Investigating Racial and Location Disparities in Strip Search Rate and its Effectiveness

INF 2178 Midterm Assignment

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

Introduction

In Canada, the law allows police to strip search with or without consent when 'reasonable' (Lemke, 2022). The term 'reasonable' is vague and does not set standard procedures for police to follow when conducting strip searches. The Toronto Police Service currently faces issues around policing, racism, and is criticized for abusing their authoritative powers. In 2020, the Toronto Police Service began collecting race data to help eliminate systematic racism and improve racial equality (TPS, 2022). In Toronto, police can use their judgment to decide whether a strip search is appropriate based on the situation of arrest, history of individual, items discovered during frisk search, mental state, and risk to society (TPS, 2022). Strip searches have been criticized for being dehumanizing as the individual is required to remove all clothes to allow for private areas to be inspected (Lemke, 2022). Previously, the Toronto Police have also stated that items are rarely found during strip searches, and oftentimes these items are not a risk to society (Lemke, 2022a). The Toronto Police has been criticized for abusing their strip search powers and targeting people of colour, especially individuals who are perceived as Black (Lemke, 2022). Between 2014 and 2016, the Toronto Police had conducted a strip search on approximately 40% of individuals who were arrested (Lemke, 2022). This strip search rate was higher than other municipalities, who have a strip search rate of less than 1% (Lemke, 2022). In October 2020, the Toronto Police updated their policy to ensure all strip searches are documented, captured on audio and video, and authorized by a supervisor (TPS, 2022). This policy was updated to improve transparency and accountability of police officers conducting strip searches.

Literature Review

Racial Disparities in Strip Search

Previous studies on strip searches indicate there are racial biases from police when conducting strip searches. People of colour, in particular individuals who are perceived as 'Black' are more likely to be strip searched compared to people who are perceived as 'White' (Newburn et al., 2004).

In Canada, strip searches can be conducted based on what the officers view as reasonable (Lemke, 2022). Researchers argue that officers' judgment is influenced by racial stereotypes promoted through media and the criminal justice system (Mullings et al., 2016). With mainstream Canadian media being predominantly fueled by a white perspective, media continues to inforce stereotypes through over-publicizing reports emphasizing high levels of gun violence, drug use, and murders among African Canadian men (Mullings et al., 2016). The media instills fear around African Canadian men and often portray them as a threat to society (Mullings et al., 2016). The hyper criminalization of African Canadians through the criminal justice system also contributes to racial stereotypes by justifying the harsh treatment against Black Canadians through describing them as dangerous and violent individuals (Jones & Sheehy, 2021). As a result, police may associate people of colour with being more engaged in criminal activity due to racial stereotypes, which results in POCs to be targeted for a strip search when an individual is arrested.

Although police have been criticized for discrimination, they have access to various resources, which protects them from facing severe consequences (Jones & Sheehy, 2021). In legal trials where officers are put on trial for illegal strip searches and racism, the police have an advantage over the victim. Police are supported by their unions, and have the ability to hire well-known lawyers (Jones & Sheehy, 2021). In cases where the police are being prosecuted, the Crown utilizes evidence from police witnesses in their investigation (Jones & Sheehy, 2021). As a result police are rarely criminally charged or convicted and typically face small consequences such as internal disciplinary (Jones & Sheehy, 2021).

Due to the lack of racial data, documentation, and video evidence, it is difficult for researchers to fully understand if certain ethnic groups are more likely to be subjected to a strip search. In one study, researchers found that once CCTV footage was set as a requirement for strip searches, the rate of strip searches drastically declined (Newburn et al., 2004). With no data surrounding the race of arrested individuals, it is difficult to provide evidence to prove that police have racial bias when conducting strip searches (Jones & Sheehy, 2021).

Racial Biased Policing in Toronto Canada

Studies show that crime is clustered within specific neighbourhoods and are not distributed evenly (Charron, 2011). Toronto neighbourhoods located downtown, in the northeast

end, and in the northwest end have higher crime rates (Wang et al., 2019). Distribution of crime is concentrated in neighbourhoods with similar characteristics. Crime often occurs in neighbourhoods with lower socio-economic status, low levels of education and low income (Wang et al., 2019).

Individuals perceived as Black are more likely to be stopped and arrested in areas with a large wealthy and White dominated population (Meng, 2014). This can be seen in the neighbourhoods within Etobicoke (Meng, 2014). The study suggests that police are more likely to stop Black individuals in these neighbourhoods because they are perceived as "out of place" (Meng, 2014). Officers respond to incidents based on their subjective perception of the area and subjects (Meng, 2014). Police are less likely to target Black individuals within areas that have a high Black population (Meng, 2014).

