Investigating Impact of Policy Change and Location of Arrests in Strip Search and its Effectiveness

INF 2178 Midterm Assignment

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Link to Final Colab:

https://colab.research.google.com/drive/1aNgxpeQNppQkOfLRpgm1dZWFDDeRoemZ

Link to Midterm Colab:
https://colab.research.google.com/drive/1kJJhtp01uPRvegzHXUBL0ZefQJ3Usred?usp=sharing

Introduction

In October 2020, the Toronto Policy Services underwent a policy reformation to provide better transparency on all strip searches being conducted (TPS, 2022). Strip searches have been criticized for being inhumane and allowing police officers to abuse their powers (Lemke, 2022). Toronto has also been criticized for conducting strip searches on 40% of arrested individuals, compared to other municipalities who have a strip search rate of less than 1% (Lemke, 2022). With the policy change, we want to understand if the new policies have been effective and have impacted the number of strip searches being conducted in Toronto.

Literature Review

Impact of Policy Change on Police Behaviour

Studies show that policy changes have a positive impact on police reform and behaviour (Engel et. al., 2022). Police have been criticized for the use of force due to vague policies and different conceptions about what force is (Engel et. al., 2022).

Studies found that policy and training needs to be created through fact-based evidence and repeated training for police officers to retain the knowledge (Engel et. al., 2022). Researchers found that new policies and training methods were more effective when these changes were encouraged by all levels of the organization, in particular direct-reporting supervisors (Engel et. al., 2022).

Documentation, reporting are effective tools in reducing the number of police-related incidents (Engel et. al., 2022). Case studies demonstrated that police departments that implemented these measures saw a decrease in fatal police shootings, and shootings from the police department (Engel et. al., 2022).

Researchers also discovered that although training and policy can be used to reform police behaviour, training is just one aspect to solving the problem to see long term change (Engel et. al., 2022). Support is needed from each police agency to encourage training and reinforcing the policy on the police officers (Engel et. al., 2022).

Research Questions

In our report we want to understand the following research questions:

1. Does area of arrest and year influence strip search?
2. Has there been a change in the frequency of strip searches conducted during arrests between 2020 and 2021 after controlling items found rate during a strip search?

In our midterm report we discovered there was no difference in the implementation of strip searches across individuals perceived as White, Black, and Indigenous, however there was a significant difference in the probability of a strip search being conducted across different areas of Toronto. Building off our findings from the last report we will continue using area of arrest as an independent variable in our research.

In the Toronto Police Services Report, they indicated that procedural changes were implemented in October 2020 to ensure better transparency and accountability for all strip searches conducted (TPS, 2022). The policy change required all strip searches to be captured through audio and video and be authorized and documented to better ensure strip searches were conducted appropriately (TPS, 2022). As highlighted in our literature review, policy changes typically impact police behaviour. With the implemented policy change, we wanted to better understand if the policy change is impacting the number of strip searches being conducted.

Exploratory Data Analysis

Research Question 1

For research question 1, we would like to conduct a logistic regression to determine if there is any effect between area of arrest, year, and strip searches being conducted. The independent variables will be the area of arrest and arrest year, and the dependent variable will be whether or not a strip search was conducted for the arrest incident. The results from our last report indicated there was a significant difference in the rate of strip searches being conducted in different areas of Toronto, in particular between Central and West Toronto areas. See Figure 1 to view results from Tukey HSD for our Two-Way ANOVA analysis from our last report. Using the results from our last analysis we will focus on arrests located in Central and West Toronto for our logistic regression analysis. See Table 1 to understand how police divisions were categorized into the following area.

Figure 1

Summary to Tukey HSD Results for Area of Arrests and Strip Rate for Two-Way ANOVA

```
 Multiple Comparison of Means - Tukey HSD, FWER=0.05
====================================================
 group1 group2 meandiff p-adj   lower   upper  reject
----------------------------------------------------
Central   East  -0.0383 0.2361 -0.0949  0.0183  False
Central   West  -0.0946  0.001 -0.1512 -0.0379   True
   East   West  -0.0563 0.0517 -0.1129  0.0004  False
----------------------------------------------------
```

Table 1

Area assignment by Toronto Police Division

Area	Police Division
East	41,42,43, 54, 55
Central	32,33,13,53,14,51, 52
West	22, 23, 31, 12, 11

To determine if the independent variables will be a good predictor of strip search we plotted the variables on a bar chart and conducted a chi square test. The bar charts help to display whether the independent variables will be good predictors. As seen in Figure 2 and 3, we can see there is a visible difference in the frequency of strip searches between 2020 and 2021 and arrests that occurred in Central and West Toronto. There are more strip searches being conducted in 2020 and within Central Toronto, With the noticeable differences, these variables may be good predictors in our model.

