
# Investigating The Effects of Race, Sex, And Age On The Severity of Crime

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# I. INTRODUCTION

## Research Context And Motivation

Racial, sex, and age based disparities in crime statistics have become a growing area of concern, and in turn, a growing area of interest for academic studies. Understanding how the race, sex, and age of an offender is correlated to the severity of crimes that they commit can help to assess whether certain racial, sex, or age groups are at a higher risk of committing certain crimes. Furthermore, knowledge of confounding factors that put these individuals at higher risk can be leveraged to develop targeted mitigation measures for use in crime prevention work for these groups. This is important work to advance and ensure a more equitable approach to public safety, while acknowledging and addressing the disadvantages faced by at-risk groups.

## Literature Review

Motivated by communal safety and well-being, research on predictors of crime have taken an interdisciplinary approach by applying a sociological, biological, law enforcement, and social justice lens, to ensure a holistic approach to uncovering and addressing the root cause of issues that lead offenders to commit crimes [1]. A 2018 study by the U.S. Department of Justice, which took a look at the race of violent crime offenders in proportion to the U.S. population, found that Black people were overrepresented amongst offenders in non-fatal violent crimes [2]. Of all crimes, almost half of all offenders in robberies (51%) and one third of all offenders for aggravated assault (34%) were Black [2]. It was also found that White people were underrepresented amongst offenders in non-fatal violent crimes [2]. Of all crimes, almost half of all offenders for aggravated assault (45%) and one third of all offenders in robberies (31%) were White [2]. Hispanic people were represented proportionally to their representation in the population in serious, non-fatal, violent crimes, but underrepresented amongst offenders for simple assault [2]. Asians were also underrepresented except for crimes involving rape or sexual assault [2]. Overall, it can be seen that both Black and White people were involved in more non-fatal violent crimes than other racial groups.

Additionally, studies by both the University of New Brunswick and Public Safety Canada have found that one of the most consistent results across research on crime and sex, is that

females commit significantly less crime than males across all categories of crime [3, 4]. As well, when females do commit crimes, they are typically less severe in nature, such as theft, fraud, and drug violations, and usually against known victims [4]. Another argument made by studies is that higher levels of testosterone in men than women lead to aggression and violence, which in turn, results in males committing more crimes [1].

In the book, *The Nurture Versus Biosocial Debate in Criminology: On the Origins of Criminal Behavior and Criminality*, Jeffery Ulmer and Darrell Steffensmeier, Professors of Sociology and Criminology at Pennsylvania State University, authored a chapter on the relationship between age and crime [1]. From their scan of major literature on the topic, they highlighted age as being one of the strongest predictors of crime, a trend that is consistent with earlier studies on criminology dating as far back as the nineteenth-century [1]. At a high-level, they found that a majority of studies proposed that crime peaks in early adolescence or early adulthood, and declines thereafter [1]. Several studies attributed this trend to biological factors, such as developments in the prefrontal cortex during the early twenties, which can improve functioning, reasoning, and impulse control, which in turn, would reduce the likelihood of committing crimes [1]. However, sociologists argue that while biological factors do play a role, they must also be considered in context of the social structure and culture of the environment [1]. Studies by social scientists have found that trends that show a decline in criminality into adulthood, can be attributed to a setting where youth have greater access to legitimate opportunities as they transition into adulthood [1]. However, this is not the case for all populations, as minority groups tend to face more barriers as a result of systematic inequalities which hinder their transition into adulthood [1].

In one study highlighted in the chapter, it was found that adult offending levels were higher in Black versus White adults [1]. Applying a social science lens, it was argued that this trend could be attributed to Black youth having limited access to legitimate adult jobs, leaving them more likely to partake in criminal activity [1]. It was also found that age is correlated with the severity of crime [1]. Typically, younger offenders are more likely to commit crimes with less severe consequences, such as vandalism, petty theft, robbery, and drug violations [1]. More severe, public, and sophisticated crimes like homicide, aggravated assault, drinking and driving,

and fraud, have age distributions closer to the late twenties to thirties [1]. Trends amongst older populations show a shift towards less visible and less physical crimes, such as bookie, fence, or involvement in criminal enterprises [1]. As mentioned earlier, studies also argue that testosterone levels, which are typically higher in young and middle aged males, can explain the physical and severe nature of crimes that they commit, which subdue as men get older and testosterone levels begin to decrease [1]. As such, the intersection of race and age can also be considered as a predictor of criminality.

Despite the trends being observed in these studies, there are always exceptions to the norm. Some researchers have argued that crime peaks across the ages of fifteen to thirty four, whereas others have proposed fifteen to fifty as the lifespan of criminal activity for an offender [1]. Another exception to the norm is major shifts in social and cultural environments. More recently, the COVID-19 pandemic and resulting lockdowns which started in 2020, presented such an instance. Statistics Canada found that police-reported crime decreased eight percent in the first year of the pandemic [5]. At the same time, the combined severity and volume of non-violent crime decreased ten percent [5]. However, this was not consistent across all categories of crime, as hate crime increased thirty-seven percent in the same year [5].

Overall, there is abundant research on the correlation between the occurrence and severity of crime, race, sex, and age. However, these should be considered alongside confounding factors as presented by biological and sociological changes when being considered as predictors of criminality.

**Research Objectives**

Leveraging the findings from existing literature, this study will aim to further investigate the relationship between the severity of crime (rated by the maximum sentence one can receive if convicted), and demographic factors such as, perceived race, sex, and age. A dataset published by the Toronto Police Service was used to investigate the following research questions:

*Research Question 1:* Does the severity of crime vary by the race, sex, and age of an offender?

*Research Question 2:* Does the severity of crime vary by the interactions of: (i) race and sex of an offender?; (ii) race and age of an offender?; (iii) sex and age of an offender?

## II. EXPLORATORY DATA ANALYSIS

### Overview

This section of the report will outline the steps undertaken for the exploratory data analysis (EDA). It will provide justification for the variables that were selected for the study, and include the various data visualizations that were developed, along with details around what data was included in each figure and why, and provide interpretations to highlight key information and trends from each plot. This section will also outline the descriptive statistics, and the hypotheses and results of the t-tests that were undertaken in the study.

### Selection Of Variables

For the first step of the exploratory data analysis, it was decided to streamline the variables of initial interest to: Arrest Year, Arrest Month, Perceived Race, Sex, Age Group At Arrest, Youth At Arrest Under 18 Years, Arrest Local Division, and Occurrence Category.

