

INF2178 Midterm Project Group41 Writeup

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1. Introduction

Oppressive power in policing methods raises concerns about their expansive power capacities to justify unlawful practices towards arrestees. We will be investigating incidents of strip searches relative to sex and age groups using the data provided by the Toronto Police Service. This research will examine evidence of biased policing towards sex treatment between males and females, and different age groups to understand systemic patterns in Toronto police practices.

To achieve such a comprehensive examination, we will introduce existing literature on the matters pertaining to biased policing towards females and racial groups in Canada to reveal systematic biased patterns towards intersectional identity groups. We explored the methods taken by the Canada's RCMP and the Toronto police service to align police practices with current policies and jurisprudence, such as community engagement and improved reporting practices that provide contextual information surrounding strip search circumstances, for better compliance that mitigates bias towards historically marginalized communities. There appears to be gaps in the literature to understand the occurrences of strip searches towards youths compared to adults. Next, an exploratory data analysis is provided to introduce the dataset and provide the frequency and measures of central tendency of the variables included. We conduct t-tests to explore the differences in strip search occurrences between sexes. Based on the results generated we ran two ANOVA tests to explore the differences in strip searches between age groups and races, and explored these variable intersections with sex. We provide the statistical findings of these tests to be able to interpret their significance.

We conclude that our research aligns with existing literature when it comes to evidence of police bias towards minority groups such as Indigenous peoples. We add to the literature by demonstrating the existence of disproportionate arrestee experiences of strip searches by younger age groups as a reference to the police's power and authority in relation to age. This finding suggests younger minority groups are more susceptible to unnecessary strip searches than older ones. However, we also indicate the limits to our research, such as pertaining to issues with the dataset. We suggest further exploration of contextual circumstances surrounding strip search occurrences, to provide a more holistic understanding of unnecessary strip search occurrences in Toronto.

1.1 Research Questions

RQ1: How varied are the socio-demographics characteristics of the arrestees who were strip searched? How might the number of strip searches performed on arrestees differ based on the different combinations of these characteristics?

RQ2: How does the number of strip searches experienced by an arrestee differ based on socio-demographic factors (e.g., sex, age groups, races)?

1. Do males and females who are arrested by the Toronto Police Department differ in the number of strip searches experienced?
2. Is there a significant difference between the number of strip searches by the Toronto Police Department and different age groups?
3. Is there a significant difference between the number of strip searches by the Toronto Police Department and different racial groups?

2. Literature Review (Yasmin)

Police misconduct reveals disproportionate treatment towards minority people who have historically been exploited and socially placed in vulnerable positions, perpetuating unfair or poor life opportunities. A structural intersectional approach conveys how socio-demographic factors, where race intersects with sex, gender, and age, are useful indicators of a person's social position and respective experiences in treatment by institutional organizations like police departments (Alang, Haile, Hardeman, Judson, 2023, p.33). Individuals who belong to more than one minority group, such as females who identify as a racial minority, face a greater likelihood of discrimination that shapes their life opportunities. We seek to explore socio-demographic differences, and their intersection, with regards to exposure to strip searches in Toronto.

In Canada, existing literature on the differences in strip search treatment between sexes, males and females, by RCMP members reveal systemic biased policing. Specifically, female arrestees disproportionately faced more accounts of unreasonable or illegal strip searches characterized as “cruel, inhumane and degrading” compared to males that violated the “*Corrections and Conditional Release Act* and the *Charter of Rights and Freedoms*” (Psutka and Sheehy, 2016, p.242, 243). Strip searches involve the inspection of bodily orifices by police officers towards arrestees (Toronto Police Service, 2022). As media circulated these assaults conducted by Canadian officers, centered on the objectification theory surrounding the sexualization of female's bodies. Additionally, the issue of biased policing faced by females raises issues about the expansive capacity in the ability for police officers to have oppressive power and control over female bodies, their autonomy, and fundamental rights. Social pressure propelled the Supreme Court in the *R v Golden* 2001 to rule that strip searches must only be conducted by reasonable grounds, such as an arrestee concealing a weapon, with additional limitations such as prohibiting opposite-sex and public strip-searching. The Civilian Review and Complaints Commission filed a report in 2013 concerning the potential shortcomings committed by RCMP when it came to

strip searches that violate the *Canadian Charter of Rights and Freedoms* (Royal Canadian Mounted Police Act). The report pressured eleven significant improvements in the RCMP's training supervision and national and divisional policies to better improve transparency, accountability and police compliance with jurisprudence.

The 2017 Report enhanced the clarity of recommended policies provided by the 2013 report to ensure compliance in light of further incidents of biased policing when it came to disproportionate and unnecessary strip-searches experiences by female arrestees compared to males. New practices included transforming paper file reporting practices on strip-search data and violations using form C-13 by implementing a desktop application for RCMP to record, track and assess data of arrestees and record contextual circumstances surrounding the strip search to provide reasonable grounds in compliance with current policies. Additionally, Indigenous and Black identifying arrestees in Toronto were found to face more unlawful strip searches than other races. The Toronto Police Service took initiative throughout the years of 2019 to 2022, such as Community Advisory Panel (CAP), to publicly engage with diverse communities to understand citizen concerns regarding the intersection of race, mental health status, gender and age to address systemic disparities in policing and help guide their practices that do not further perpetuate historically marginalized communities (Toronto Police Service, 2022, p.26). The Toronto Police Service also followed up with reports on the engagement and the initiatives they will implement to make changes. As such, while the Toronto Police Service have taken initiatives to improve their strategies to limit instances of unlawful strip-searches in general, historical reports reveal repeated patterns of biased policing towards females despite further formal rulings to deter such occurrences. Evidently, biased policing appears to be systemically entrenched and suggests that female arrestees disproportionately face more strip searches than males do.

Additionally, the Anti-Racism act was implemented in 2017, which outlined the need for police to take into consideration race-related data for strip-searches. Police officers are required to be informed about the unique identities and cultural practices tied towards minority groups to ensure correct procedures are performed with respect and without making subjective assumptions. For example, Indigenous peoples holding a medicine bag or bundle during a strip search need to be treated with respect as it is sacred to them. This new act requires officers to record how they handled the situation and stored the bag. The dataset we will be using derived from the Toronto Police Service aligns with this new act, as there is contextual data, such as race, sex, age, and behaviours, imputed surrounding the incident of strip search. However, there are gaps in the literature to comprehend the disparities in police treatment regarding strip searches conducted across age groups, such as minors compared to adult age levels, in Canada and Toronto. About 30 incidents are recorded of strip searches conducted for youth arrestees without informing a guardian, highlighting a pattern of lack of precaution for strip searching youths in Toronto (McNeilly, 2019, p.130).

This research will explore the socio-demographic factors, such as race and age, as well as the biological binary indicators of sexual identity, sex, as well as their intersection effect, to understand the differences in police treatment between groups of people in Toronto. Our aim is to identify evident areas of disproportionate exposure to strip searches as indicators of systemic biased policing practices performed by the Toronto Police Service.