Racial biased policing raises concerns around officers missing potential criminals who are associated with other race groups (Meng, 2014). By targeting individuals who "do not belong", it deters the focus from arresting actual criminals regardless of race (Meng, 2014). Racial profiling also enforces racial segregation and racial antagonism by portraying individuals as dangerous and suggesting that people of colour can visit neighbourhoods with a dominant White population at the risk of being stopped by police (Meng, 2014).

Although researchers can perceive that personal prejudices and attitudes from officers are factors in racial profiling, the lack of evidence makes it difficult to prove that officers' attitude, lifestyle, and value contribute to discrimination on duty (Meng, 2014). Researchers suggest that the Toronto Police Services should focus as an organization to allow community members to participate in the decision-making process to determine what police services are needed within their neighbourhoods (Meng, 2014). This can help improve treatment towards members of the community in an equitable way (Meng, 2014). It is also important for the Toronto Police Services to review their information that determine why people of colour are at high risk of being racially profiled within specific neighbourhoods (Meng, 2014).

Research Questions

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

1. Is there a difference in strip search rates by area of arrest for White, Black, and Indigenous individuals who are arrested?

2. Is there a difference in rate of items found during strip search between White, Black, and Indigenous individuals who are strip searched?

In the Toronto Police Services report, it indicates that White, Black, and Indigenous populations are more likely to be strip searched (TPS, 2022). As a result, these three groups were selected as the main focus in our research questions. We want to determine if the rate of strip searches vary by perceived race and area of arrest. This will identify if Toronto Police are disproportionately conducting strip searches based on ethnicity. It can help us understand if certain Toronto areas influence the likelihood of an individual to be strip searched. It will also allow us to determine if there are higher strip rates in areas that have been identified as high crime rates in our literature review. In addition, analyzing the rate of items found by perceived race will allow us to understand how effective strip searches are. It will also allow us to understand if specific races are more likely to have an item found during a strip search.

These research questions will help address the issue of whether police are targeting people of colour when conducting strip searches. It will also help understand if strip searches are more effective amongst the different ethnicities. If there is no difference in items found amongst the different groups, it can help refute racial stereotypes produced by the media and the criminal justice system that describe individuals perceived as Black as dangerous and violent. The research aims to provide data-driven insights to better understand any variables that contribute to any distinctions between how often strip searches are conducted and how effective these searches are.

Exploratory Data Analysis

Research Question 1

For our analysis, strip search rate was calculated based on the following steps:

1. We grouped the data by race and police division to determine the number of arrests and strip searches that occurred by race and police division. Data includes arrests from 2020 and 2021.
2. We removed arrests not assigned to a division for this analysis.
3. We calculated the strip search rate by taking the total number of strip searches and dividing it by the total number of arrests by police division and perceived race.

The field ‘Area’ was defined based on the location of the police division. The divisions were categorized into the following areas as shown in Table 1.

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

For research question 1, we would like to conduct a Two-Way ANOVA to determine if there is any effect between area, perceived race, and strip search rate. To conduct a two-way ANOVA the following assumptions need to be met:

1. Samples are independent from each other
2. The dependent variable is continuous
3. The dependent variable is normally distributed
4. There are homogenous variances between groups

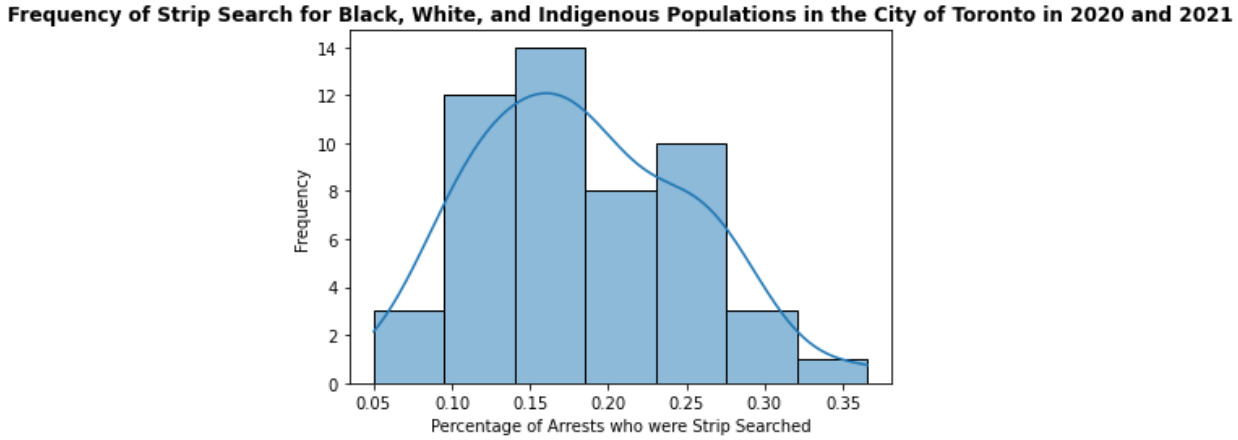
The first assumption is met as each group has different participants. The two variables we will analyze are ‘Perceived Race’ and ‘Area’. Each division is located within one area and has a strip rate calculated for each race. As a result, there will be no overlap between the populations.