Year and month were selected to enable observation of trends over time, such as seasonality, as related to the number of arrests. Demographic factors, such as race, sex, age, and youth, were selected to enable observation of whether certain groups of people were at higher risk of arrest. Similarly, local division was selected to enable observation of whether people from certain communities or neighbourhoods were at higher risk of arrest. Occurrence category, in combination with the mentioned predictors, was selected to enable observation of whether certain groups (based on race, sex, age, youth, and location) were at higher risk of committing certain crimes.

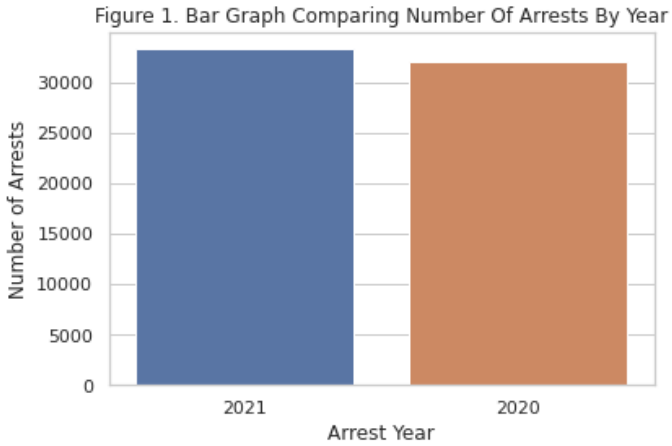
Variables including identification numbers were not selected as they did not provide meaningful information. However, while variables such as Strip Search, Booked, Actions At Arrest, Search Reason, and Items Found, could be used for analysis, they were not included, as it was decided to narrow the scope of the study to the correlation between demographic factors (race, sex, and age) and severity of crime, as supported by existing literature.

### EDA Through Data Visualization

The purpose of the preliminary EDA in this study was to determine if the number of initial variables of interest could be narrowed before conducting t-tests. This was accomplished by developing bar plots for each variable of interest to observe if there were any trends that

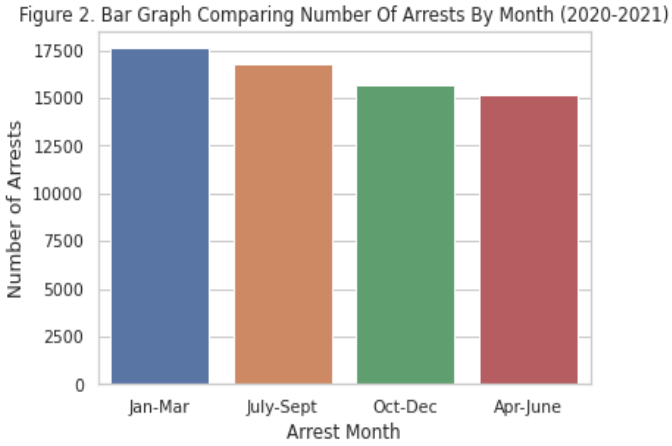
would be meaningful to explore further. If not, the variables would not be considered for further analysis.

***Figure 1. Bar Graph Comparing Number Of Arrests By Year***



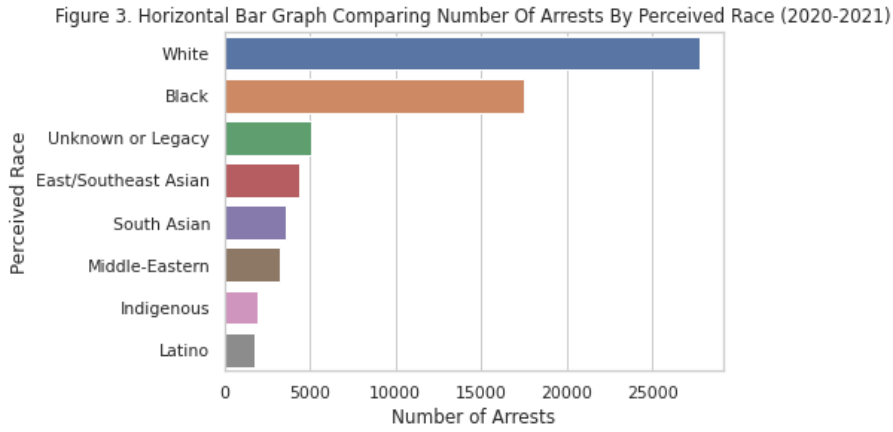

This graph shows that there was not a significant difference between the number of arrests from 2020-2021. However, there was a slight uptick in the number of arrests in 2021. Additionally, as the data in this study was limited to a time period of two years, this limits the analysis. As the COVID-19 pandemic and resulting lockdowns were occurring at this time, as a next step, it would be interesting to analyze data prior to and after this time, to observe if the trends noted by Statistics Canada (as mentioned in the above literature review) hold true and show a decrease in crime in 2020, and observe whether crime increased after lockdown restrictions were lifted. However, these inferences could not be made with this dataset, so arrest year was not explored further as a variable.

***Figure 2. Bar Graph Comparing Number of Arrests By Month (2020-2021)***



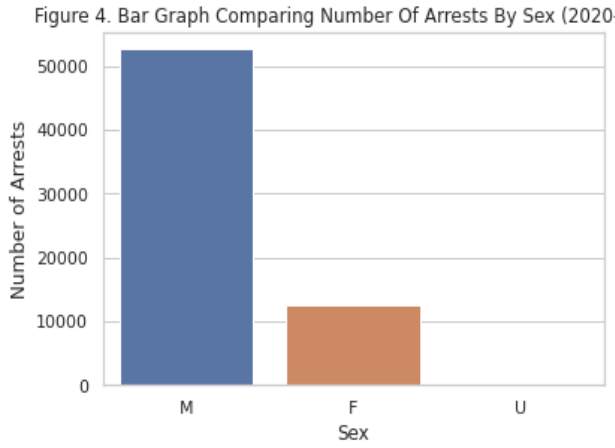

This graph provides an additional layer to the year data presented in Figure 1, by breaking the time down further into months. It appears that there were no significant differences between each quarter. While there were slightly more arrests in the Winter and Summer quarters, it does not appear that the number of arrests followed seasonal trends. As such, arrest month was not explored further as a variable.