3. Exploratory data analysis (EDA)

3.1 Descriptive Statistics

There are 65276 records in the Toronto Police Service's dataset on arrests and strip searches. Between April 2020 and December 2021, every arrest's socio-demographic characteristics and details on the strip search are included. The majority of this report's attention will be given to how many strip searches each arrest record had across all sex and age categories.

3.1.1 Frequency Distribution & Sample Mean

Table 3.1: below shows the frequency of each category for the sex of the person arrested[Sex], and the sample mean of the number of strip searches [StripSearchCount] for different sex groups [Sex].

Gender	Frequency	Mean of StripSearchCount
Male	4219	1.55
Female	826	1.55

Table 3.2: below shows the frequency of each category for the age group of the person arrested[Age_group__at_arrest_], and the sample mean of the number of strip searches [StripSearchCount] for different age groups [Age_group__at_arrest_].

Age Group	Frequency	Mean of StripSearchCount
Aged 17 years and under	8	1.00
Aged 17 years and younger	205	1.38
Aged 18 to 24 years	953	1.42
Aged 25 to 34 years	1719	1.64
Aged 35 to 44 years	1263	1.63
Aged 45 to 54 years	612	1.46

Aged 55 to 64 years	252	1.45
Aged 65 and older	30	1.07
Aged 65 years and older	3	1.00

Table 3.3: below shows the frequency of each category for the racial group of the person arrested[Perceived_Race], and the sample mean of the number of strip searches [StripSearchCount] for different racial groups [Perceived_Race].

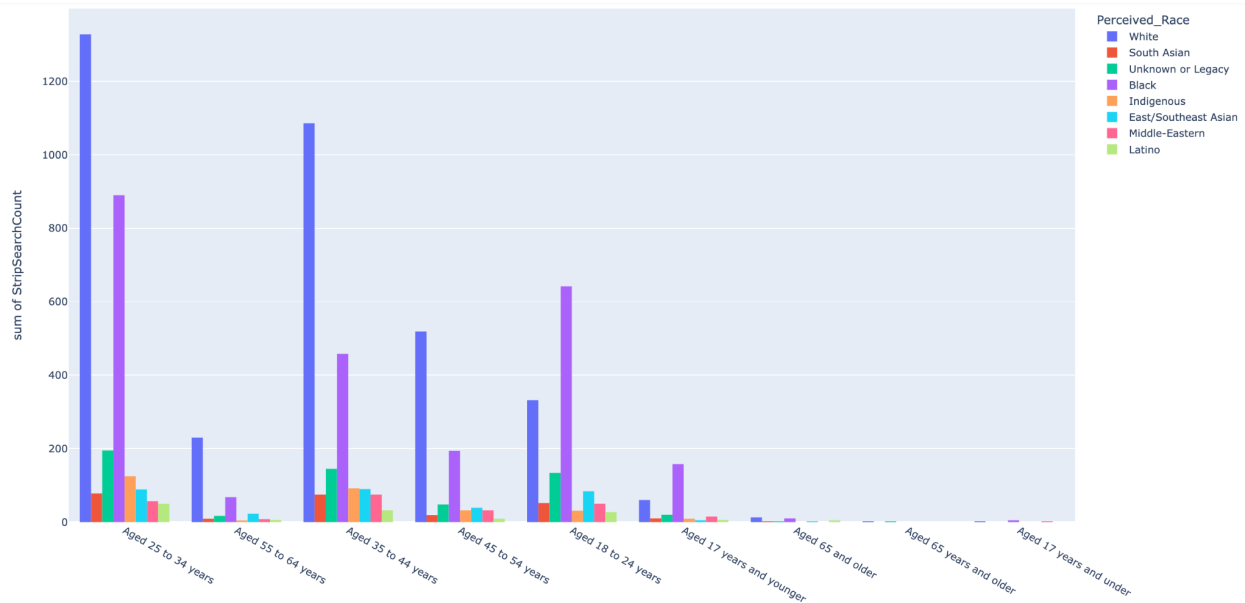
Race	Frequency	Mean of StripSearchCount
White	2200	1.62
Black	1633	1.48
Unknown or Legacy	369	1.52
East/Southeast Asian	247	1.34
South Asian	192	1.28
Middle-Eastern	163	1.46
Indigenous	151	1.94
Latino	90	1.48

3.1.2 Measures of Central Tendency & Measure of Variability

Table 3.3: below shows the central tendency and variability of the number of strip searches for the person arrested.[StripSearchCount]

Measurements	StripSearchCount
Sample size (N)	5046
Mean	1.55
Median	1
Mode	1.55
Variance	1.74

Figure 3.1: Number of strip searches for different perceived races. (broken down by age groups)



As shown by figure 3.1, the number of strip searches for white and black arrestees would be significantly higher than for arrestees of other races. Additionally, there are more recorded strip searches on the dataset for arrestees between the ages of 25 and 44. Teenagers (under 18) and seniors (65 and over) have limited records of the amount of strip searches, and different racial groups of them are almost evenly represented.

Figure 3.2: boxplot of number of strip searches for different perceived races. (broken down by age groups)

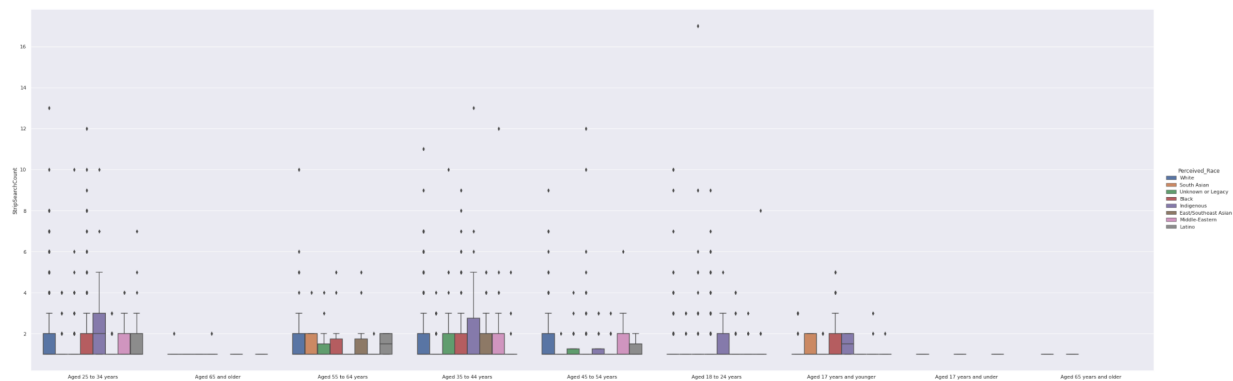


Figure 3.2 demonstrates how difficult it is to distinguish differences from the box plot because the average number of strip searches for different perceived racial and age categories is remarkably comparable. Yet, it is still evident that the average number of strip searches will be

higher for indigenous arrestees in the age range of 25 to 34 and 17 years younger than for other racial groups.