For the second assumption, the dependent variable we are analyzing is ‘Strip Search Rate’. The value strip search rate is a continuous variable as it is a percentage, and can have an unlimited number of values.

The third assumption requires the dependent variable to be normally distributed. As seen in Figure 1, the dependent variable Strip Search Rate follows a normal distribution. The variable has a skewness of 0.4. The skewness is between -0.5 and 0.5, which means the data is approximately normally distributed.

Figure 1

Histogram showing the Frequency of Strip Search in the population of Toronto for Black, White and Indigenous Individuals



For the fourth assumption, a Levene test was conducted to verify this assumption. As seen in Figure 2, the p-value is 0.08. The p-value is greater than 0.05, which means the variances are not significantly different from each other.

Figure 2

Results of Levene Test

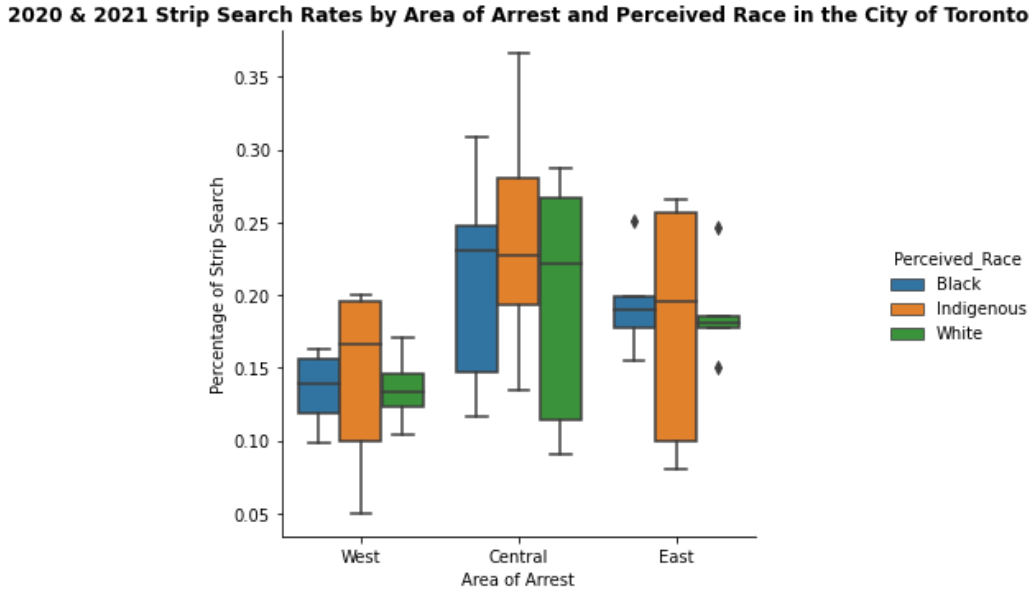
```
## p > 0.05 can assume equal variance
stat, p = levene(t1, t2, t3, t4, t5, t6, t7, t8, t9)
print(stat, p)
```

```
1.9237408965056952 0.0815763146141901
```

To further explore our data, we created a box plot to determine if there were any differences between our groups. We can quickly see in Figure 3, there is a difference in strip search rates by the different Toronto areas. It appears that there are more strip searches that occur in the central areas of Toronto. In addition, individuals perceived as White appear to have a slightly higher strip search rate compared to individuals perceived as Indigenous or Black.

Figure 3

Boxplot showing the Strip Search Rate by Area of Arrest for Black, White and Indigenous Individuals



Finally, we conducted t-tests to determine if there is a significant difference between two-groups amongst the variables. The results are summarized in Table 2.