Figure 2

Bar graph showing frequency of strip searches conducted in Central and West Toronto

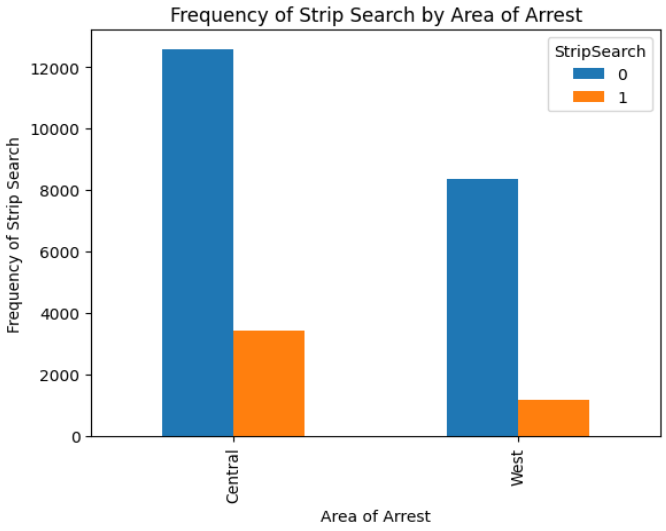
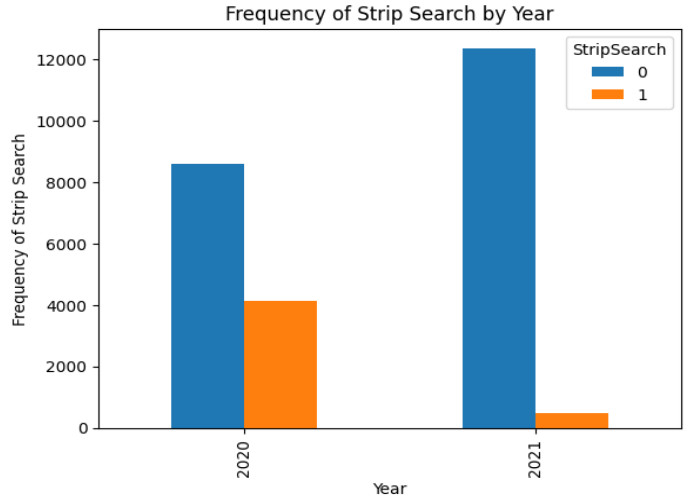


Figure 3

Bar graph showing frequency of strip searches conducted in 2020 and 2021



We performed a chi square test to conduct a univariate analysis to better understand the relationship between each independent variable and the dependent variable. The p-value for area of arrests and arrest year were both less than 0.05 as seen in Table 2. This indicates there is a relationship between the arrest year and strip search, and area of arrest and strip search.

Table 2

Hypotheses for chi square-tests for Research Question 1

Hypothesis	P-Value	Outcome
H0= There is no difference in strip searches being conducted between arrests made in Central Toronto or West Toronto H1= There is a difference in strip searches being conducted between arrests made in Central Toronto or West Toronto	3.4888705928063125e-75	The p-value is less than 0.05, therefore we can reject the null hypothesis. There is a difference in strip searches being conducted between arrests made in Central Toronto and West Toronto
H0= There is no difference in strip searches being conducted between arrests made in 2020 or 2021 H1= There is a difference in strip searches being conducted between arrests made in 2020 or 2021	p<0.001	The p-value is less than 0.05, therefore we can reject the null hypothesis. There is a difference in strip searches being conducted between arrests made in Central Toronto and West Toronto

In addition, we also conducted a Crammer's V test to measure the effect size for the chi square tests. As seen in table 3, area of arrest and strip search have a weak relationship, but arrest year and strip search have a strong relationship. Although the null hypothesis for area of arrest and strip search was rejected, the Crammer's V value indicates these variables have a weak relationship. We will continue to use the area of arrest as an independent variable for our logistic regression.

Table 3

Crammer's V test for Research Question 1

Variables	Value	Outcome
Area of Arrest & Strip Search	0.11	The Crammer's V value is 0.11, which indicates a weak relationship between Area of Arrest and Strip Search
Arrest Year & Strip Search	0.37	The Crammer's V value is 0.37, which indicates a strong relationship between Arrest Year and Strip Search

For logistic regression the following assumptions need to be met:

1. Samples are independent from each other
2. Dependent variables are binary
3. Absence of Multicollinearity
4. Large sample size
5. Absence of Outliers
6. Independent variables are linearly related to log odds

The first assumption is satisfied as there are individual data points for each arrest record. No participant will be overlapped for each arrest record.

For the second assumption, the dependent variable in our analysis is 'StripSearch'. This field is binary as strip searches being conducted are populated as 1 and strip searches not being conducted are populated as 0. The field 'StripSearch' only takes one of two values to represent two categories.

The third assumption requires the independent variables to not be correlated with each other. The presence of multicollinearity will inflate the coefficient value from the independent variables and lead to unreliable results when a logistic regression is conducted (Gakovic, 2020). To identify the correlation between independent variables we conducted a variance inflation factor (VIF). VIF will determine the strength of correlation between the independent variables by providing a score (Garkovic, 2020). If the score is greater than 5, it indicates high

multicollinearity between the independent variables. Since our independent variables are categorical, we have to one-hot encode our independent variables to convert them into a numeric format. As a result of the one-hot encoding, the independent variables we will be using are 'Area_West' and 'Arrest_Year_2020'. As summarized in Table 4, our variables all had a VIF less than 5, which means that multicollinearity does not exist. Assumption 3 is satisfied.