Figure 3.3: Number of strip searches for different sexes. (broken down by racial groups)

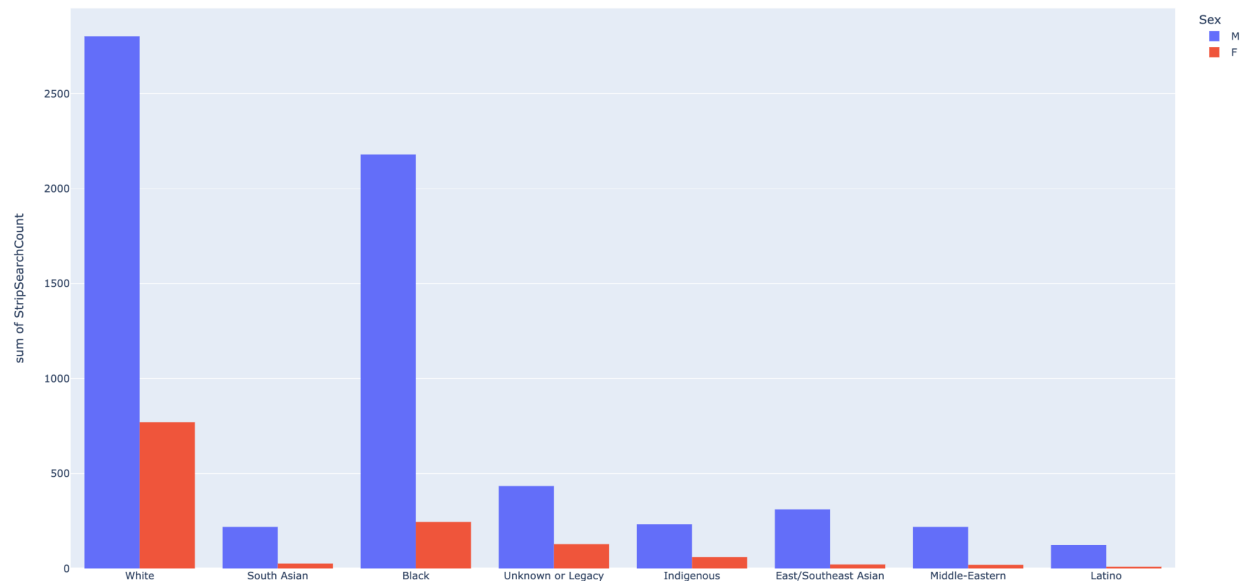


Figure 3.2 demonstrates that the number of male strip searches is always significantly larger than the number of female strip searches, particularly for the white and black races.

Figure 3.4: boxplot of number of strip searches for different sexes. (broken down by racial groups)

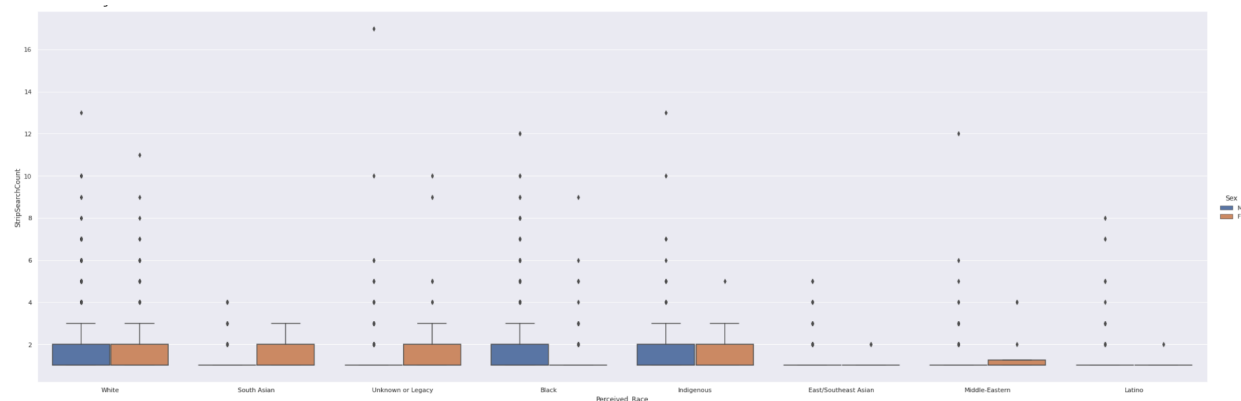


Figure 3.2 illustrates that the average number of strip searches for various perceived racial and sex categories is extremely similar, making it difficult to discern the differences from the box plot.

3.2 T-Test

A statistical test called a t-test contrasts the means of two samples. It is used in hypothesis testing, where the null hypothesis is that there is no difference between the group means, and the

alternate hypothesis is that there is a difference between the two. Here, a t-test is performed to examine the average number of strip searches an arrestee experienced across sex and two categories of age.

3.2.1 T-test for StripSearchCount and Sex

T-test is performed to evaluate whether there was a statistically significant difference in the means of number of strip searches conducted on the arrested person [StripSearchCount] between males and females [Sex].

Null Hypothesis(H0): the population means of females and males who have been strip searched are equal.

Alternative Hypothesis(HA): the population means of females and males who have been strip searched are not equal

Table 3.4: below shows the t-test results.

T-Test	Results
SD - male	1.219398
SD - female	1.178936
95% Conf. - male	1.509058
95% Conf. - female	1.466699
Difference (Male - Female)	(1.545864-1.547215)= -0.0014
Degrees of freedom	5043
t	-0.0293
p-value	0.9766
Point-Biserial r	-0.0004

The results from table 3.4 indicate that the mean number of strip searches for male arrestees (M=1.55, SD=1.22) is almost equal to the mean number of strip searches for female arrestees (M=1.55, SD=1.18). With alpha established at 0.05, this is a statistically significant difference as the p-value (0.97) is greater than 0.05, 95% CI [1.47,1.51]. Therefore, we **cannot reject** the null hypothesis of the population that means that females and males who have been strip searched are

equal, which means there is **no significant difference** of strip search times between male and female.

4. Method

4.1 Data description

The dataset is derived from the Toronto Police Service published in November 2022. It includes 65,276 records related to all arrests and strip searches within Division boundaries. The data includes 25 columns indicated by variables such as arrest year, month, sex, anonymized person ID, perceived race, and strip search. For the t-test, the categorical variable sex [Sex] was treated as the independent variable and the amount of strip-searches [StripSearchCount] as the continuous dependent variable. Since the t-test proved that there are no significant differences in strip search occurrences between male and female arrestees, we explore differences in strip search occurrences across age groups. We conduct two, one-way ANOVA tests, between age group and [StripSearchCount] as the continuous dependent variable, and between perceived race and strip search count. We then conduct a two-way ANOVA test for the effect of sex and racial groups on StripSearchCount. Later, we perform a Post-hocs test for StripSearchCount & Age group at arrest as well as Perceived Race separately, and reveal the results of Tukey's HSD for these tests.