### *Figure 3. Horizontal Bar Graph Comparing Number Of Arrests By Perceived Race (2020-2021)*



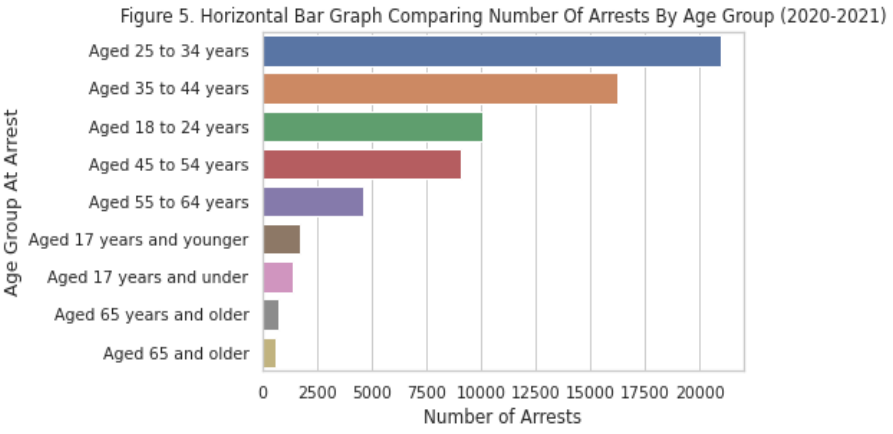

This graph shows that White offenders accounted for the greatest number of arrests, followed by Black offenders. As well, these two races accounted for significantly more arrests than any other race, even if the number of arrests amongst all other races were combined. As there was a major discrepancy between race and number of arrests, perceived race was selected to be explored further as a variable.

### *Figure 4. Bar Graph Comparing Number Of Arrests By Sex (2020-2021)*




This graph shows that male offenders accounted for significantly more arrests than females. As well, the number of arrests amongst those who did not identify with “male” or “female” were extremely small and negligible. As there was a major discrepancy between sex and number of arrests, sex was selected to be explored further as a variable.

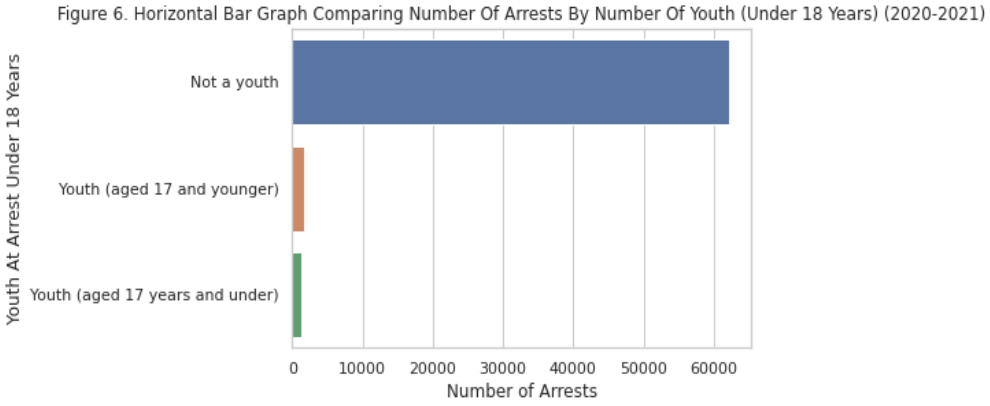
### *Figure 5. Horizontal Bar Graph Comparing Number Of Arrests By Age Group (2020-2021)*




This graph shows that most arrests occur amongst those aged 25-34 years, followed by those aged 35-44 years. There also appears to be

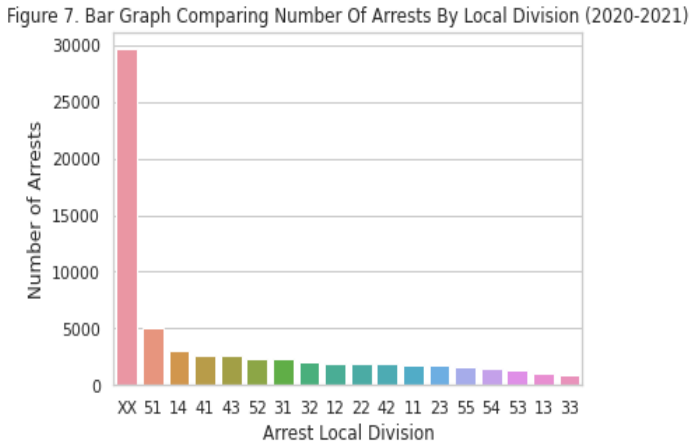
a trend that more arrests occur amongst adults (18+ years) than youth. As well, it can be seen that those 17 years and under are grouped in different categories between the two years, which will need to be considered and consolidated into one group for further analysis. Overall, as there was a major discrepancy between age and number of arrests, age group was selected to be explored further as a variable.

***Figure 6. Horizontal Bar Graph Comparing Number Of Arrests By Number Of Youth (Under 18 Years) (2020-2021)***




This graph provides an additional layer to the data presented in Figure 5 by consolidating the age groups into two, broader categories. Similar to the findings from that plot, there appears to be a trend that more arrests occur amongst adults (18+ years) than youth. However, as both figures 5 and 6 are looking at the same data, further analysis will focus on the age group, rather than whether an offender was a youth or not, as the larger number of groupings enables more insight into trends by age.

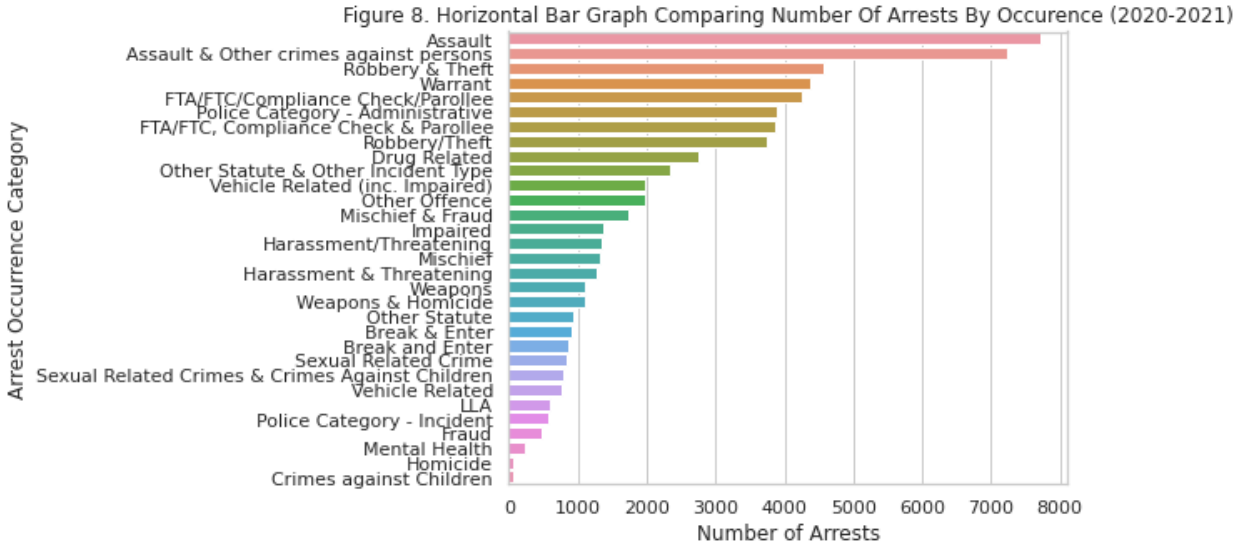
***Figure 7. Bar Graph Comparing Number Of Arrests By Local Division (2020-2021)***