Table 4

VIF Results for Research Question 1

Variable	VIF	Outcome
Area_West	1.24	The VIF is less than 5, which indicates variables are not correlated and multicollinearity does not exist.
StripSearch	1.42	The VIF is less than 5, which indicates variables are not correlated and multicollinearity does not exist.
Arrest_Year_2020	1.69	The VIF is less than 5, which indicates variables are not correlated and multicollinearity does not exist.

For the fourth assumption, we created a contingency table to summarize the total number of records in each category. As seen in Table 5 and 6, each category has over 400 records, which indicates a large sample size.

Table 5

Contingency Table for Area of Arrest

Area	Central	West
StripSearch		
0	12574	8371
1	3429	1174

Table 6

Contingency Table for Arrest Year

Arrest_Year	2020	2021
StripSearch		
0	8584	12361
1	4131	472

Finally, the fifth and sixth assumptions do not apply to our variables. Our independent variables are categorical and not continuous. As a result, these assumptions do not apply.

Research Question 2

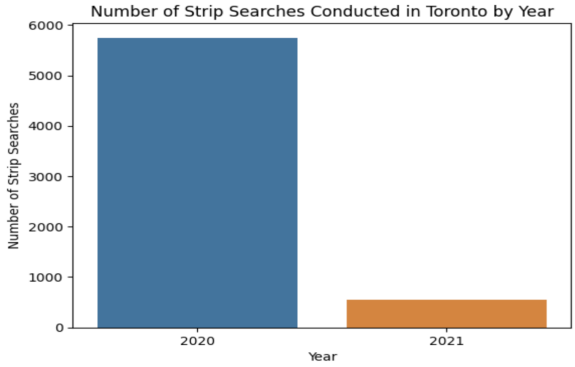
The second research seeks to investigate whether there has been a change in the frequency of strip searches conducted during arrests between the years 2020 and 2021, while controlling for the effect of items found rate during a strip search. ANCOVA will be used as the statistical analysis method to compare the frequency of strip searches between the two years, with the dependent variable being the frequency of strip searches conducted during arrests, and the independent variable being time, specifically the year of the arrest. The covariate, items found rate during a strip search, will be included in the analysis to control for its potential effect on the frequency of strip searches. This approach will enable us to identify whether changes in the frequency of strip searches over time may reflect shifts in law enforcement policies or practices, rather than variations in the prevalence of illegal items. Ultimately, this research question aims to provide insight into the use of strip searches in law enforcement, by examining

whether there have been any changes in their frequency over time and identifying potential factors that may contribute to these changes.

Figure 4 compares the number of strip searches during arrests in Toronto in 2020 and 2021. The blue bars represent 2020, while the orange bars represent 2021. There is an overall decrease in strip searches in 2021 compared to 2020, with approximately 5,700 searches in 2020 and 500 searches in 2021. This difference appears statistically significant. The bar chart provides a clear way to compare the number of strip searches between the two years.

Figure 4

Bar plot showing numbers of strip searches conducted in 2020 and 2021



One assumption of ANCOVA is that the dependent variable should follow a normal distribution. In this case, we checked the distribution of the strip search rate data for both 2020 and 2021 using skewness values. The skewness value for 2020 was 0.58, indicating a slightly positive skew, while the skewness value for 2021 was 1.61, indicating a more pronounced positive skew. Despite the slightly non-normal distribution in 2020 and the more pronounced non-normal distribution in 2021, we will still proceed with ANCOVA analysis since the sample sizes are sufficiently large, and ANCOVA is known to be robust to moderate deviations from normality.

Figure 5

Distribution of the frequency of strip searches conducted during arrests in Toronto in 2020 and 2021.