Table 2

Hypotheses for t-tests for Research Question 1

Hypothesis	P-Value	Outcome
H0= There is no difference in strip search rate between arrested individuals perceived as White or Black H1= There is a difference in strip search rate between arrested individuals perceived as White or Black	0.74	The p-value 0.74 is greater than 0.05, therefore we cannot reject the null hypothesis. There is no difference in strip search rate between arrested individuals perceived as White or Black.
H0= There is no difference in strip search rate between arrested individuals perceived	0.47	The p-value 0.47 is greater than 0.05, therefore we cannot reject the null

as White or Indigenous H1= There is a difference in strip search rate between arrested individuals perceived as White or Indigenous		hypothesis. There is no difference in strip search rate between arrested individuals perceived as White or Indigenous.
H0= There is no difference in strip search rate between arrested individuals perceived as Indigenous or Black H1= There is a difference in strip search rate between arrested individuals perceived as Indigenous or Black	0.65	The p-value 0.65 is greater than 0.05, therefore we cannot reject the null hypothesis. There is no difference in strip search rate between arrested individuals perceived as Indigenous or Black.
H0= There is no difference in strip search rate between arrests made in East Toronto or West Toronto H1= There is a difference in strip search rate between arrests made in East Toronto or West Toronto	0.007	The p-value 0.007 is less than 0.05, therefore we can reject the null hypothesis. There is a difference in strip search rate between arrests made in East Toronto and West Toronto
H0= There is no difference in strip search rate between arrests made in East Toronto or Central Toronto H1= There is a difference in strip search rate between arrests made in East Toronto or Central Toronto	0.26	The p-value 0.26 is greater than 0.05, therefore we can't reject the null hypothesis. There is no difference in strip search rate between arrests made in East Toronto and Central Toronto
H0= There is no difference in strip search rate between arrests made in Central Toronto or West Toronto H1= There is a difference in strip search rate between arrests made in Central Toronto or West Toronto	0.0013	The p-value 0,0013 is less than 0.05, therefore we can reject the null hypothesis. There is a difference in strip search rate between arrests made in Central Toronto and West Toronto

According to the t-tests there is no difference in strip search rate amongst the different perceived race groups. There is also no difference in strip search rate for arrests made in East and Central Toronto. The t-tests did conclude there was a difference in strip search rate for arrests made in East Toronto or West Toronto and Central Toronto or West Toronto. Although there was no correlation for the perceived race, we can still conduct a Two-Way ANOVA to determine if there is an interaction between the two independent variables and confirm the findings of the t-test.

Research Question 2

For the second research question, our study focused on examining the relationship between the number of items found and perceived race during the execution of the strip search. To explore the relationship, we used the One-Way ANOVA test to find the effect of race on the rate of items found.

As mentioned above, our research questions focused on three racial groups: White, Black and Indigenous. For our analysis we calculated items found rate by performing the following steps:

1. We first grouped the data by race and police division to calculate the total sum of strip searches performed between 2020 and 2021.
2. We calculated the total frequency of items found during these strip searches. Since the original data only gives whether items were searched, we assume that only one item was discovered per search.
3. From the number of strip searches and the number of items found, we calculated the rate of items found by dividing the frequency of items found with the number of strip searches across the three races.

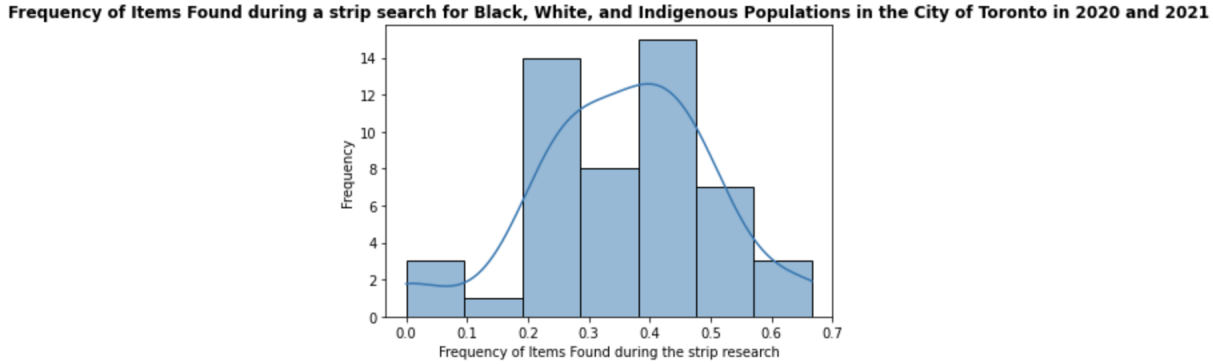
Before proceeding with the analysis, we must consider whether the present data satisfy the basic assumptions for the one-way ANOVA test:

1. The dependent variable is normally distributed
2. The dependent variable is continuous
3. There are homogenous variances between groups
4. Samples are independent from each other

ANOVA assumes that the data is normally distributed. It can be seen from Figure 4 that the dependent variable shows an apparent normal distribution and has a skewness of 0.3. The skewness is between -0.5 and 0.5, therefore, the first assumption is satisfied.