This graph shows that most arrests do not specify the local division where they occur, which does not provide much insight. As well, the major discrepancy between unidentified divisions versus all other divisions skews the graph. If removed, it would appear that most

arrests occur in local division 51. Overall, there does not appear to be much meaningful information that can be extracted from this plot, at least for the purpose of this study, which is looking at more prominent trends. As such, local division was not explored further as a variable.

***Figure 8. Horizontal Bar Graph Comparing Number Of Arrests By Occurence (2020-2021)***



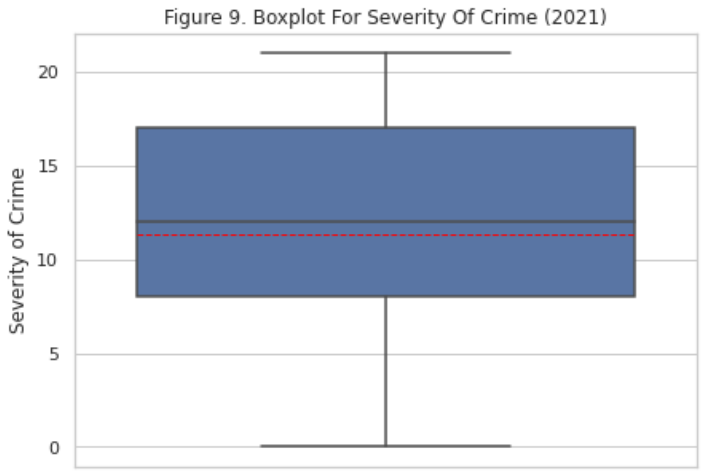

This graph shows that most arrests occurred for assaults, and overall, for less severe and non-fatal crimes, such as robbery, theft, and drug related incidents. As well, it can be seen that several occurrences are duplicated and in categories with slightly different names across the two years, which will need to be considered and consolidated accordingly for further analysis. Overall, as there is a major discrepancy between occurrence and number of arrests, occurrence will be explored further as a variable.

**EDA Through Descriptive Statistics**

For the next step of the exploratory data analysis, it was decided to investigate the effects of demographic factors, including race, sex, and age, on the severity of crime. In order to do so, the discrete variable, occurrence category, was transformed into a continuous outcome variable, which measured the severity of crime. This process is further detailed in the methods section of this report. Descriptive statistics and a boxplot were then produced for the outcome variable, severity of crime, to extract key information on the variable, as outlined in both *Table 1* and *Figure 9*.

| ***Table 1. Descriptive Statistics For Severity Of Crime (2021)**** | |
|---|---|
| count | 33294 |
| mean | 11.37 |
| std | 5.40 |
| min | 0 |
| 25% | 8 |
| 50% | 12 |
| 75% | 17 |
| max | 21 |

*Rounded to the nearest hundredth




From both *Table 1* and *Figure 9*, it can be seen that in 2021, there were 33,294 crimes that led to an arrest. On average, these crimes ranked 11.37 on the severity scale, where 11 denotes a crime as severe as a drug related offense, and 12 denotes a crime as severe as a vehicle related offense. Of all arrests, the most severe crime committed was homicide, as denoted by a severity level of 21.

The mean, as represented by the dotted red line in the box plot, appears lower than the median. The bottom whisker of the boxplot is also longer than the top. As such, it can be interpreted that the distribution of arrests is negatively skewed. In other words, this means that there were more crimes of lower severity that led to arrests in 2021. Also, as the boxplot is relatively long, this means that over all arrests, there was an extensive range of crime severity.

75% of all arrests in 2021 were a result of crimes below a severity level of 17, where 17 denotes a crime as severe as assault. 50% of all arrests were a result of crimes below a severity level of 12, where 12 denotes a crime as severe as a vehicle related offense. And 25% of all arrests were a result of crimes below a severity level of 8, where 8 denotes a crime as severe as an FTA, FTC, compliance check, or parolee related offense.

**EDA Through T-tests**

For the final step of the exploratory data analysis, three t-tests were conducted between the predictor variables, race, sex, and age, and the outcome variable, severity of crime. This step was undertaken to determine which of the variables were statistically significant predictors

of severity of crime, which would be used to inform which interactions (amongst the predictor variables) to measure through ANOVA tests later in the study.

### *T-test 1: Race And Severity Of Crime*

The first t-test was conducted between offenders who were perceived as White versus racialized. To arrive at this dichotomy, all races other than White, including Black, East/Southeast Asian, Indigenous, Latino, Middle Eastern, South Asian, and Unknown or Legacy, were re-coded into one new category, BIPOC (Black, Indigenous, People Of Colour). A t-test was then conducted to infer the difference in means in the severity of crime between White offenders and BIPOC offenders. The hypotheses of the test were:

- *Null Hypothesis:* There is no difference in the mean severity of crime between White and BIPOC offenders.
- *Alternative Hypothesis:* There is a difference in the mean severity of crime between White and BIPOC offenders.

A Welch's t-test was performed. Results of the test are outlined in *Table 2*.

***Table 2: Welch's T-test On The Mean Severity Of Crime Between White and BIPOC Offenders***

| T-statistic (Welch's T-test) | p-value | Degrees of Freedom |
|---|---|---|
| –9.3528 | 0.0000 | 29688.5151 |

Results show that the difference in means between White offenders (Mean = 11.05; SD = 5.50) and BIPOC offenders (Mean = 11.61; SD = 5.29) is statistically significant, with the p-value (0) being smaller than 0.05 at a 95% confidence interval [-0.68, -0.44]. As such, the null hypothesis can be rejected. This means that there is a difference in the mean severity of crime between White offenders and BIPOC offenders.

### *T-test 2: Sex And Severity Of Crime*

The second t-test was conducted to determine whether the mean severity of crime differed between male and female offenders. Rows where the sex of the offender was unidentified were removed, as they accounted for a very small and negligible proportion of the sample. As a result, the remaining data consisted of only offenders who identified as "male" or "female". The hypotheses of the test were:

- *Null Hypothesis:* There is no difference in the mean severity of crime between male and female offenders.
- *Alternative Hypothesis:* There is a difference in the mean severity of crime between male and female offenders.