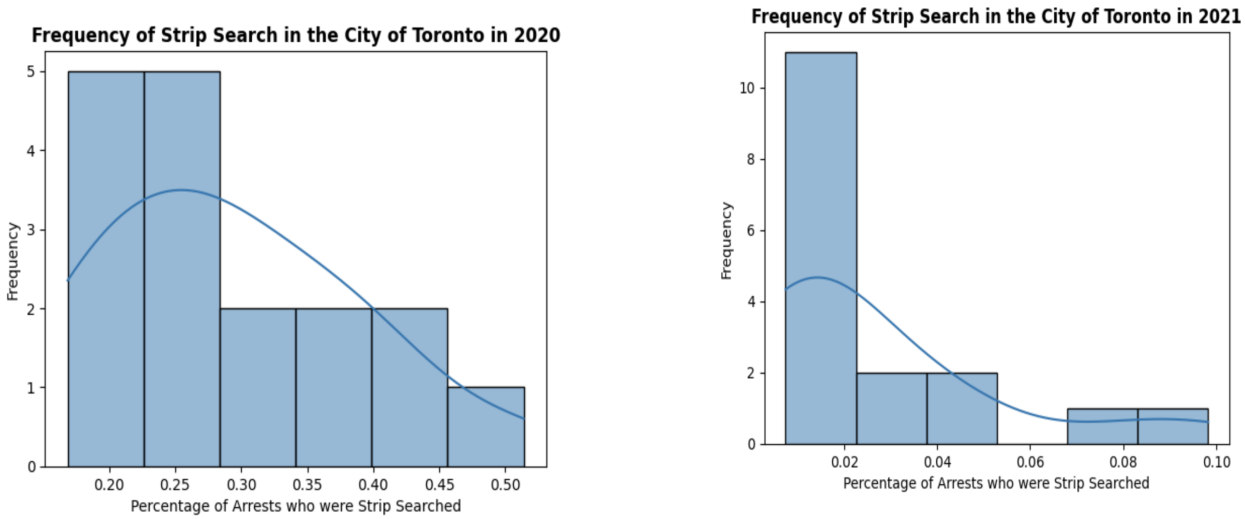


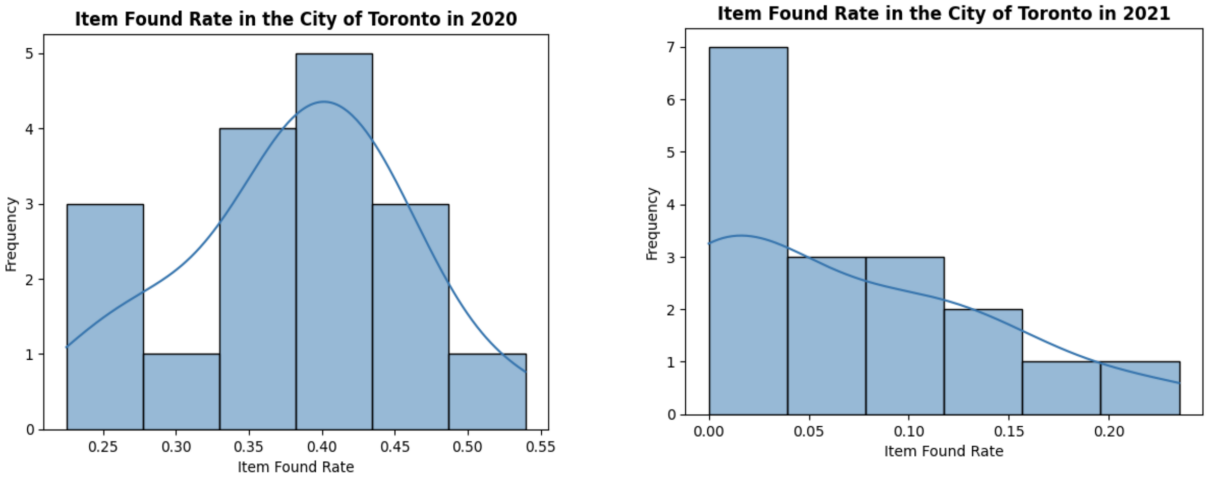
Figure 6 shows the distribution of the item found rate for strip searches conducted in 2020 and 2021. The graph on the left represents the distribution of the item found rate in 2020, while the graph on the right represents the distribution in 2021.

The skewness of the item found rate for the year 2020 is -0.224, indicating that the distribution is approximately symmetric. Similarly, the skewness of the item found rate for the year 2021 is 0.774, indicating that the distribution is slightly right skewed.

As a covariate variable, it is important to check the distribution of the item found rate to ensure that it meets the assumption of normality for the ANCOVA test. Based on the skewness values, it appears that the distribution of the item found rate for both years is relatively normal, which suggests that the data may be suitable for ANCOVA analysis.

Figure 6

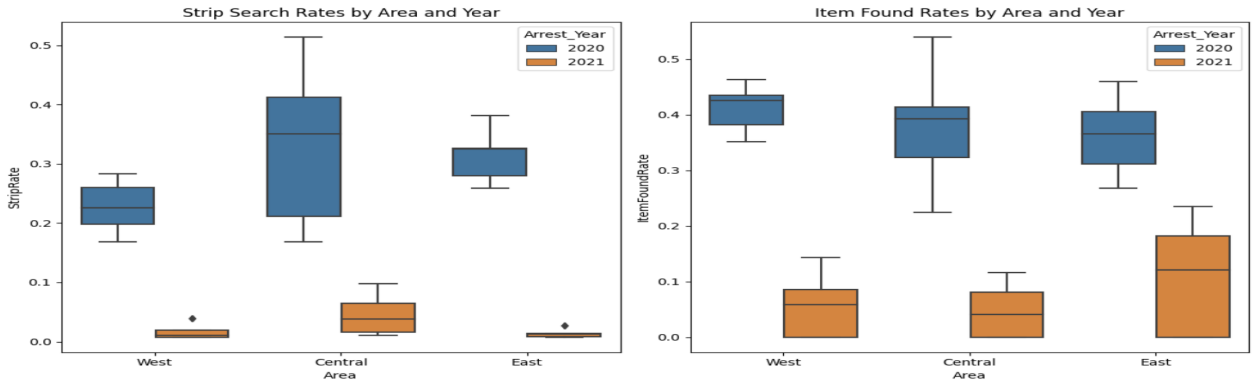
Distribution of the item found rate in Toronto in 2020 and 2021.



The box plots (Figure 7) visually show the central trend and distribution of the data for each category, allowing for comparison and identification of any patterns or trends. The graph on the left shows strip search rates by region and year, showing that the median strip search rate for all regions is lower in 2021 than in 2020. Outliers are present in both years and regions, with the highest rates in both years occurring in the Central region. In the graph on the right, item discovery rates are shown by region and year. We observe that the median item discovery rate is lower in 2021 than in 2020 for all regions, with outliers in both years and regions. In 2020, the western region has the highest item discovery rate, while in 2021, the eastern region has the highest item discovery rate. Overall, the data show a decrease in strip search and item discovery rates from 2020 to 2021 for all regions. However, there is variation within and between regions in both years, suggesting that there may be factors other than year and region that affect these rates.