4.2 ANOVA Test

One-Way ANOVA, also known as "analysis of variance," examines the means of two or more independent groups to see if there is statistical support for the notion that the related population means are statistically substantially different. We use it in this study to see if there is a statistically significant variation in the average number of strip searches across different age groups or racial groups.

A two-way ANOVA test is a statistical method for assessing the impact of two nominal predictor variables on a continuous result variable. Here, we applied it to examine the impact of various concatenations of sociodemographic characteristics variables on the frequency of strip searches. For instance, assessing the impacts of age and sex groups on the number of strip searches as well as the effects of race and sex on the number of strip searches.

4.2.1 One-way ANOVA Test for StripSearchCount & Age group at arrest_

A one-way ANOVA test was performed to determine whether or not there is a statistically significant difference in means of number of strip searches [StripSearchCount] for different age groups between April 2020 and December 2021 [Age group at arrest_].

Null Hypothesis(H0): the mean value of number of strip searches by the Toronto Police Department for all different age groups are equal

Alternative Hypothesis(HA): the mean value of number of strip searches by Toronto Police Department for at least one age group is significantly different from the mean values of other age groups.

Table 4.1: One-way ANOVA test results for number of strip searches and age groups

	Statistics	p-value
ANOVA test	5.15	2.03e-06***

The one-way ANOVA test indicates that we **can reject** the null hypothesis and that the difference between the means of the number of strip searches [StripSearchCount] for at least one category of age group at arrest [Age group at arrest_] is statistically significant with a significance value of 2.03e-06 (<0.05).

4.2.2 One-way ANOVA Test for StripSearchCount & Perceived Races

A one-way ANOVA test was performed to determine whether or not there is a statistically significant difference in means of number of strip searches [StripSearchCount] for different racial groups between April 2020 and December 2021 [Perceived_Race].

Null Hypothesis(H0): the mean value of number of strip searches by the Toronto Police Department for all racial age groups are equal

Alternative Hypothesis(HA): the mean value of number of strip searches by Toronto Police Department for at least one racial group is significantly different from the mean values of other racial groups.

Table 4.1: One-way ANOVA test results for number of strip searches and racial groups

	Statistics	p-value
ANOVA test	6.73	5.88e-08***

The one-way ANOVA test indicates that we **can reject** the null hypothesis and that the difference between the means of the number of strip searches [StripSearchCount] for at least one category of perceived racial group [Perceived_Race] is statistically significant with a significance value of 5.88e-08 (<0.05).

4.2.3 Two-way ANOVA test for the effect of sex and age groups on StripSearchCount

A two-way ANOVA was performed to analyze the effect of [Sex] and [Age group at arrest_] on [StripSearchCount].

Null hypothesis:

1. There is no significant difference in the means of distinct sexes
2. There is no significant difference in means of variance age groups
3. There is no interaction between sex and age groups.

Alternative hypothesis:

1. The means for distinct sexes are not equal
2. The means for variance age groups are not equal
3. There is an interaction between sex and age groups

Table 4.2: Two-way ANOVA test results for sex and age groups

Variables	SS	df	F	p-value
Sex	0.08	1.0	0.05	8.19e-01***
Age_group__at_arrest_	68.98	8.0	5.90	7.54e-07***
Sex:Age_group__at_arrest_	11.92	8.0	1.02	4.18e-01***
Residual	7346.26	5028.0		

Since the p-values for sex and age groups are both less than .05, this means that both factors have a statistically significant effect on the number of strip searches. And since the p-value for the interaction effect (4.18e-01) is also less than .05, this tells us that there is a significant interaction effect between sex and age groups.

4.2.4 Two-way ANOVA test for the effect of sex and racial groups on StripSearchCount

A two-way ANOVA was performed to analyze the effect of [Sex] and [Age group at arrest_] on [StripSearchCount].

Null hypothesis:

1. There is no significant difference in the means of distinct sexes
2. There is no significant difference in means of variance racial groups
3. There is no interaction between sex and racial groups.

Alternative hypothesis:

1. The means for distinct sexes are not equal
2. The means for variance racial groups are not equal
3. There is an interaction between sex and racial groups

Variables	SS	df	F	p-value
Sex	1.20	1.0	0.83	3.63e-01***
Perceived_Race	69.90	7.0	6.85	3.93e-08***
Sex:Perceived_Race	22.52	7.0	2.21	3.07e-02***
Residual	7326.11	5029.0		

4.3 Post-hocs Test

Figure 4.1: Heatmap of post-hocs test results for StripSearchCount & Age group at arrest_

