e., false negatives), meaning that these individuals displayed actions indicating cooperation during arrest, but the model failed to detect it. Additionally, the model incorrectly predicted 438 instances as positive when they were actually negative (i.e., false positives), meaning that the model incorrectly identified these individuals as displaying actions indicating cooperation during arrest.

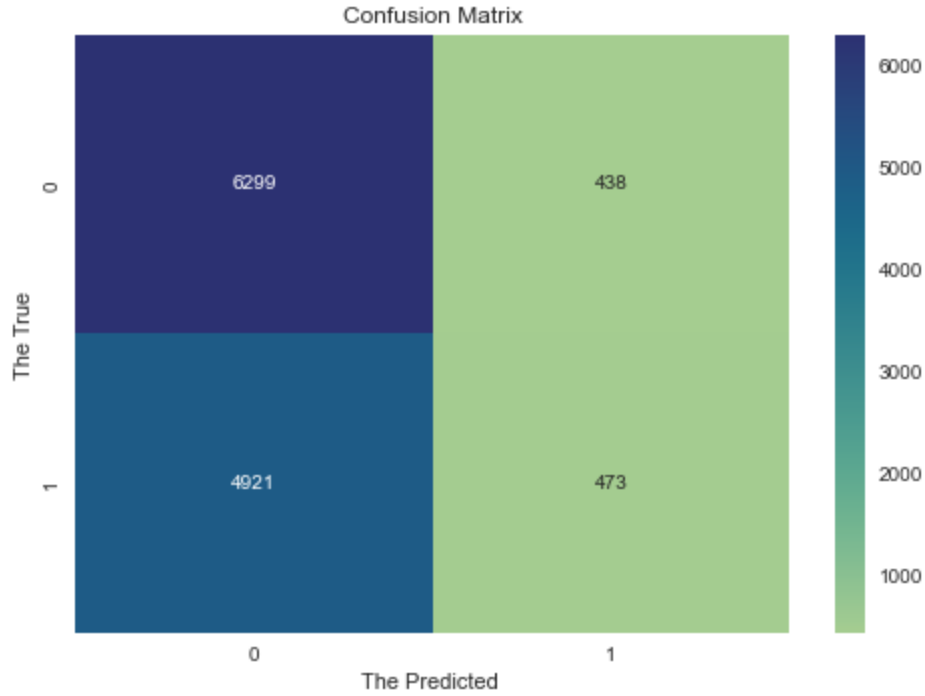


Figure 13: Confusion Matrix for Logistic Regression for Research Question Two

4.3 Logistic Regression: Research Question Three

Figure 14: Logit Regression Summary for Research Question Three

| Variables | coef | std err | z | P> z | [0.025 | 0.975] |
|--|---------|---------|---------|-------|--------|--------|
| Intercept | -3.8055 | 0.071 | -53.412 | 0 | -3.945 | -3.666 |
| Perceived_Race[T.East/Southeast Asian] | -0.3514 | 0.109 | -3.225 | 0.001 | -0.565 | -0.138 |
| Perceived_Race[T.Indigenous] | 0.0388 | 0.124 | 0.312 | 0.755 | -0.205 | 0.282 |
| Perceived_Race[T.Latino] | -0.453 | 0.164 | -2.767 | 0.006 | -0.774 | -0.132 |
| Perceived_Race[T.Middle-Eastern] | -0.0401 | 0.108 | -0.372 | 0.71 | -0.251 | 0.171 |
| Perceived_Race[T.South Asian] | -0.4453 | 0.122 | -3.653 | 0 | -0.684 | -0.206 |
| Perceived_Race[T.Unknown or Legacy] | -0.5925 | 0.112 | -5.311 | 0 | -0.811 | -0.374 |
| Perceived_Race[T.White] | -0.0339 | 0.053 | -0.643 | 0.52 | -0.137 | 0.07 |
| Sex[T.M] | -0.3192 | 0.054 | -5.891 | 0 | -0.425 | -0.213 |
| arrested | 1.2348 | 0.054 | 22.725 | 0 | 1.128 | 1.341 |

As the final step, a logistic regression was conducted to examine the variables associated with research question three. Given the complexity of Figure 14, the same approach used in section 4.2 of the paper to analyze the odds ratio table will be employed here.

Figure 15: Odds Ratio Summary for Research Question Three

| Variables | Lower CI | Upper CI | OR |
|--|----------|----------|--------|
| Intercept | 0.0193 | 0.0256 | 0.0222 |
| Perceived_Race[T.East/Southeast Asian] | 0.5684 | 0.8712 | 0.7037 |
| Perceived_Race[T.Indigenous] | 0.8149 | 1.3261 | 1.0395 |
| Perceived_Race[T.Latino] | 0.4612 | 0.8762 | 0.6357 |
| Perceived_Race[T.Middle-Eastern] | 0.7778 | 1.1866 | 0.9607 |
| Perceived_Race[T.South Asian] | 0.5045 | 0.8135 | 0.6406 |
| Perceived_Race[T.Unknown or Legacy] | 0.4443 | 0.6881 | 0.5529 |
| Perceived_Race[T.White] | 0.8716 | 1.072 | 0.9666 |
| Sex[T.M] | 0.6535 | 0.8081 | 0.7267 |
| arrested | 3.0904 | 3.824 | 3.4377 |

The odds ratio in Figure 15 displays the output for research question three, which is studying race, sex, and booking status by mental instability at arrest.