A Welch's t-test was performed. Results of the test are outlined in *Table 3*.

***Table 3: Welch's T-test On The Mean Severity Of Crime Between Male and Female Offenders***

| T-statistic (Welch's T-test) | p-value | Degrees of Freedom |
|---|---|---|
| -1.3577 | 0.1746 | 9985.6940 |

Results show that the difference in the mean severity of crime between male (Mean = 11.35; SD = 5.41) and female (M = 11.45; SD = 5.31) offenders is not statistically significant, given that the p-value (0.1746) is larger than 0.05 at a 95% confidence interval [-0.24, 0.04]. As such, the null hypothesis cannot be rejected. This means that there is not sufficient evidence that there is a difference in the mean severity of crime between male and female offenders.

### *T-test 3: Youth vs. Adult And Severity Of Crime*

The final t-test was conducted to determine if the mean severity of crime differed between youth (people aged 17 and below) and adult (people aged 18 or above) offenders. In the dataset, the column, "Youth_at_arrest__under_18_years" was a binary variable with inputs of either, "Youth" (aged 17 and below) or "Not a Youth" (aged 18 and above). The hypotheses of the test were:

- *Null Hypothesis:* There is no difference in the mean severity of crime between youth and adult offenders.
- *Alternative Hypothesis:* There is a difference in the mean severity of crime between youth and adult offenders.

A Welch's t-test was performed. Results of the test are outlined in *Table 4.*

***Table 4: Welch's T-test On The Mean Severity Of Crime Between Youth and Adult Offenders***

| T-statistic (Welch's T-test) | p-value | Degrees of Freedom |
|---|---|---|
| 12.0205 | 0.0000 | 1514.2090 |

Results show that the difference in the mean severity of crime between youth (Mean = 12.89, SD = 4.75) and adult (Mean = 11.30; SD = 5.41) offenders is statistically significant, as

indicated with a p-value (0) larger than 0.05 at a 95% confidence interval [1.33, 1.85]. As such, the null hypothesis can be rejected. This means that there is a difference in the mean severity of crime between youth and adult offenders.

## III. METHODS

### Dataset Description

The Arrests and Strip Searches dataset that was analyzed in this study was sourced from The Toronto Police Service's public safety data portal [6]. It contained 65,276 observations across 24 attributes. The dataset included information related to all arrests and strip searches conducted in the City of Toronto and other jurisdictions across a time period of 2020-2021 [6].

After manipulating the data to fit the scope of the study, there were 33,294 observations across 26 attributes. While the original dataset spanned two years, after the initial exploratory data analysis, the study narrowed its scope to focus on information from only 2021. This was decided as there were inconsistencies in grouping and naming conventions between the two years of data. 2021 was selected as it contained more data and groupings, and was more recent.

### Exploratory Data Analysis (EDA)

#### *Preliminary Phase: Selection Of Variables And Data Visualizations*

Exploratory data analysis was undertaken as the first step in the study. The initial phase of the EDA involved streamlining the 24 attributes in the dataset to 8 attributes based on areas of interest. The next phase involved producing bar plots for each of the 8 attributes to uncover high-level trends. If major discrepancies or other interesting trends were noted in the data visualizations, the variables were selected for further exploration. A literature review was also conducted to learn more about the existing research on the relationships amongst the attributes of interest. This further streamlined the dataset to 4 attributes of interest. It was then decided to focus the study on the correlation between demographic factors, including race, sex, and age, to the severity of crime. For more details on the process and findings of the EDA, please refer to the exploratory data analysis section at the beginning of this paper.

#### *Transformation Of Outcome Variable*

The next step in the study involved transforming the outcome variable. As the study looked to investigate factors that impact the severity of crime, the concept of "severity" had to

be operationalized. Severity of crime was measured by the maximum sentence an individual could receive, should they be convicted with an indictable offence. Indictable offences refer to the more severe types of criminal activities that warrant an immediate arrest. All 21 categories of the offence were ranked by the maximum receivable sentence. An arrest made without a description of the offence was assigned a level of 0. A new column titled, “Severity”, was added to the data frame to reflect these levels. Severity was a continuous variable with values ranging from 0 to 21, where higher ratings were assigned to increasingly severe crimes.

Information on the maximum sentence for each category of offence was extracted from the Canadian and Ontario Criminal Codes, which are the statute legislations that govern criminal offences in Canada and the Province of Ontario (where the City of Toronto is located) [7, 8]. In cases where the maximum sentence was the same for two or more categories (e.g., homicide and sex related crimes result in a maximum sentence of life in prison without parole), the category with the higher minimum sentence was noted as more severe. It was decided to apply this operationalized definition to assess the severity of an offence, as maximum sentence was codified and measurable.

There were several considerations with this method. While some offence categories do not vary in type (e.g., there is only one kind of homicide), other categories, such as theft, can be of various types. Theft of items or services that are more valuable are deemed as more serious in the Canadian Criminal Code, hence, the maximum sentence would be longer than that of a theft of a lower value item or service [7]. However, the dataset did not include a detailed description of the offence, and therefore, it was not possible to determine the specific type of offence that an individual committed. As such, the longest sentence that an offender could receive within that broader category of crime was taken to represent the severity of the crime. It is acknowledged that this may have exaggerated the severity of an offence in broader categories, and resulted in a wide range of sentence lengths. However, this was mitigated by applying the same method consistently across all categories of crime, aiming to achieve a fairer and more objective measure.

Additionally, some of the criminal categories in the dataset did not include a detailed description of the individual crimes. As an example, the category of, “Police Category -

Administrative", did not correspond to any particular offence in the Canadian or Ontario Criminal Codes. In this case, additional reports from Statistics Canada were referenced to estimate the severity of the offences [9]. However, these offences were typically of a lower severity in relation to those that were recognized in the criminal codes.

### *T-tests*

As the final step of the EDA, methods of statistical inference were used to compare and infer relationships between perceived race, sex, and age, and the severity of crime. A t-test is designed to test if there is a statistically significant difference between the means of two groups, where the explanatory variable is a nominal, two-level factor while the outcome variable is quantitative. A traditional Student's T-test assumes that the sample is of a normal distribution and has the same variance as the population. Instead of a Student's T-test, this report made use of the Welch's T-test, which assumes that the populations of two groups have a difference in variance. The dataset largely follows the requirement for the t-test, with a quantitative outcome variable (severity of crime), and categorical predictor variables that have exactly two levels (sex and youth at arrest). Perceived race, which had more than two levels, was re-coded to "White" and "BIPOC" (Black, Indigenous, People of Colour) to satisfy the requirement for the t-test.