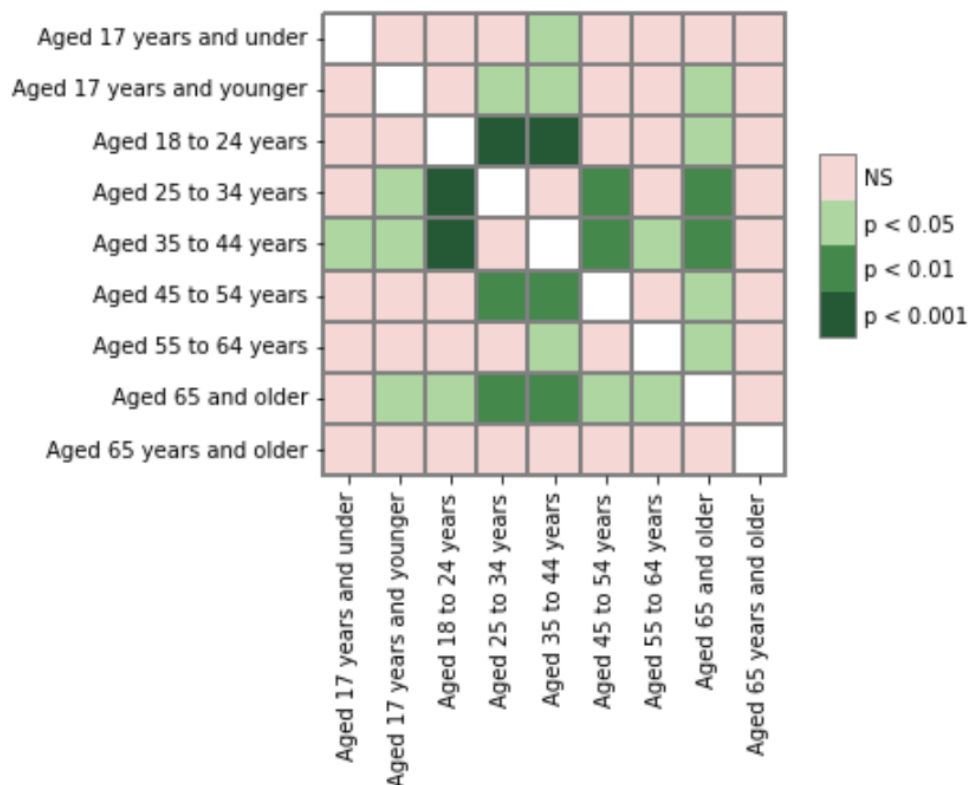


Figure 4.2: Results of Tukey's HSD for StripSearchCount & Age group at arrest_

Multiple Comparison of Means - Tukey HSD, FWER=0.05						
group1	group2	meandiff	p-adj	lower	upper	reject
Aged 17 years and under	Aged 17 years and younger	0.3805	0.9	-0.9712	1.7322	False
Aged 17 years and under	Aged 18 to 24 years	0.4187	0.9	-0.9129	1.7503	False
Aged 17 years and under	Aged 25 to 34 years	0.6358	0.8498	-0.6933	1.965	False
Aged 17 years and under	Aged 35 to 44 years	0.625	0.8659	-0.7052	1.9552	False
Aged 17 years and under	Aged 45 to 54 years	0.4575	0.9	-0.8772	1.7922	False
Aged 17 years and under	Aged 55 to 64 years	0.4484	0.9	-0.8985	1.7954	False
Aged 17 years and under	Aged 65 and older	0.0667	0.9	-1.4258	1.5591	False
Aged 17 years and under	Aged 65 years and older	0.0	0.9	-2.5392	2.5392	False
Aged 17 years and younger	Aged 18 to 24 years	0.0382	0.9	-0.2506	0.327	False
Aged 17 years and younger	Aged 25 to 34 years	0.2553	0.099	-0.0218	0.5325	False
Aged 17 years and younger	Aged 35 to 44 years	0.2445	0.1526	-0.0379	0.5269	False
Aged 17 years and younger	Aged 45 to 54 years	0.077	0.9	-0.2256	0.3797	False
Aged 17 years and younger	Aged 55 to 64 years	0.0679	0.9	-0.2848	0.4207	False
Aged 17 years and younger	Aged 65 and older	-0.3138	0.9	-1.047	0.4193	False
Aged 17 years and younger	Aged 65 years and older	-0.3805	0.9	-2.5617	1.8007	False
Aged 18 to 24 years	Aged 25 to 34 years	0.2172	0.001	0.0657	0.3686	True
Aged 18 to 24 years	Aged 35 to 44 years	0.2063	0.0023	0.0454	0.3672	True
Aged 18 to 24 years	Aged 45 to 54 years	0.0388	0.9	-0.1554	0.2331	False
Aged 18 to 24 years	Aged 55 to 64 years	0.0297	0.9	-0.2359	0.2954	False
Aged 18 to 24 years	Aged 65 and older	-0.352	0.7975	-1.0475	0.3435	False
Aged 18 to 24 years	Aged 65 years and older	-0.4187	0.9	-2.5875	1.7502	False
Aged 25 to 34 years	Aged 35 to 44 years	-0.0108	0.9	-0.1498	0.1281	False
Aged 25 to 34 years	Aged 45 to 54 years	-0.1783	0.0456	-0.3549	-0.0018	True
Aged 25 to 34 years	Aged 55 to 64 years	-0.1874	0.3433	-0.4404	0.0656	False
Aged 25 to 34 years	Aged 65 and older	-0.5692	0.2053	-1.2599	0.1216	False
Aged 25 to 34 years	Aged 65 years and older	-0.6358	0.9	-2.8032	1.5315	False
Aged 35 to 44 years	Aged 45 to 54 years	-0.1675	0.1117	-0.3522	0.0172	False
Aged 35 to 44 years	Aged 55 to 64 years	-0.1766	0.4636	-0.4353	0.0822	False
Aged 35 to 44 years	Aged 65 and older	-0.5583	0.2318	-1.2512	0.1345	False
Aged 35 to 44 years	Aged 65 years and older	-0.625	0.9	-2.793	1.543	False
Aged 45 to 54 years	Aged 55 to 64 years	-0.0091	0.9	-0.2898	0.2716	False
Aged 45 to 54 years	Aged 65 and older	-0.3908	0.7013	-1.0922	0.3105	False
Aged 45 to 54 years	Aged 65 years and older	-0.4575	0.9	-2.6283	1.7132	False
Aged 55 to 64 years	Aged 65 and older	-0.3817	0.7583	-1.1061	0.3426	False
Aged 55 to 64 years	Aged 65 years and older	-0.4484	0.9	-2.6267	1.7299	False
Aged 65 and older	Aged 65 years and older	-0.0667	0.9	-2.3378	2.2045	False

In the output shown on figures 4.1 and 4.2 above, the sample mean of the number of strip searches conducted on the arrestees between the ages of 18 and 24 is significantly different from the age groups between the ages of 25 and 34 and 35 to 44, and the number of strip searches conducted on the arrestees between the ages of 25 and 34 are significantly different from the age group between the ages of 45 and 54, with an adjusted p-value that is below the significance level. The mean difference between those group comparisons, meanwhile, does not appear to be significantly bigger than that of comparisons between age groups.

4.3.2 Post-hocs test for StripSearchCount & Perceived Races

Figure 4.3: Heatmap of post-hocs test results for StripSearchCount & Perceived Races