The intercept represents black females, which shows that the odds of a black female displaying mentally unstable actions at arrest to decrease by 0.0222 times.

Looking at the odds ratios, we can see that several racial groups exhibit decreased odds ratios for displaying mental instability at the time of their arrest. These include South Asian (0.6406), East/Southeast Asian (0.7037), and Unknown/Legacy (0.5529). These groups are less likely to exhibit mental instability during an arrest, based on our analysis. In contrast, the Indigenous race displays an increased odds ratio of 1.0395 for displaying mentally unstable behavior at the time of their arrest. It is important to note that Indigenous people in Canada have faced significant discrimination and marginalization, which may contribute to a lack of access to mental health support and resources, and potentially lead to increased stereotyping of this group. While our analysis has primarily focused on the Black race, it is crucial to also acknowledge and address the unique challenges faced by Indigenous peoples in Canada.

The odds ratio for male sex suggests a decreased likelihood of displaying actions indicating mental instability at the time of arrest, with a value of 0.7267.

The odds ratio for being booked increases significantly by 3.4377 when an individual displays actions indicating mental instability at the time of their arrest. This suggests that individuals who exhibit signs of mental instability are more likely to be booked.

4.3.1 Test Accuracy

The test accuracy score of 0.966 means that the machine learning model correctly predicted the outcome of 96.6% of the instances in the test set. In other words, the model made the correct prediction for the majority of instances in the test set, with only a small proportion of instances being predicted incorrectly.

4.3.2 Confusion Matrix

As illustrated in Figure 16, the model correctly predicted 11,725 instances as negative (i.e., individuals who do not display actions indicating mental instability during arrest) and 0 instances as positive (i.e., individuals who display such actions). However, the model incorrectly predicted 406 instances as negative when they were actually positive (i.e., false negatives), meaning that these individuals displayed actions indicating mental instability during arrest, but the model failed to detect it.

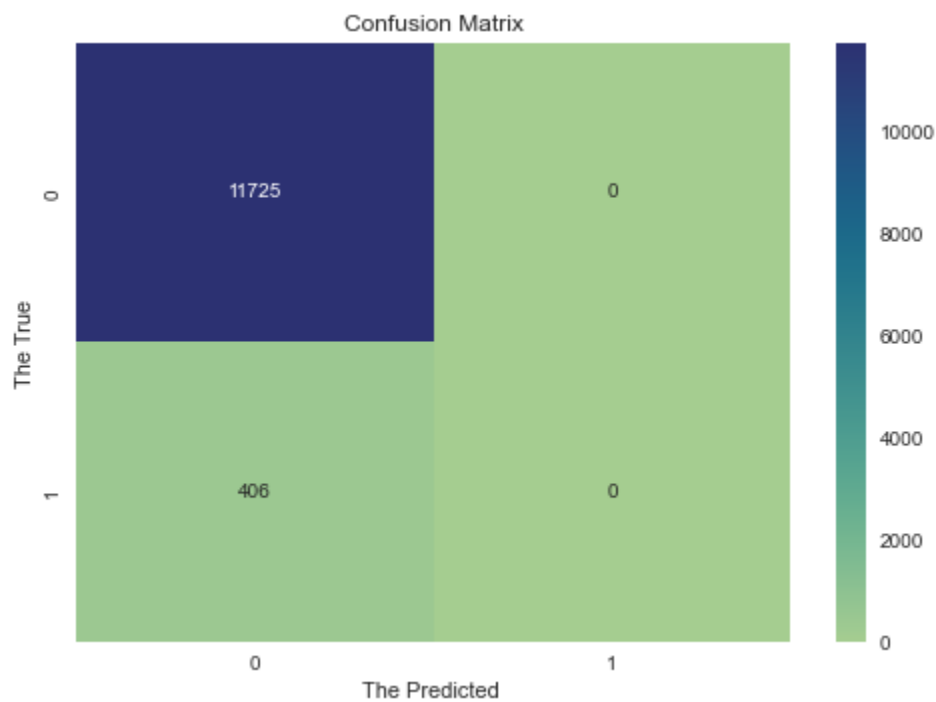


Figure 16: Confusion Matrix for Logistic Regression 2

5.0 Limitations

5.1 Prediction Interval

The researchers encountered difficulties when attempting to create a prediction interval plot, which is an important tool for forecasting future responses based on a set of predictor variables. Specifically, they encountered a value error that prevented the conversion of a string variable to a float. It is suspected that this error may have been caused by the presence of non-numeric characters in the variable of interest, even after converting it to a dummy variable. Alternatively, missing or null values in this variable could have also contributed to the error. Despite these challenges, the researchers recognize the importance of generating a reliable prediction interval and will continue to explore possible solutions to this issue.