Three t-tests were then conducted on each of the predictor variables and the outcome variable to determine which of the variables were statistically significant predictors of severity of crime, which would be used to inform further statistical tests.

### One-way ANOVA

The next step of the study involved conducting further statistical tests through one-way ANOVA. This was done to measure which levels of the predictor variables, race and age, were statistically significant predictors of severity of crime. These variables were selected as they were identified to be statistically significant by the earlier t-tests.

A one-way ANOVA (Analysis of Variance) is similar to a t-test as the explanatory variable must be categorical with a quantitative outcome variable. The major difference is that a one-way ANOVA can accommodate an explanatory variable that has more than two levels, which is something that a t-test cannot tolerate. A one-way ANOVA requires the data to satisfy

the following assumptions: (1) outcomes for each group are independent and normally distributed; (2) outcomes for each group have an equal variance; (3) independence of errors. The dataset follows the requirement for a one-way ANOVA test, with a quantitative outcome variable (severity of crime), and categorical explanatory variables (race, sex, and age).

To check for normality of the data, a Shapiro-Wilk test was performed, returning a p-value of 0. This means that the null hypothesis of the data being normally distributed cannot be rejected. However, it should be noted that with a sample size larger than 5000, the p-value may not be accurate.

**Two-way ANOVA**

Leveraging the results of the t-tests and one-way ANOVA, as a final test, two-way ANOVA was conducted. This was done to measure if any of the interactions between the levels of race, sex, and age were statistically significant predictors of severity of crime.

A two-way ANOVA is an extension of a one-way ANOVA, where there are two categorical explanatory variables with a quantitative outcome variable. In this case, since there are two explanatory variables, it takes into account the interactions amongst any level within the first and second variables (i.e., the interaction term). Similarly, a two-way ANOVA assumes that the data is normally distributed with equal variances for all levels within both explanatory variables, and the errors are independent. As a result of the interaction term, two-way ANOVA looks to investigate correlation between the two explanatory variables. If one explanatory variable does not affect the other in a two-way ANOVA, this means that it follows an additive model. On the other hand, a two-way ANOVA with interaction refers to the effect where the outcome of one explanatory variable depends on a specific level of another explanatory variable.

**Post-hoc Test: Tukey's Honest Significant Difference (HSD) Test**

A post-hoc test was performed after each ANOVA test with statistically significant results. In particular, Tukey's HSD test was conducted as a post-hoc test on statistically significant variables to further explore which levels of the explanatory variables were significant. After one-way ANOVA, Tukey's HSD test was used to assess which levels of race and age were statistically significant predictors of severity of crime. After two-way ANOVA, the test was used to assess which interactions between levels of race, sex, and age were statistically significant.

Although earlier t-tests had revealed that sex was not a statistically significant predictor of severity of crime, it was still included in the two-way ANOVA and associated post-hoc test, as the interaction between sex and other explanatory variables could potentially be statistically significant and should be investigated.

## IV. RESULTS

### One-way ANOVA

#### *Overview*

Following the second t-test, it was identified that the difference in means between the explanatory variable, sex, and the outcome variable, severity of crime, was not statistically significant. As a result, the following one-way ANOVA tests only included race and age as explanatory variables. For more details on the process and findings of the t-tests, please refer to the EDA through t-tests section earlier in this report.

In the Toronto Police Service's dataset, the variables, "Perceived Race" and "Age Group At Arrest" included information related to an offender's perceived race and age group at the time of arrest. Perceived race included eight levels: Black, East/Southeast Asian, Indigenous, Latino, Middle Eastern, South Asian, Unknown or Legacy, and White. Age group at arrest included seven levels: Aged 17 years and under, Aged 18 to 24 years, Aged 25 to 34 years, Aged 35 to 44 years, Aged 45 to 54 years, Aged 55 to 64 years, and Aged 65 years and older.

Two tests were conducted using one-way ANOVA, one for each explanatory variable as measured against severity of crime (outcome variable). Tukey's HSD was conducted as a post-hoc test following each ANOVA, with statistical results included in the appendix. The results of the ANOVA tests are detailed next.

#### *One-way ANOVA Test 1 : Severity Of Crime Amongst Levels Of Perceived Race*

The first one-way ANOVA test was conducted to assess if there was a difference in mean severity of crime amongst the eight levels of perceived race. As seen in *Table 5*, the f-statistic was 24.98 with a p-value of $2.97 \times 10^{-34}$, which is smaller than 0.05 at a 95% confidence interval.

***Table 5: One-way ANOVA Between Severity Of Crime And Levels Of Perceived Race***

| Outcome Variable | Explanatory Variable | F-statistic | p-value |
|---|---|---|---|
| Severity of Crime | Perceived Race | 24.98 | $2.97 \times 10^{-34}$ |

As the differences in mean were statistically significant, a post-hoc test was conducted to further investigate which levels were significant. In *Table 6* in *Appendix A*, which highlights the levels of race that had statistically significant differences, it can be seen that not all racial groups had statistically significant differences in mean when compared to each other. The pairs that had statistically significant differences in mean severity of crime were primarily between: (1) Black and other races; (2) Indigenous and other races; and (3) White and other races. This means that the differences in mean severity of crime in the remaining pairs of racial groups were not statistically significant.

### *One-way ANOVA Test 2 : Severity Of Crime Amongst Levels Of Age Group*

The second one-way ANOVA was conducted to assess if there were differences in mean severity of crime amongst the seven levels of age group. As seen in *Table 7*, the f-statistic was 24.26 with a p-value of $7.82 \times 10^{-29}$, which is smaller than 0.05 at a 95% confidence interval.

***Table 7: One-way ANOVA Between Severity Of Crime And Levels Of Age Group***

| Outcome Variable | Explanatory Variable | F-statistic | p-value |
|---|---|---|---|
| Severity of Crime | Age Group at Arrest | 24.26 | $7.82 \times 10^{-29}$ |

As the differences in mean were statistically significant, a post-hoc test was conducted to assess which differences were significant. As highlighted In *Table 8* in *Appendix B*, the test showed that the differences between all age groups was not statistically significant. Most notably, the differences in mean severity of crime were found between the group, “Aged 17 and under” with other older age groups, as well as between the group, “Aged 65 years and older” with the younger age groups. However, there was no statistically significant difference in mean severity of crime between the groups “Aged 17 and under” and “Aged 65 years and older”.