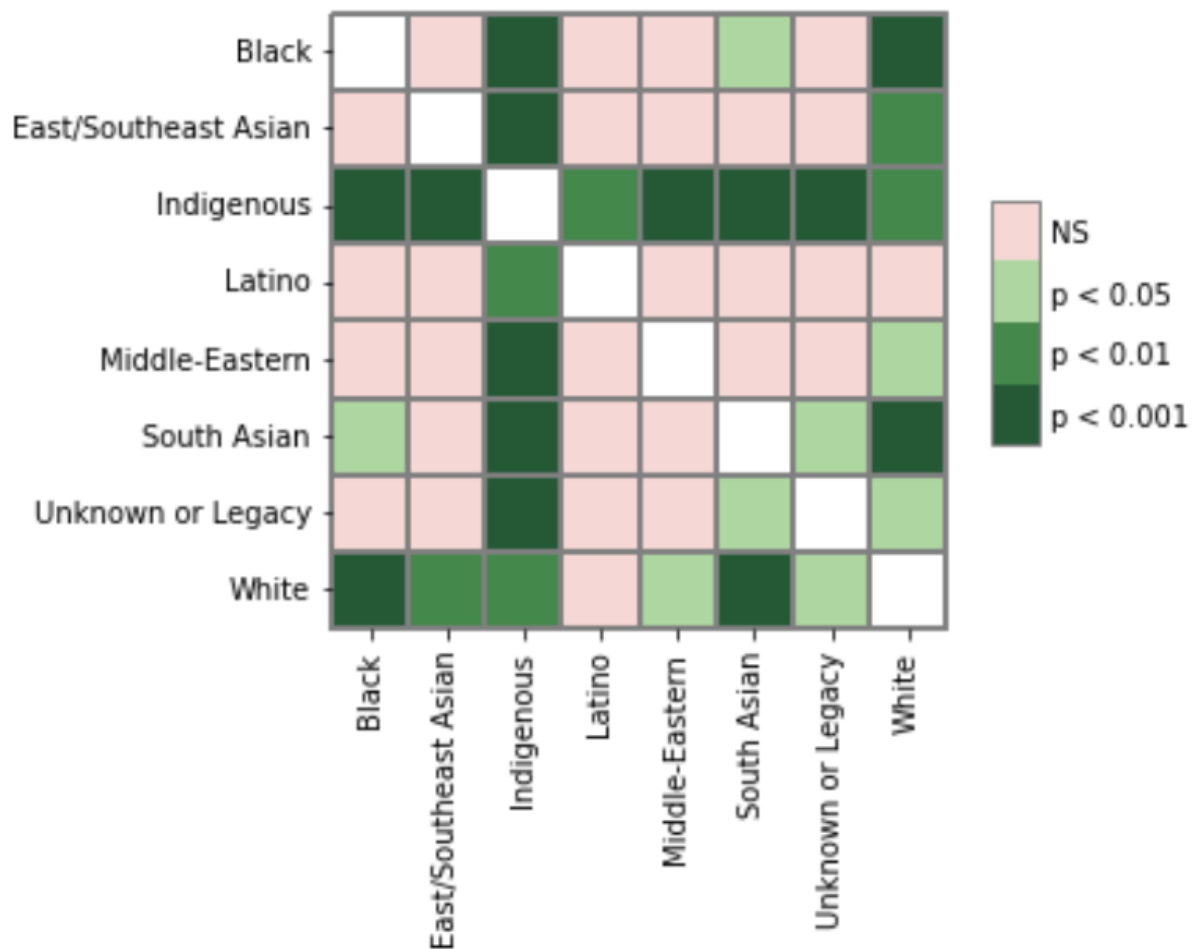


Figure 4.4: Results of Tukey's HSD for StripSearchCount & Perceived Races at arrest_

Multiple Comparison of Means - Tukey HSD, FWER=0.05						
group1	group2	meandiff	p-adj	lower	upper	reject
Black	East/Southeast Asian	-0.1409	0.6582	-0.3909	0.1092	False
Black	Indigenous	0.4554	0.001	0.1439	0.7669	True
Black	Latino	-0.0072	0.9	-0.4038	0.3894	False
Black	Middle-Eastern	-0.0249	0.9	-0.3257	0.276	False
Black	South Asian	-0.209	0.312	-0.4884	0.0705	False
Black	Unknown or Legacy	0.038	0.9	-0.1731	0.2492	False
Black	White	0.1386	0.0105	0.019	0.2583	True
East/Southeast Asian	Indigenous	0.5963	0.001	0.2179	0.9746	True
East/Southeast Asian	Latino	0.1336	0.9	-0.3173	0.5846	False
East/Southeast Asian	Middle-Eastern	0.116	0.9	-0.2536	0.4856	False
East/Southeast Asian	South Asian	-0.0681	0.9	-0.4205	0.2843	False
East/Southeast Asian	Unknown or Legacy	0.1789	0.6024	-0.1222	0.48	False
East/Southeast Asian	White	0.2795	0.0133	0.0337	0.5253	True
Indigenous	Latino	-0.4626	0.078	-0.9504	0.0251	False
Indigenous	Middle-Eastern	-0.4803	0.0103	-0.894	-0.0666	True
Indigenous	South Asian	-0.6644	0.001	-1.0627	-0.266	True
Indigenous	Unknown or Legacy	-0.4174	0.0084	-0.7712	-0.0635	True
Indigenous	White	-0.3168	0.0389	-0.6249	-0.0086	True
Latino	Middle-Eastern	-0.0177	0.9	-0.4987	0.4633	False
Latino	South Asian	-0.2017	0.8977	-0.6696	0.2662	False
Latino	Unknown or Legacy	0.0453	0.9	-0.3853	0.4759	False
Latino	White	0.1459	0.9	-0.248	0.5398	False
Middle-Eastern	South Asian	-0.1841	0.8239	-0.5742	0.206	False
Middle-Eastern	Unknown or Legacy	0.0629	0.9	-0.2816	0.4074	False
Middle-Eastern	White	0.1635	0.6825	-0.1338	0.4608	False
South Asian	Unknown or Legacy	0.247	0.295	-0.0789	0.5729	False
South Asian	White	0.3476	0.0033	0.072	0.6232	True
Unknown or Legacy	White	0.1006	0.7943	-0.1054	0.3066	False

In the results shown on figures 4.3 and 4.4 above, the sample mean of the number of strip searches conducted on the arrestees who are indigenous is significantly different from the racial groups of black, white, Middle-eastern, South Asian, and race unknown arrestees, and the number of strip searches conducted on the arrestees who are white is significantly different from the South Asian arrestees, with an adjusted p-value that is below the significant level. While it does not appear that the mean difference between those group comparisons is materially greater than that of comparisons between racial groups.

5. Results/Findings

The means of female and male arrestees who have been strip searched is 1.55. The t-test findings for strip search count and sex has a p-value is 0.97 which is greater than 0.05. This findings tells us we cannot reject the null hypothesis that the population means female and male arrestees who

have been strip searched are equal. As such, there is no significant difference in the number of strip search occurrences between these groups.

The one-way ANOVA test for StripSearchCount & Age group at arrest reveals a significance value of $2.03e-06$, which is greater than 0.05. In other words, we reject the null hypothesis that the mean value of the number of strip searches by the Toronto Police Department for all different age groups are equal. This finding reveals the difference between the means of the number of strip searches for at least one age group at arrest is statistically significant.

The one-way ANOVA test for StripSearchCount & Perceived race at arrest reveals a significance value of $5.88e-08$, which is greater than 0.05. Meaning, we can reject the null hypothesis that the mean value of number of strip searches by the Toronto Police Department for all racial age groups are equal. This finding reveals the difference between the means of the number of strip searches for at least one category of perceived racial group is statistically significant.

The two-way ANOVA test for the effect of sex and age groups on StripSearchCount reveals a p-value for sex of $8.19e-01$ and for age groups, $7.54e-07$, which are both less than 0.05. This finding reveals that both variables have a statistically significant effect on the number of strip searches. The p-value for the interaction effect is $4.18e-01$, which is less than 0.05, indicating we can reject the null hypothesis that there is no interaction between sex and age groups. This test proves there is a significant interaction effect between sex and age groups on strip search count.