Figure 4

Histogram showing the distribution of items found rate in the population of Toronto for Black, White and Indigenous Individuals



Regarding ANOVA''s second assumption, we have the item found rate as our dependent variable, and the item found rate is based on the total number of items found divided by the number of strip searches performed, so this is a continuous data and satisfies anova's second assumption.

For the third assumption, one-way ANOVA requires that the variables have the same variance. In this case, we performed the Levene test, and the result was 0.56 as seen in Figure 5. It is greater than 0.05 so the third assumption is fulfilled.

The fourth assumption of the ANOVA test is the independence between variables. For this research question, we choose item found rate as our dependent variable and three ethnic groups as our independent variables, without any internal relationship between the two variables and with independence; therefore, the second assumption of one-way ANOVA is also satisfied.

Figure 5

Results of Levene test for the second research question

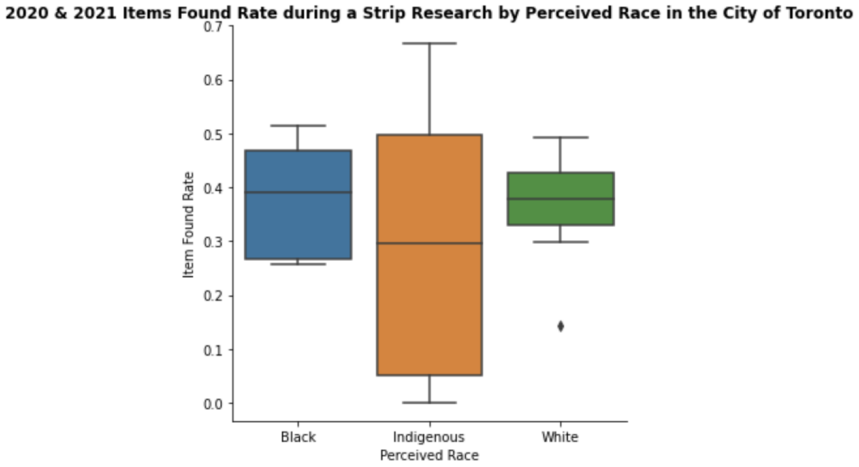
```
#p > 0.05 can assume equal variance
stat, p = levene(l1,l2,l3)
print(stat, p)
```

```
0.5934200001874327 0.5678623239885726
```

To better understand this dataset, we created box plots. As seen in Figure 6, there is no significant difference in the median for rate of items found for the three individual races. Individuals perceived as Blacks and Whites have a similar rate of items found, and individuals perceived as Indigenous have a slightly lower rate of having items found during a strip search.

Figure 6

Boxplot showing the Rate of Items Found for Black, White and Indigenous Individuals



We also conducted t-tests on the item found rate during strip searches for the three race groups. The results will be shown in Table 3.

Table 3

Hypotheses for t-tests for Research Question 2

Hypothesis	P-Value	Outcome

H0= There is no difference in item found rate during strip searches between individuals perceived as White and Black H1= There is a difference in item found rate during strip searches between arrested individuals perceived as White and Black	p-value=0.57	The p-value 0.57 is greater than 0.05, therefore we cannot reject the null hypothesis. There is no difference in item found rate during strip searches between individuals perceived as White and Black. .
H0= There is no difference in item found rate during strip searches between individuals perceived as White and Indigenous H1= There is a difference in item found rate during strip searches between arrested individuals perceived as White and Indigenous	p-value=0.90	The p-value 0.90 is greater than 0.05, therefore we cannot reject the null hypothesis. There is no difference in item found rate during strip searches between arrested individuals perceived as White and Indigenous.
H0= There is no difference in item found rate during strip searches between individuals perceived as Indigenous and Black H1= There is a difference in item found rate during strip	p-value=0.85	The p-value 0.85 is greater than 0.05, therefore we cannot reject the null hypothesis. There is no difference in item found rate during strip searches between arrested individuals perceived as Indigenous and Black

searches between arrested individuals perceived as Indigenous and Black		

For the second research question, the results of the t-test showed no significant difference between the three perceived races and the item finding rate. We can still perform a one-way ANOVA to further confirm the findings of the t-test.