Figure 7

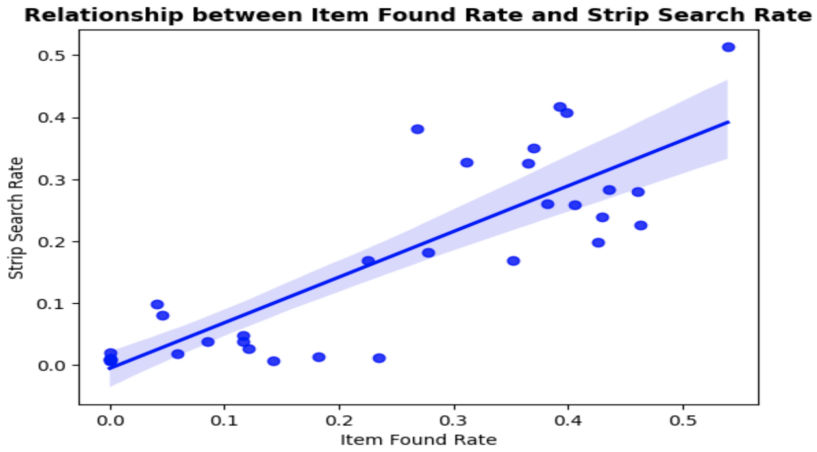
Boxplot of Strip Search and Item Found Rates by Area and Year



The scatterplot and regression line show the relationship between the strip search rate and item found rate. Each dot represents a different area and year combination, with the horizontal axis representing the item found rate and the vertical axis representing the strip search rate. The plot suggests a slight positive correlation between the two variables, meaning that as the item found rate increases, the strip search rate tends to increase slightly as well. However, the correlation is not very strong and there is a lot of variability in the data, indicating that other factors may also influence the strip search rate.

Figure 8

Scatter plot showing the relationship between strip search rate and item found rate.



The t-test was conducted to determine whether there was a significant difference in the strip search rate and item found rate between 2020 and 2021. The t-test results showed that there was a significant difference in both variables between the two years, with a t-statistic of 10.84 and 11.97 for strip search rate and item found rate respectively, and a p-value of 0.0000 for both. This suggests that the difference in strip search rate and item found rate between 2020 and 2021 is unlikely to have occurred by chance, and that there may be underlying factors contributing to the observed differences. Overall, the t-test helps to provide statistical evidence for any significant changes in the strip search and item found rates between the two years.

Table 7

Hypothesis Testing for Strip Search Rate and Item Found Rate in 2020 and 2021

Null hypothesis:	**Alternative hypothesis:**
There is no significant difference in strip search rates between 2020 and 2021.	There is a significant difference in strip search rates between 2020 and 2021.
There is no significant difference in item found rates between 2020 and 2021.	There is a significant difference in item found rates between 2020 and 2021.

The power analysis was conducted to determine the necessary sample size to achieve a power of 0.8, given an alpha level of 0.05 and an effect size of 0.835 (Eta-squared). The actual sample size was 33. Based on the power analysis, a sample size of 13 would be sufficient to achieve the desired power level. The actual power achieved with a sample size of 33 was 0.996, indicating that the statistical test had a high likelihood of correctly rejecting the null hypothesis when the alternative hypothesis was true. Overall, the power analysis suggests that the chosen sample size was more than sufficient to detect the effect size of interest with a high level of power.

Table 8

ANOVA Power Analysis Results

Parameter	Value
Alpha	0.05
Power	0.8
Effect size (Eta-squared)	0.835
Sample size	33
Required sample size	13
Actual power	0.996

In this section, we also checked the assumptions of ANCOVA, which are necessary for the validity of the results. Assumptions of ANCOVA include linearity, homoscedasticity, normality, and independence of residuals. It is important to ensure that these assumptions are met

in the data before proceeding with the analysis. Therefore, we will conduct various diagnostic plots to check for these assumptions. If any of these assumptions are violated, we will need to consider appropriate methods to address the issues, such as transformations of the dependent or independent variables, or nonparametric alternatives.