5.2 Coding ‘stripreason’ as a Covariate

To create a covariate for ANCOVA testing, the researchers had to select the strip reason that was deemed to be the most severe. This involved making a subjective judgment, which could have been influenced by personal biases. It should be noted that the circumstances and context leading up to each strip reason could vary widely, and therefore, this decision should be interpreted with caution. Despite these limitations, the researchers believe that including this covariate in the analysis will help control for potential confounding factors and improve the accuracy of their results.

5.3 Power Analysis

Section 3.3 of this paper analyzed several variables to assess their power in detecting differences between groups. However, one limitation of the power analysis is that some of the variables have larger sample sizes than what is available in the current dataset. This may suggest that these variables are not powerful enough to detect significant differences between other variables. While the researchers attempted to address this limitation by using effect size estimates based on previous studies or meta-analyses, it is still possible that the power of some variables may have

been overestimated. Therefore, caution should be taken when interpreting the results and generalizing the findings beyond the scope of this study.

5.4 Biased Data Collection and Lack of Context

The dataset used in this study was collected based on police officers' reports, which raises concerns about potential biases and reproducing stereotypes. Police officers may have unconscious biases that could influence their perception of the situation and how they report it. These biases and variations in reporting could lead to inaccurate or incomplete representations of the behaviors and actions of those who were arrested.

In addition to this, studying behaviors at the time of arrest lacks crucial contextual information that could influence these behaviors. For example, individuals may be experiencing mental health crises, substance abuse, or other factors that could affect their behavior and actions. The lack of context in the data could result in misinterpretation or misrepresentation of these behaviors, potentially leading to incorrect conclusions and actions. Future studies should aim to collect data using multiple sources and methods, including self-reporting from the individuals involved, to ensure a more comprehensive and accurate representation of the behaviors and actions at the time of arrest.

6.0 Conclusion

Ultimately, this report provides valuable insights into the factors of being strip-searched and the number of actions being arrested. Through the analysis of the Toronto police dataset, our research aimed to answer three core research questions, which are:

1. Do race and sex influence the chance of being strip-searched as it is controlled by the strip reason indicator?
2. Does the race, age group, sex, and booking of an individual influence the probability of cooperative behavior displayed at the time of their arrest?
3. Does the race, sex, and booking of an individual affect the probability of their actions pertaining to mental instability at the time of their arrest?

When conducting our ANCOVA tests. The first ANCOVA test, testing for strip search and race, and controlled by strip reason presented interesting findings. The uncorrected p-value for race in relation to strip searches is less than the alpha level of 0.05, which indicates that there is a significant relationship between race and the likelihood of being strip searched when controlling for the reason behind the search. This finding raises important questions about racial biases in law enforcement and suggests that further research is needed to better understand these issues and develop effective strategies for addressing them. The second ANCOVA, testing for strip search and sex, and controlled by strip reason did not yield surprising results. The uncorrected p-value for sex in relation to strip searches is larger than the alpha level of 0.05, indicating that there is not a significant relationship between sex and the likelihood of being strip searched when controlling for the reason behind the search. While the initial hypothesis suggested a potential relationship, the results suggest that sex alone is not a strong predictor, although it may still contribute to stronger results when combined with other variables.

The logistic regression pertaining to research question 2 examined the relationship between race, sex, age, booking status, and cooperative actions at the time of arrest. It showed results that suggest that there is a presence of racial bias in law enforcement, with East/Southeast Asian, Latino, and Middle Eastern races more likely to display cooperative actions at the time of their arrest, while Black, Indigenous, and Unknown/Legacy races are less likely. Younger age groups also tend to exhibit less cooperative behavior, with older individuals displaying more cooperation. Furthermore, individuals who display cooperative behavior at the time of their arrest are more likely to be booked. These findings point to the potential impact of bias on police behavior and highlight the need for continued efforts to address and mitigate such bias.

The second logistic regression analysis examined the relationship between race, sex, booking status, and mental instability at the time of arrest. The results suggest that several racial groups, including South Asian, East/Southeast Asian, and Unknown/Legacy, are less likely to display signs of mental instability at the time of arrest, while the Indigenous race displays an increased likelihood. Male sex is associated with a decreased likelihood of displaying signs of mental instability, and individuals who exhibit signs of mental instability are more likely to be booked.

Through careful examination of the data, we have identified significant trends, patterns, and relationships that help us understand the underlying factors driving the Toronto Police Department. Our findings not only provide a better understanding of the data, but also offer useful information that can be used to inform decision-making and policy formulation with respect to trends within police institutions.

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