Method

Data Set Description

This data set includes all arrests and strip searches processed by the Toronto Police Service between 2020 and 2021. This data set includes a total of 65,276 records (rows) as well as 25 columns. Each row of data represents a record of each suspect who is arrested. Each column includes information about the arrest, including the record number associated with the arrest, the month and year it occurred, the perceived ethnicity of the suspect, the age group, the reason for the arrest, the response made during the arrest, whether the suspect was strip-searched, and the reason for the strip-search. According to the notes from the Toronto Police Service, there could be a few entries where a person was strip-searched, but the data does not reflect a record (i.e., value = 0) due to problems with the booking template. In those instances, the viewer should assume a booking took place. The location of the arrest, which is consolidated to the Division level, describes where the arrest happened inside the limits of the Division. The location should not be mistaken for the Division the arresting officer was assigned to by users. XX denotes arrests for which the location could not be geocoded or for which the arrest occurred beyond the City of Toronto's borders in another jurisdiction. The age of a person arrested and subjected to a strip search is the age that the individual declared to the arresting officer at the time of the arrest.

Research Question 1

For research question 1, we will conduct a Two-Way ANOVA experiment to determine if strip search rate is affected by perceived race and/or area of arrest in Toronto. The independent variables will be ‘Perceived Race’ and ‘Area of Arrest’. The dependent variable will be ‘Strip

Search Rate'. The hypotheses we will be testing are indicated in Table 4. If the Two-Way ANOVA model is an additive model, a One-Way ANOVA will also be conducted.

Table 4

Hypotheses for Two-Way ANOVA for Research Question 1

	Null hypothesis (H0)	**Alternate hypothesis (H1)**
1	There is no difference in average strip search rate for any perceived race	There is a difference in average strip search rate by perceived race
2	There is no difference in average strip search rate at any area of arrest in Toronto	There is a difference in average strip search rate by area of arrest in Toronto
3	The effect of perceived race does not depend on the area of arrest in Toronto	Perceived race and area of arrest in Toronto interact in effecting strip search rate

There is an uneven population between each of the 3 areas. To ensure each of the population groups are equal, we conducted a random sample to randomly select 4 police divisions within the associated Toronto area to each area group.

Research Question 2

For the second research question, we will perform a One-Way ANOVA test to determine if the rate of items found during strip search is affected by the three perceived ethnicities. Our dependent variable will be the 'Items Found Rate', and the independent variable will be the three perceived ethnic groups. The hypotheses we will be testing are indicated in Table 5.

Table 5

Hypotheses for One-Way ANOVA for Research Question 2

Null hypothesis (H0)	**Alternate hypothesis (H1)**
*H*0: there is no difference in average item found rate for any perceived race.	(*H*a) there is at least one perceived race group that differs significantly from the overall average of the item found rate.

Results

Research Question 1

From the results shown in Figure 7, we can fail to reject the null hypothesis for hypotheses 1 and 3 as the p-value is greater than 0.05. The F ratio is not significant, which suggests that population means are not statistically significant. There is no difference in strip search rate between individuals perceived as White, Black or Indigenous. Strip search rate is also not affected by the interaction of Perceived Race and Area of Arrest. As a result, this is an additive model.

For hypothesis 2, the p-value 0.00029 is less than 0.05, therefore we can reject the null hypothesis. There is also a significant F ratio, which suggests that the population means are significantly different from each other. As a result, there is a statistical difference in strip search rate and area of arrest.

Figure 7

Results of Two-Way Anova with independent variables 'Perceived Race' and 'Area of Arrest' and dependent variable 'Strip Search Rate

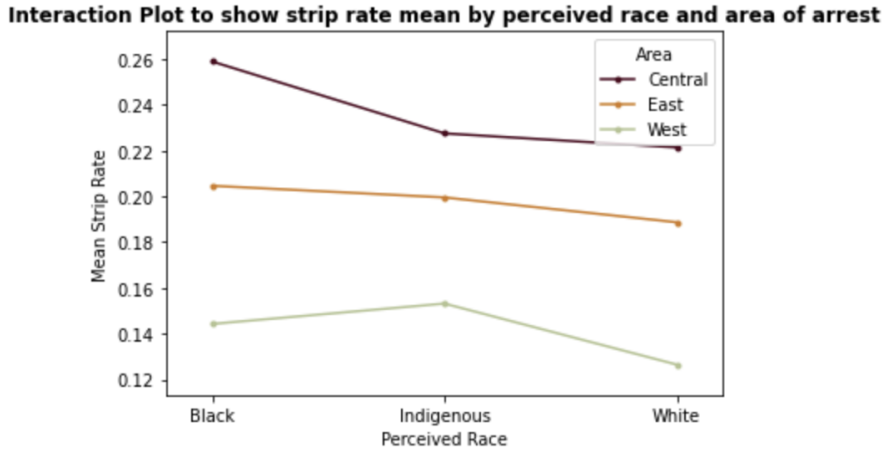
	sum_sq	df	F	PR(>F)
C(Perceived_Race)	0.003435	2.0	0.462739	0.634457
C(Area)	0.054285	2.0	7.313028	0.002897
C(Perceived_Race):C(Area)	0.001803	4.0	0.121444	0.973604
Residual	0.100211	27.0	NaN	NaN

ariables 'Perceived Race' and 'Area of
tistically significant information, Figure