Table 9

Assumptions of ANCOVA

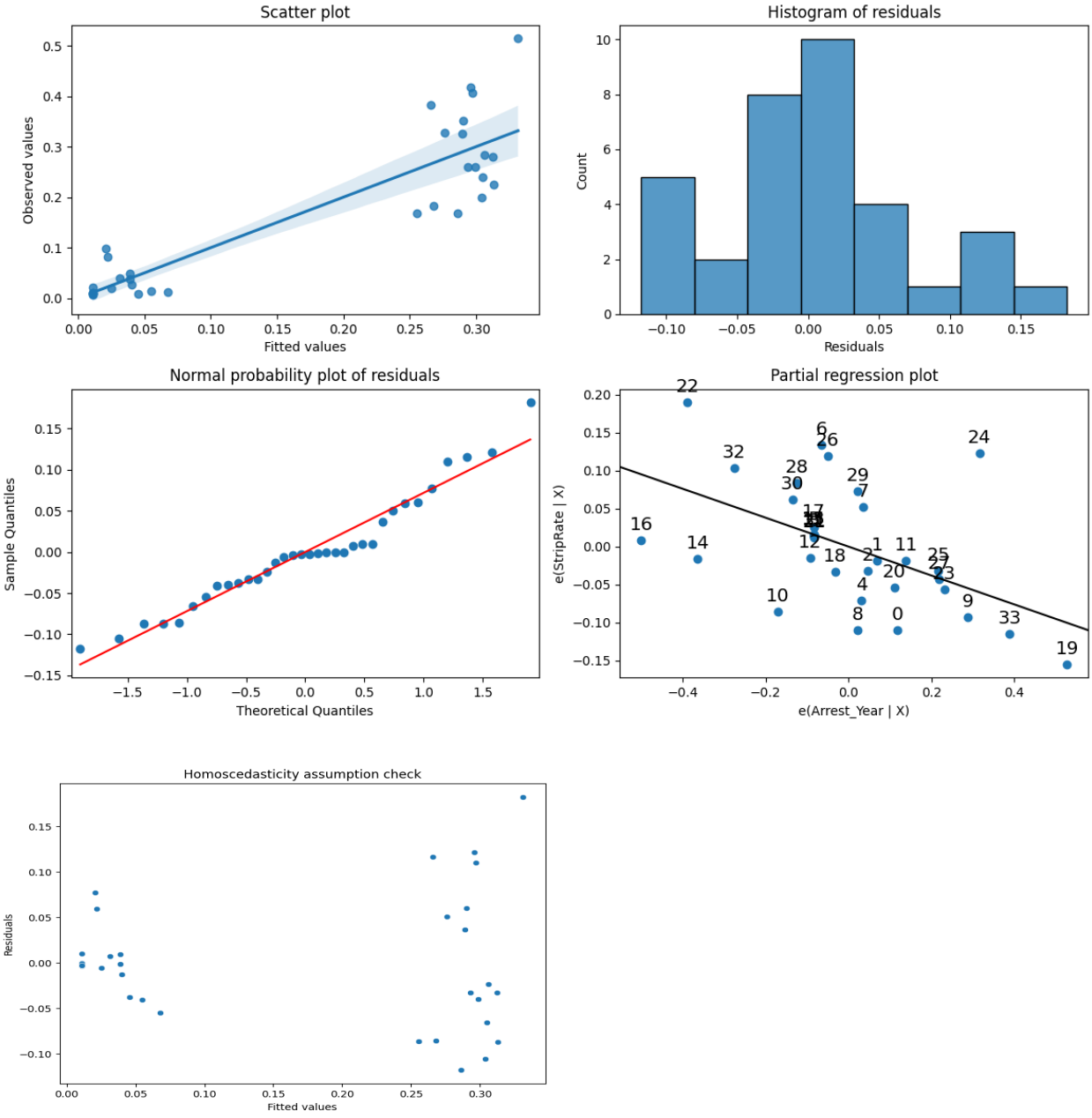
Assumption	***Description***
Linearity	*The relationship between the dependent variable and each covariate is linear.*
Homoscedasticity	*The variance of the dependent variable is equal across all levels of the independent variable, for each level of the covariate(s).*
Normality	*The residuals are normally distributed.*
Independence	*The observations are independent of each other.*

The scatter plot of the fitted values versus the observed values in the upper left is used to check the linearity assumption of the ANCOVA model. Since the relationship between the fitted

and observed values is linear, the linearity assumption is satisfied. The second plot is a histogram of the residuals. It is used to check the normality assumption of the ANCOVA model. The residuals are mostly normally distributed; therefore, the normality assumption is satisfied. The third plot is a normal probability plot of the residuals. It is also used to check the normality assumption of the ANCOVA model. The plot shows that the residuals follow a roughly straight line, indicating that they are normally distributed. Therefore, the normality assumption is satisfied. The fourth figure is a partial regression plot used to check the linearity assumptions of the ANOVA model. It displays the relationship between the dependent variable and one of the independent variables while controlling for the other independent variables. In this case, the plot shows the relationship between StripRate and Arrest_Year while controlling for the effect of ItemFoundRate. The line is straight with no significant curvature, indicating that the linearity assumption is satisfied. The fifth plot is a scatter plot that shows the relationship between the residuals and the fitted values. It is used to assess the homoscedasticity assumption of the ANCOVA model. When the residuals are randomly and evenly scattered around the zero line, then the homoscedasticity assumption is considered satisfied.

Figure 9

Assumption Checks for ANCOVA Model



Method

Research Question 1

For Research Question 1, we will conduct a Logistic Regression to understand if area of arrest and year have an influence on strip search. The independent variables will be 'Arrest Year' and 'Area of Arrest'. The dependent variable will be 'Strip Search'. The hypotheses we will be testing are indicated in Table 10.