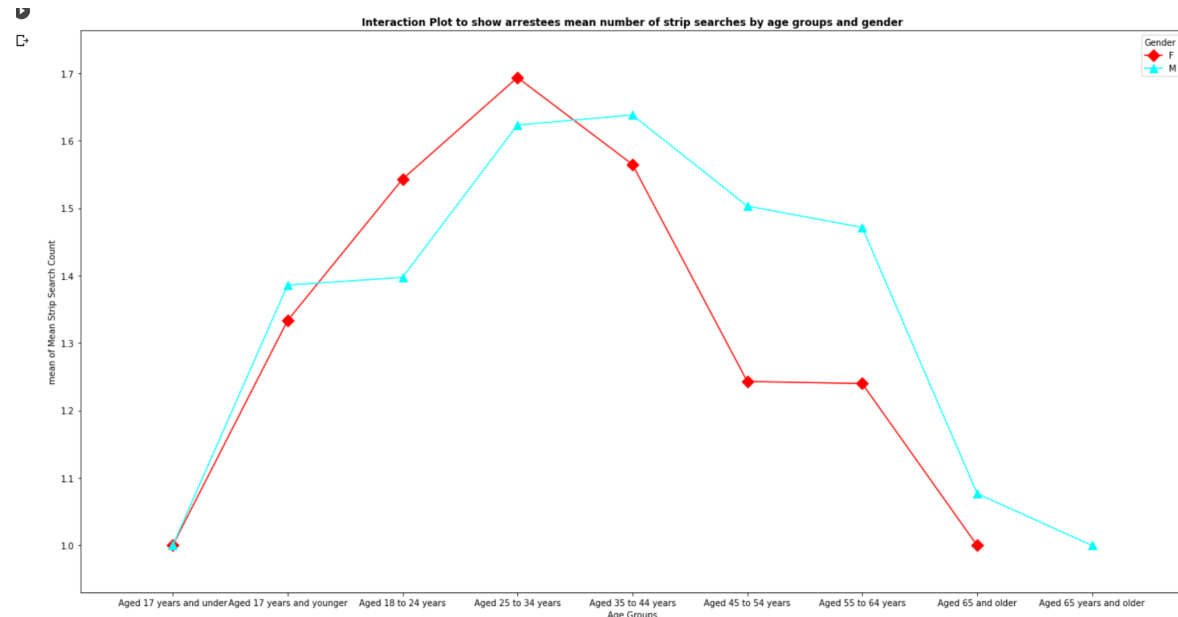
The two-way ANOVA test for the effect of sex and perceived racial group on StripSearchCount reveals a p-value for sex of $3.63e-01$, and for perceived race, $3.93e-08$, which are both less than 0.05. This finding reveals that both variables have a statistically significant effect on the number of strip searches experienced. The p-value for the interaction effect is $3.07e-02$, which is less than 0.05, indicating we can reject the null hypothesis that there is no interaction between sex and perceived race. This test proves there is a significant interaction effect between sex and racial groups on strip search count.

The Post-hocs test for StripSearchCount & Age group at arrest reveals age groups in the range 18 to 24 and 25 to 34, as well as 35 to 44 have a p-value less than 0.001, indicating statistical significance. In other words, results of Tukey's HSD for StripSearchCount & Age group at arrest reveals the sample mean (0.212) of the number of strip searches conducted on the arrestees between the ages of 18 and 24 is significantly different from the age groups between the ages of 25 and 34. This test allows us to infer that the mean difference between group 1 and 2 comparisons, that is between younger and older age groups, does not appear to be significantly bigger than that of comparisons specifically between age ranges.

The Post-hocs test for StripSearchCount & Perceived Races at arrest reveals most races have a p-value less than 0.001 indicating statistical significance. Results of the Tukey's HSD for StripSearchCount & Perceived race at arrest reveals the sample mean difference between Indigenous arrestees and Black arrestees is 0.45, and between South EastAsian, 0.6, South Asian, 0.7, and White, -0.3, Middle Eastern, 0.5, all with respective p-values below the significance level of 0.05.

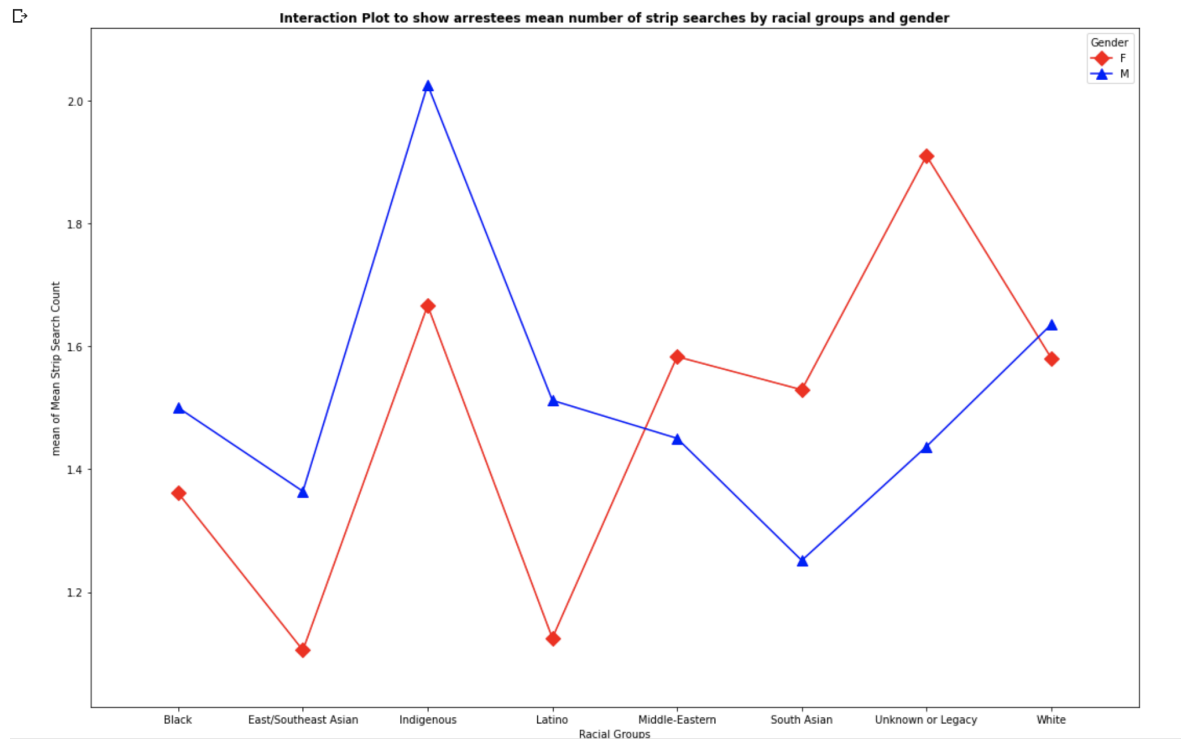
The interaction plot (Figure 5.1) displaying the mean number of strip searches by age groups and sex reveals peaks of the curve that indicate age groups with the most strip search experiences with regards to sex. Specifically, the mean strip search count for ages 25 to 34 years reaches 17 for female arrestees compared to 14 for males. Female and male arrestees who are minors relatively experience the same mean strip search count ranging from 13 to 14.

Figure 5.1: Interaction plot to show arrestee mean number of strip searches by age groups and gender



The interaction plot (Figure 5.2) displaying the mean number of strip searches by racial groups and gender reveal the peak of the curve for males, at 20, are Indigenous arrestees, while for females it is unknown perceived racial identity. Nevertheless, the second peak for females, at 14, is Indigenous and White. The trend of the plot for Figure 5.2 reveals female arrestees who are perceived as a minority race have higher strip search counts than male-identifying minority groups.