1. There is no interaction between the variables 'Perceived Race' and 'Area of Arrest' as the lines are parallel.
2. Central Toronto has a higher percentage of strip searches being conducted compared to East and West Toronto.
3. There is no significant difference in strip search rate by perceived race in each of the 3 areas of arrests. However, we can also see from the plot that individuals perceived as 'White' have a slightly lower strip search rate in each of the Toronto areas compared to individuals perceived as 'Black' or 'Indigenous' in all areas of arrests.

Figure 8

Interaction plot that displays strip rate mean by perceived rate and area of arrest



A Two-Way ANOVA test does not tell which areas are significantly different from each other. A post-hoc test called Tukey HSD was conducted to understand which pairs of areas of arrest are significantly different from each other. As seen in Figure 9, there is no significant difference in strip search rate means between Central Toronto and East Toronto, and East Toronto and West Toronto. The p-value is >0.05, which indicates no statistical significance. For arrests that occur in Central Toronto and West Toronto, there is a significant difference in the

means of strip search rate as the p-value is <0.05. There is the largest mean difference between the two groups. This is also confirmed in the interaction plot in Figure 8 as the lines for Central and West are the furthest apart.

Figure 9

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

Since the Two-Way ANOVA was an additive model, a One-Way ANOVA was also conducted with 'Area of Arrest' and 'Strip Search Rate' to view the results without 'Perceived Race'. Hypothesis 2 as indicated in Table 4 is used for this test. To conduct this test, a random sample of 10 groups were selected for each area regardless of race. As seen in Figure 10, the p-value of 0.007 is less than 0.05, therefore we can reject the null hypothesis. Similar to our results in the Two-Way ANOVA, there is a statistically significant difference in strip search rate and area of arrest. A Tukey HSD test was also conducted to identify which areas are statistically significant from each other. Similarly, the Tukey HSD results in Figure 11 confirms there is a significant difference in the means of strip search rate in arrests that occur in Central Toronto and West Toronto. The p-value of 0.006 is less than 0.05, which means there is a significant difference.

Figure 10

Results of One-Way Anova with independent variables 'Perceived Race' and dependent variable 'Strip Search Rate'

	df	sum_sq	mean_sq	F	PR(>F)
Area	2.0	0.037250	0.018625	5.875385	0.007614
Residual	27.0	0.085591	0.003170	NaN	NaN

Figure 11

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

Multiple Comparison of Means - Tukey HSD, FWER=0.05

group1	group2	meandiff	p-adj	lower	upper	reject
Central	East	-0.0317	0.4308	-0.0942	0.0307	False
Central	West	-0.0854	0.0059	-0.1478	-0.023	True
East	West	-0.0536	0.1024	-0.1161	0.0088	False

The results of both experiments show that there is no significant difference in strip search rate between perceived races and area of arrests, however, there is a significant difference in strip search rate and area of arrest. Each perceived race group had a different likelihood of being strip searched based on the area they were arrested. There was a significant difference in strip search rates between Central Toronto and West Toronto. Arrests that occurred in Central Toronto had the highest likelihood of being strip searched regardless of race, while arrests in West Toronto had the lowest chance of being strip searched.

Research Question 2

From the results shown in Figure 12, we see that the F test statistic is 0.64 and the corresponding p-value is 0.533. Since the p-value is greater than 0.05, we fail to reject the null hypothesis. This means there is no sufficient evidence to say that there is a statistically significant difference between the mean of the rate of items found among the three perceived race groups.

Figure 12

Results of One-Way Anova with independent variables 'Perceived Race' and dependent variable 'Item Found Rate'

	df	sum_sq	mean_sq	F	PR(>F)
Perceived_Race	2.0	0.035542	0.017771	0.642912	0.533619
Residual	27.0	0.746325	0.027642	NaN	NaN

Although the ANOVA test already stated that there was no significant difference in items found rates between the three ethnic groups, we still conducted post-hoc tests to further analyze our data.

Figure 13 displays the three different comparisons in our study, the difference between group means, and the adjusted p-value for each comparison. All three sets of comparisons have p-values greater than 0.05, which fully supports our previous conclusion that there were no significant differences between Black and Indigenous individuals, Black and White individuals, and Indigenous and White individuals when items were identified during the strip search.