Table 10

Hypotheses for Logistic Regression for Research Question 1

	Null hypothesis (H0)	**Alternate hypothesis (H1)**
1	There is no difference in likelihood of strip search being conducted at any area of arrest in Toronto	There is a difference in likelihood of strip search being conducted at any area of arrest in Toronto
2	There is no difference in likelihood of strip search being conducted based on the year of arrest	There is a difference in likelihood of strip search being conducted based on the year of arrest
3	There is no difference in likelihood of strip search being conducted at any area of arrest in Toronto and the year of arrest	There is a difference in likelihood of strip search being conducted at any area of arrest in Toronto and the year of arrest

Currently our dataset is unbalanced. 82% of records were not strip searched and 18% were strip searched. Since there are a significantly higher number of records that were not strip searched, we will need to rebalance the records for strip searched to ensure the results of the logistic regression are not skewed. To address the imbalance, we used Synthetic Minority Oversampling Technique (SMOTE). SMOTE is a technique that creates synthetic data points

similar to the existing data points (Korstanje, 2020). After performing SMOTE on our training dataset, we can see there are 14,665 records for strip search and no strip search. Now that the dataset is balanced, we can perform a Logistic Regression

Research Question 2

The second research question used data from Toronto police departments to investigate whether there was a change in the frequency of strip searches during arrests between 2020 and 2021, after controlling for the item found rate during strip searches. The sample included all strip searches conducted during the study period, and the frequency of strip searches and probability of finding illegal items were calculated based on region and year. To test the research questions, an analysis of covariance (ANCOVA) was conducted, with StripRate as the dependent variable and Arrest Year and Item Found Rate as independent variables. ANCOVA was chosen because it allowed us to control for the effect of item found rate on strip search rate. The ANOVA model was fitted using ordinary least squares (OLS). The sum of squares, degrees of freedom, F- and P-values, and residuals for each independent variable were examined. A significance level of 0.05 was used to determine statistical significance. The assumptions of the ANOVA model were also tested using scatter plots of residuals versus fitted values and partial regression plots to test the linearity and homogeneity hypotheses, respectively. Histograms of residuals and normal probability plots were used to check the normality assumption. See Table 11 for Hypothesis and Table 12 for variables used in Research Question 2.

Table 11

Hypothesis for ANCOVA for Research Question 2

	Null hypothesis (H0)	**Alternate hypothesis (H1)**
1	There is no difference in strip search rate based on the year of arrest when controlling for items found rate	There is a difference in strip search rate based on the year of arrest when controlling for items found rate

Table 12

Analysis of Covariance (ANCOVA) for the Effect of Arrest Year on Strip Search Rate Controlling for Item Found Rate

Variable	Type	Description
StripRate	Dependent	The frequency of strip searches conducted during each arrest
Arrest Year (2020&2021)	Independent	The year in which the arrest was made (2020 or 2021)
Item Found Rate	Covariate	The probability of finding illegal items during each strip search
Analysis Method	ANCOVA	Analysis of covariance was used to control for the covariate.

Results/Findings

Research Question 1

From the results shown in Figure 10, we can reject the null hypotheses for all 3 hypotheses as the p-value is less than 0.05. Area of arrest and arrest year influence the likelihood of being strip searched. Using the Odds Ratio as seen in Table 13, the odds of being strip searched in Western Toronto is 72% lower than being arrested in Central Toronto. Individuals were also 3 times more likely to be strip searched in 2020 compared to 2021. Both variables have a small standard error, which indicates the data is a good fit to the regression model.

Figure 10

Results of Logistic Regression

```
Optimization terminated successfully.
         Current function value: 0.600869
         Iterations 5
                         Results: Logit
================================================================
Model:              Logit            Pseudo R-squared: 0.133
Dependent Variable: StripSearch      AIC:              35250.9799
Date:               2023-04-08 22:35 BIC:              35267.5526
No. Observations:   29330            Log-Likelihood:   -17623.
Df Model:           1                LL-Null:          -20330.
Df Residuals:       29328            LLR p-value:      0.0000
Converged:          1.0000           Scale:            1.0000
No. Iterations:     5.0000
----------------------------------------------------------------
                  Coef.  Std.Err.    z     P>|z|   [0.025  0.975]
----------------------------------------------------------------
Area_West        -1.2785   0.0256 -49.9161 0.0000 -1.3287 -1.2283
Arrest_Year_2020  1.2392   0.0192  64.5443 0.0000  1.2016  1.2768
================================================================
```

Table 13

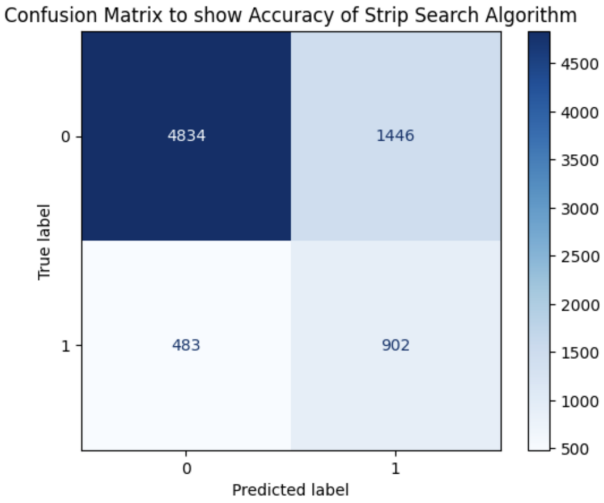
Odds Ratio for Results of Logistic Regression

Variable	Odds Ratio	Description
Area_West	0.28	Odds of strip search is 72% lower if arrested in West Toronto than Central Toronto
Arrest_Year_2020	3.45	Odds of strip search is 3 times higher if you were arrested in 2020 than 2021

When we predict the test set results, our model has a 75% accuracy. Looking at the Confusion Matrix in Figure 11, we can see 5286 records were correctly predicted and 1929 records were incorrectly predicted. 4834 records that were not strip searched and 902 records that were strip searched were correctly predicted. There is a 77% accuracy for records that were not strip searched and 65% accuracy for records that were strip searched.