Figure 5.2: Interaction plot to show arrestee mean number of strip searches by racial groups and sex



6. Discussion

The t-test to explore the differences in strip searches conducted by the Toronto Police Service based on sex reveals that females and males did not differ in the amount of times they were strip searched by the Toronto Police department. While existing literature on the evidence of biased policing with regard to unnecessary strip-search predominantly faced by females compared to males, it appears that RCMP has systematically structurally aligned their practices with the *Corrections and Conditional Release Act* and the *Charter of Rights and Freedoms*. In other words, the 2017 Final Report and Anti-Racism Act proved to substantially implement significant improvements to ensure consistency with current policies and jurisprudence to eradicate biased policing offences. Improved practices include transforming the paper file form C-13 into a desktop application that ensures RCMP can keep record of arrestees's data, and ensure compliance with policies through increased transparency and accountability. Additionally, the improved method of reporting strip-search data enables a better understanding of the contextual

circumstances to understand whether there were reasonable grounds for conducting the strip-search.

We found the one-way ANOVA test we performed to explore the differences in the number of strip searches experienced between racial groups is consistent with existing literature that minority races face disproportionate mistreatment by the Toronto Police. The first two-way ANOVA test aligned with our hypothesis that there is a significant interaction effect between sex and age groups. Meaning, we are able to contribute to existing literature by exploring how age is a useful contributing factor when investigating police bias towards female-identifying individuals, to understand within groups differences in strip search occurrences. Additionally, the second two-way ANOVA test reveals a significant interaction effect between sex and racial groups. This effect is consistent with existing literature that addresses the reality of systemic biased policing towards intersectional minority groups. Essentially, initiatives implemented by the Toronto Police Service appear to have significantly reduced instances of police bias against arrestees who identify as female. However, their efforts fall short despite engaging with the community and guiding their practices in addressing and rectifying the historical structural exploitation and abuse experienced by non-White identifying races that has contributed to their contemporary disadvantage.

Furthermore, the Post-hocs test for StripSearchCount & Age Groups reveals arrestees ages 18 to 24 experience more strip search occurrences than ages 25 to 44. In other words, this finding addresses concepts of boundaries of police authority with regards to age. Based on this finding, we can make a reasonable assumption that the Toronto Police Service has an issue with covert oppression towards younger age groups enabled by their acquired position of power and authority. Tukey's HSD for StripSearchCount & Perceived Races at arrest reveals that the minority racial group that disproportionately experiences strip searches are Indigenous communities. This findings aligns with the literature about the systemic oppression Indigenous peoples have experienced in Canada.

Lastly, the interaction plot for Figure 5.1 enables a better examination of differences in the mean strip search count for particular age groups with regards to sex. Female arrestees ages 25 to 34 years experience the most strip search occurrences than other ages. However, male arrestees ages 35 to 44 experience the most strip searches. Additionally, for both sexes, minors experience relatively the same mean strip search count. This finding proves useful to infer the differences in police treatment for different age groups relative to sex to understand within and between group differences. Figure 5.2 reveals male and female Indigenous arrestees have higher strip search occurrences than other races. Additionally, in accordance with our intersectional approach to this research, female arrestees who perceive themselves as a minority racial group predominantly experience higher strip search occurrences than minority arrestees who are male. This finding

implies that female arrestees in Toronto face a double burden for identifying as a member of more than one minority group; female and non-White.

7. Conclusion

A major limitation to our research is we did not explore the contextual circumstances surrounding the strip searches conducted between male and female arrestees. A more robust investigation of the behaviours of the arrestees to understand the reasonable grounds for conducting a strip search that aligns with current policies and jurisprudence is needed. Moreover, we recognize that there is a lack of literature on strip-search occurrences for different age groups to base our hypothesis on and interpret our results accordingly.

Additionally, the dataset is secondary from Toronto Police Service, so all of our analysis and study is based on the variables included in the dataset and thus are limited by it. We relied on sex as a variable for our research provided by the dataset. However, sex is a biological indicator that may misrepresent intersectional identities who do not identify with their biological indicator to better explore evidence of biased policing towards marginalized groups. The issue with grouping socially constructed identities under a single biological marker is that we are unable to capture experiences of unnecessary strip searches by arrestees who do not fall under a binary identifying category. Future research should explore gendered experiences, a socially constructed phenomenon, to holistically examine evidence of structural police-led bias towards the LGBTQ+ community. The dataset is also limited in scope as it is collected within Toronto, so this sample may not be able to represent the whole population about how gender or age groups affect the number of strip searches. It contains certain record errors, such as the same person with different races. This discrepancy may suggest errors in the input of data for the variables we used, which indicated that the data may not be reliable to use for inferences. We also recognize that there is an issue with sample sizes in the dataset for our research, where there are more male arrestees data than females. This error suggests that the frequency of strip searches in females compared to males based on sample size may be disproportionate. For example, there are more recorded strip searches on the dataset for arrestees between the ages of 25 and 44. Teenagers (under 18) and seniors (65 and over) have limited records of the amount of strip searches.

Overall, our research reveals that the Toronto Police Service needs to continue to improve their consistency in recording representative data for strip searches conducted. The importance of representative data is to be able to interpret and infer areas that need improvement, and ensure inferences made are not skewed. This is an important aspect of procedure as part of the process to mitigate abuse of power, and combat systemic police discrimination and ensure equal treatment between races, sexes, and age groups in accordance with current policies and jurisprudence.

References

- Alang, S., Haile, R., Hardeman, R., & Judson, J. (2023). Mechanisms Connecting Police Brutality, Intersectionality, and Women's Health Over the Life Course. *American Journal of Public Health* (1971), 113(S1), S29–S36. <https://doi.org/10.2105/AJPH.2022.307064>
- McNeilly, G. (2019). *Breaking the Golden Rule: A Review of Police Strip Searches in Ontario* [PDF]. Toronto: Office of Independent Police Review Director, 1-162. February 28, 2023, from https://www.oiprd.on.ca/wp-content/uploads/OIPRD_Breaking-the-Golden-Rule_Report_Accessible.pdf
- Psutka, M., & Sheehy, E. (2016). Strip-searching of women in Canada: wrongs and rights. *Canadian Bar Review*, 94(2), 241–279.
- Royal Canadian Mounted Police Act. (n.d.). Review of the RCMP's policies and procedures regarding strip searches [PDF]. Retrieved February 28, 2023, from <https://www.crc-cetp.gc.ca/en/review-rcmps-policies-and-procedures-regarding-strip-searches>
- Toronto Police Service. (2022). *Race & Identity Based Data Collection Strategy: Understanding Use of Force & Strip Searches in 2020* [PDF]. Toronto: Toronto Police Service, 1-87. Retrieved February 28, 2023, from https://www.tps.ca/media/filer_public/93/04/93040d36-3c23-494c-b88b-d60e3655e88b/98ccfdad-fe36-4ea5-a54c-d610a1c5a5a1.pdf