Figure 13

Summary to Tukey HSD Results for Perceived Race and Items Found Rate

Multiple Comparison of Means - Tukey HSD, FWER=0.05

group1	group2	meandiff	p-adj	lower	upper	reject
Black	Indigenous	-0.0794	0.5407	-0.2637	0.1049	False
Black	White	-0.0151	0.9	-0.1994	0.1692	False
Indigenous	White	0.0643	0.6568	-0.12	0.2486	False

Discussion and Conclusion

We raised two research questions based on data about arrests and strip searches published by the Toronto Police Service in 2021. First, we examined if strip search rate was affected by the three perceived ethnic groups and areas of arrest. It showed that strip search rates did not differ significantly between the perceived racial groups and arrest areas. We also found that while strip search rates did not differ significantly across the three perceived race groups, strip search rates were different across Toronto. Those arrested in the Central Toronto area had higher strip-search rates. In comparison, those arrested in the Western and Eastern areas had lower strip-search rates, and these strip-search likelihoods were not related to perceived ethnicity. The Toronto Police

Service's explanation for this phenomenon is that because strip search rates are positively correlated with crime rates, and the downtown Toronto area (D14, D51, D52) has significantly higher crime rates than other areas, search rates would be higher than other areas as well. This also confirms the analysis of property and violent crime in Toronto by Wang et al. (2019), who conclude that crime rates are higher in downtown Toronto. For the second research question, we found there was no difference in the frequency of items found during strip searches among the three groups of arrestees who were considered to be of different races. As a result of this study, we cannot conclude which ethnicity is more dangerous. The results of this study contrast with the stereotypes and ideologies of race in the mainstream media.

Mullings et al. (2016) noted that in the Canadian justice system, policymakers are influenced by stereotypes and excessive media propaganda. For example, the mainstream media reinforces stereotypes by overly promoting gun violence, drug use, and murder among African Canadians. Police may resort to violent and unwarranted strip searches of innocent individuals perceived as Black. It was also concluded in Meng's (2014) study that police may conduct unreasonable investigations and arrest more individuals perceived as Black in communities that are White dominated, resulting in discriminatory actions. In addition, Newburn et al. (2004) argue that Blacks are more likely to be strip-searched by police than Whites. Although these previous studies differ from our findings, both suggest that Blacks are more likely to be mistreated in the law enforcement process. On the other hand, our study's current results do not suggest a racial disparity in the likelihood of strip searches in the Toronto Police Service. This disparity may be due to internal police department policies that have become more cautious and reasonable regarding strip searches. According to the Toronto Police Service's 2020 publication, Race and Identity-Based Data Collection, in October 2020, the Toronto Police Service updated its rules regarding strip searches, requiring audio and video recordings of all strip searches and transparency and accountability to ensure the fairness of the process. The Toronto Police Service has also enhanced training, including a review of case law and the requirement to obtain authorization from authorities and file with higher authorities (TPS, 2020). The implementation of these new provisions will improve the Toronto Police Service's strip search system and may also be a way to eliminate gender discrimination in law enforcement by Toronto police officers.

For some limitations of our experiment, our experimental design was based on three ethnic groups. At the same time, the original data included more ethnic groups, and we did not

model the results by considering the effect of other ethnic groups on the results. For future studies, researchers may consider including more ethnic groups to thoroughly analyze the data from Toronto police officers during strip searches by building a statistical model that includes more ethnic groups. Second, we could not obtain the exact number of items searched for when examining item find rates, so we had to assume that only one item was found at a time, however, this does not affect the primary experimental results. For the rate of items found, future studies should consider the specific number of items found during strip searches, as multiple items may be found on a suspect. Third, in future experiments, researchers can explore what causes the strip search rate to be higher in the central area of Toronto. Fourth, since our data only includes 2020 and 2021, researchers can explore the impact of changes in Toronto Police Service policies on strip search rates in the following experiments.

In summary, there are no racial differences in the implementation of strip searches in Toronto for the three perceived races (White, Black, and Indigenous), however, the probability of receiving a strip search varies regionally, which is unrelated to race. For the probability of finding items in the strip search, the study's results indicated that no significant differences were found among the three perceived races, which means we cannot conclude which race is more dangerous. Such findings have important implications for both society and the justice system. First, stereotypes and media misinformation create negative impressions of policymakers, leading to policies that are not easily detectable as racial discrimination. Furthermore, although the findings do not suggest that the Toronto Police Service currently has a problem with racial discrimination in its strip-search enforcement process, the findings could provide support for the Toronto Police Service to develop and monitor future policies. The Toronto Police Service could use similar research methods to conduct self-examinations in other areas internally to improve existing policies.

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