Figure 11

Confusion Matrix for Logistic Regression



Research Question 2

Table 14 shows the results of the ANCOVA. It includes three sources of variation: Arrest Year, Item Found Rate, and Residual. The F-value for Arrest Year is 11.35, with a corresponding p-value of 0.002. This indicates that after controlling for the effect of Item Found Rate, Arrest Year has a significant effect on Strip Rate. The F-value for Item Found Rate is 2.24, with a corresponding p-value of 0.145. This indicates that after controlling for the effect of Arrest Year, Item Found Rate does not have a significant effect on Strip Rate. Overall, the results suggest that there is a significant difference in the frequency of strip searches conducted during arrests between 2020 and 2021 after controlling for the Item Found Rate during a strip search.

Based on the ANCOVA results, it can be concluded that there is a significant difference in the frequency of strip searches conducted during arrests between 2020 and 2021, after controlling for the effect of item found rate during a strip search. The results also indicate that the item found rate does not significantly influence the strip search rate after controlling for the effect of arrest year. Therefore, it appears that there has been a change in the frequency of strip searches conducted during arrests between 2020 and 2021, even after taking into account the influence of the item found rate during a strip search.

Table 14

Summarizing the ANCOVA results

	sum_sq	df	F	PR(>F)
Arrest_Year	0.056081	1.0	11.351533	0.002030
ItemFoundRate	0.011068	1.0	2.240363	0.144563
Residual	0.153152	31.0	NaN	NaN

Discussion

In the first research question, the logistic regression model we developed was 75% accurate in predicting whether a strip search was conducted for a particular arrest record. Although this accuracy is not perfect, it suggests that the model is capable of predicting strip searches with reasonable accuracy. Additionally, the sensitivity (77%) and specificity (65%) of the model suggest that it is more accurate in predicting records that were not strip searched than those that were strip searched.

Notably, the dataset used in the analysis for the first research question was unbalanced, with the number of records that were not strip searched being significantly higher than those that were searched. To address this issue, we used SMOTE to create synthetic data points that were similar to the existing data points, which helped us balance the dataset and improve the accuracy of our logistic regression model. A limitation of the first research question is that the dataset only includes information about the area of arrest, the year of arrest, and whether a strip search was conducted. There may be other important factors that influence the likelihood of conducting a strip search that are not included in the dataset, such as the severity of the offense, the gender or race of the arrestee, and the individual's behavior during the arrest. Therefore, a potential direction for future research is to expand the dataset to include other variables that may influence the likelihood of a strip search.

The second research question aimed to investigate whether there was a change in the frequency of strip searches conducted during arrests between 2020 and 2021 after controlling for the rate of items found during strip searches. Based on the ANOVA table, a significant effect of arrest year was found on the frequency of strip searches conducted during arrests in Toronto. The F-value for the year of arrest was 11.35, and the corresponding p-value was 0.002, indicating that there was a change in the frequency of strip searches conducted during arrests between 2020 and 2021. These findings are consistent with the Toronto Police Service's October 2020 policy change, which aims to increase transparency and accountability for all strip searches. The results of this study provide insight into the effectiveness of the procedural changes implemented by the Toronto Police Service to ensure better transparency and accountability for all strip searches conducted.

On the other hand, the second research question results showed no significant effect of item found rate on the frequency of strip searches after controlling for the effect of the year of

arrest. This result suggests that the frequency of strip searches is not solely based on the likelihood of finding illegal items during the strip search. It also suggests that the implementation of new procedural changes had a greater impact on the frequency of strip searches than the likelihood of finding illegal items.

The results of the second research question indicate that the procedural changes were effective in reducing the frequency of strip searches conducted during arrests in Toronto. However, one limitation of this study is the short time period of data collection, which included only two years of data and may not adequately consider the long-term impact of procedural changes implemented by the Toronto Police Service. A longer period of data collection could provide more comprehensive insight into the effectiveness of policy changes and whether they have led to sustained improvements in police behavior. In addition, future follow-up studies could be conducted to examine the impact of implementing multiple procedural changes over multiple years on police services in Toronto.

Conclusion

Our logistic regression analysis found that arrest area and arrest year were important factors in determining whether a strip search was conducted. Individuals arrested in west Toronto were less likely to be strip searched than those arrested in central Toronto, and those arrested in 2020 were more likely to be strip searched than those arrested in 2021. Our model was 75% accurate in predicting whether a strip search was conducted and was more accurate in predicting records that were not strip searched. These findings underscore the need for continued monitoring and evaluation of strip search practices in Toronto.

The study also found that procedural changes implemented by the Toronto Police Service in October 2020 had a significant impact on the frequency of strip searches conducted during arrests. These changes effectively reduced the frequency of strip searches, even after controlling for the likelihood of illegal items being found during the search. This highlights the potential effectiveness of procedural changes in improving police behavior and ensuring transparency and accountability.

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