## Two-way ANOVA and Interaction Plots

### *Overview*

Following the one-way ANOVA tests which measured significance amongst the levels of the selected explanatory variables, two-way ANOVA was conducted to further investigate if any

of the interactions between the levels of race, sex, and age were statistically significant predictors of severity of crime. The results of the tests are detailed next.

### *Two-way ANOVA Test 1: Severity Of Crime Amongst Levels Of Race And Sex*

The first two-way ANOVA was conducted to assess if there were differences in mean severity of crime amongst the interactions of the eight levels of perceived race and two levels of sex. As seen in *Table 9*, the f-statistic was 4.45 with a p-value of $5.92 \text{ X } 10^{-05}$, which is smaller than 0.05 at a 95% confidence interval.

***Table 9: Two-way ANOVA Between Severity Of Crime And Levels Of Race And Sex***

| Outcome Variable | Explanatory Variables | F-statistic | p-value |
|---|---|---|---|
| Severity of Crime | Perceived Race<br>Sex | 4.45 | $5.92 \text{ X } 10^{-05}$ |

As the differences in mean were statistically significant, a post-hoc test was conducted to further investigate which interaction levels were significant. In *Table 10* in *Appendix C*, which highlights the interaction levels of race and sex that had statistically significant differences, it can be seen that not all interactions were statistically significant. However, the interactions that had statistically significant differences in mean severity of crime varied greatly across both race and sex. As such, it can be inferred that differences in severity of crime between offenders of different races or ages should be investigated on a case by case basis by law enforcement, or through smaller scale research studies which can enable greater insights on the intricacies and interactions between these predictors when related to the severity of crime.

### *Two-way ANOVA Test 2 : Severity Of Crime Amongst Levels Of Race And Age Group*

The second two-way ANOVA was conducted to assess if there were differences in mean severity of crime amongst the interactions of the eight levels of perceived race and seven levels of age group. As seen in *Table 11*, the f-statistic was 1.86 with a p-value of $5.75 \text{ X } 10^{-04}$, which is smaller than 0.05 at a 95% confidence interval.

***Table 11: Two-way ANOVA Between Severity Of Crime And Levels Of Race And Age Group***

| Outcome Variable | Explanatory Variables | F-statistic | p-value |
|---|---|---|---|
| Severity of Crime | Perceived Race<br>Age Group at Arrest | 1.86 | $5.75 \text{ X } 10^{-04}$ |

As the differences in mean were statistically significant, a post-hoc test was conducted to further investigate which interaction levels were significant. In *Table 12* in *Appendix D*, which highlights the interaction levels of race and age groups that had statistically significant differences, it can be seen that not all interactions were statistically significant. At a high-level, the statistically significant differences in mean severity of crime by race and age group were found amongst more Black, Indigenous, and White offenders, and across the majority of age groups for all races, with the exception of ages 55 plus.

### *Two-way ANOVA Test 3 : Severity Of Crime Amongst Levels Of Sex And Age Group*

The third and final two-way ANOVA was conducted to assess if there were differences in mean severity of crime amongst the interactions of the 2 levels of sex and seven levels of age group. As seen in *Table 13*, the f-statistic was 1.65 with a p-value of $1.29 \text{ X } 10^{-01}$, which is larger than 0.05 at a 95% confidence interval.

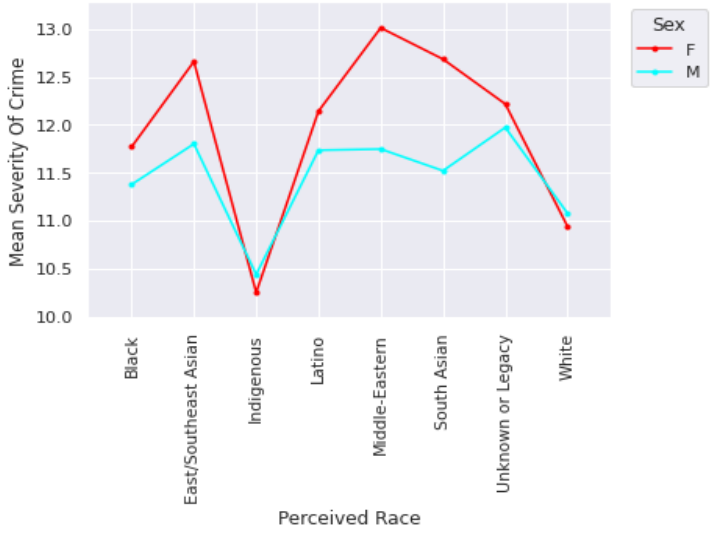
***Table 13: Two-way ANOVA Between Severity Of Crime And Levels Of Sex And Age Group***

| Outcome Variable | Explanatory Variables | F-statistic | p-value |
|---|---|---|---|
| Severity of Crime | Sex<br>Age Group at Arrest | 1.65 | $1.29 \text{ X } 10^{-01}$ |

As the differences in mean were not statistically significant, a post hoc test was not conducted. This means that there was not sufficient evidence that there were differences in mean severity of crime amongst the interactions of the levels of sex and age group.

**Interaction Plots**

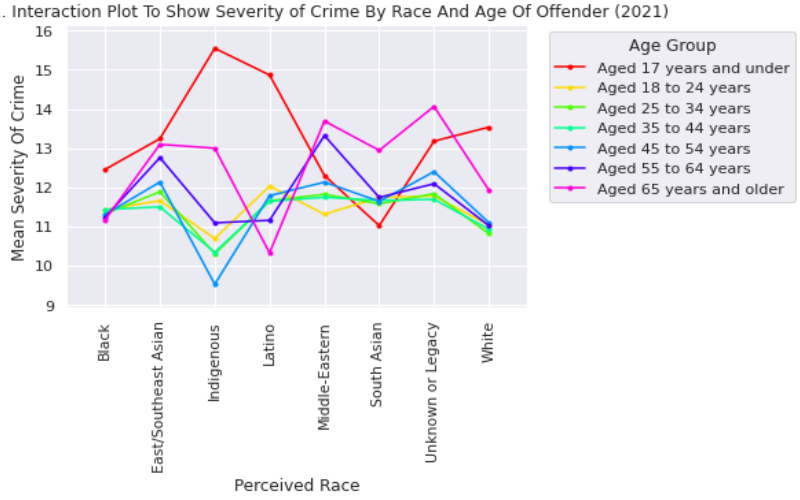
Figure 10. Interaction Plot To Show Severity of Crime By Race And Sex Of Offender (2021)




After conducting the two-way ANOVA tests, two interaction plots, *Figure 10* and *Figure 11*, were created to visualize the broader trends amongst the statistically significant interaction variables: race and sex of an offender, and race and

age of an offender, as related to differences in the mean severity of crime.

Figure 11. Interaction Plot To Show Severity of Crime By Race And Age Of Offender (2021)




From these two plots, it can be seen that of all arrested offenders in 2021, on average, females of Asian (East, Southeast, and South), Latino, Middle Eastern, and Unknown or Legacy racial groups committed the most severe crimes. As well, on average, Indigenous offenders of both sexes committed the least severe crimes. However, overall, Indigenous youth (aged 17 years and under) committed the most severe crimes of all racial and age groups. Additionally, with the exception of Indigenous offenders, BIPOC offenders of both sexes committed more severe crimes on average than White offenders. It also appears that on average, with the exception of the Indigenous, offenders between the ages 18 to 54 committed crimes of similar severity across all other racial groups.

## V. DISCUSSION

Leveraging the findings from the exploratory data analysis, statistical tests, and data visualizations, the research questions which guided the study were able to be answered, as outlined below.

### *Key Finding 1: Severity Of Crime Varies By Race And Age, But Not Sex*

The first research question in the study looked to answer whether the severity of crime varied by the race, sex, and age of an offender. As such, a series of t-tests were conducted, one of which demonstrated that the difference in mean severity of crime between males and females was not statistically significant. This means that the severity of a crime does not vary by the sex of an offender that commits the crime. Instead, the difference in mean severity of crime was statistically significant between youth (aged 17 and under) and adults (aged 18 and above). On average, youth committed slightly more severe crimes than adults. As for race, the

difference in mean severity of crime was statistically significant between White and BIPOC offenders, with BIPOC offenders committing slightly more severe crimes than white offenders.

Subsequent one-way ANOVA tests were conducted to further explore the variations in mean severity of crime amongst the more granular levels of racial and age groups. The tests showed that there were in fact statistically significant differences in mean severity of crime across the levels within the groups. Using Tukey's HSD as a post-hoc test, it was found that the difference in mean severity of crime observed in perceived race was driven mainly by three racial groups: Black, Indigenous, and White. Indigenous offenders had a higher mean severity of crime than Black, Latino, Middle Eastern, South Asian, Unknown or Legacy, and White offenders, but lower than East/Southeast Asian offenders. White offenders had a higher mean severity of crime than Black, Latino, Middle-Eastern, and South Asian offenders. Additionally, Black offenders had a higher mean severity of crime than East/Southeast Asian and Unknown or Legacy offenders but a lower mean severity of crime than Indigenous and White offenders. This differs from findings in some literature, where it is noted that the severity of crime is higher amongst Black versus White offenders [1].

As for the difference in mean across the various levels of age, Tukey's HSD test showed that statistically significant differences were not observed in all levels of age. Specifically, the significant differences were observed between those aged 17 and under and older age groups, including 18-24 years old, 25-34 years old, 35-44 years old, 45-54 years old, and 55-64 years old, with a lower mean severity of crime than the aforementioned older age groups. Other statistically significant difference in means were observed between those aged 65 and above and younger age groups, such as 18-24 years old, 25-34 years, 35-44 years old, 45-55 years old, and 55-64 years old, with those aged 65 and above having a lower mean severity of crime than the younger age groups. These findings correlate with what has been observed in existing research, as highlighted in the literature review at the beginning of this study, as youth and elderly offenders are less likely to commit severe and violent crime in comparison to those in young adulthood to middle age groups [1].

### *Key Finding 2: Severity Of Crime Varies By The Interactions Of The Levels Of Race And Age, And Race And Sex, But Not Sex And Age*

The second research question in this study looked to provide a micro lens to the first question, which looked at broader, macro trends regarding the impact of demographic factors on the severity of crime. In particular, the second question sought to answer whether the severity of crime varied by the interactions of the levels of race, sex, and age of an offender when compared to the mean severity of crimes that they committed.

Building upon the findings of the earlier t-tests and one-way ANOVA tests, a series of two-way ANOVA tests were conducted to further interrogate and uncover whether the interactions between the levels of race, sex, and age were statistically significant predictors of severity of crime. As a result, the tests showed that while interactions between the levels of race and age of an offender, and the race and sex of an offender were statistically significant predictors of severity of crime, interactions amongst the sex and age of an offender were not statistically significant. Following the statistically significant results, a series of post-hoc tests uncovered further details on the interactions. These tests showed that not all interactions between levels of race and sex, or race and age were statistically significant.

In the first case, the interactions that had statistically significant differences in mean severity of crime varied greatly across levels of race and sex. Existing research has shown that at a high level, Black and White offenders commit more severe crimes than other races [2]. Most research also found that typically, females commit significantly less crime than males across all categories of crime, and that the crime is less severe in nature [3, 4]. However, when an interaction plot for race, sex, and severity of crime was produced in *Figure 10*, it was seen that on average, females of Asian (East, Southeast, and South), Latino, Middle Eastern, and Unknown or Legacy racial groups committed the most severe crimes. While at first glance, the trends observed in *Figure 10* may seem to contradict those found in literature, it should be considered that if females and certain racial groups typically commit less crimes, this would imply that they represent a smaller proportion of the sample being observed in the dataset. As such, if a few female offenders did commit more severe crimes, this could positively skew the data due to a

few extreme cases. As a result, this would inflate the mean severity of crime levels for females, which may explain the phenomenon that is being observed in the interaction plot.

The plot also showed that on average, Indigenous offenders of both sexes committed the least severe crimes. However, it should be noted that the dataset included arrests that occurred in the City of Toronto and neighbouring jurisdictions in Ontario, where there are smaller populations of Indigenous people [10]. A 2018 report by Statistics Canada showed, “the lowest rates of crime reported in Indigenous communities were in British Columbia and Ontario [10].” As such, Indigenous offenders are likely underrepresented in the sample, resulting in trends that may not be accurate should they be compared to data collected from areas with larger Indigenous populations.

Similar to the first case, in the second post-hoc test, the interactions that had statistically significant differences in mean severity of crime varied across levels of race and age. The significant differences were found amongst more Black, Indigenous, and White offenders, as well as across the majority of age groups for all races, with the exception of ages 55 plus. Existing research has shown that at a high level, younger offenders tend to commit less severe crimes, more public and severe crimes are committed by those in their twenties and thirties, and then the severity of crime once again subdues as an offender ages [1].

However, when an interaction plot for race, age, and severity of crime was produced in *Figure 11*, it was seen that on average, Indigenous youth (aged 17 years and under) committed the most severe crimes of all racial and age groups. However, these trends should be considered alongside the systematic inequalities and social barriers faced by indigenous youth in society. As shown in existing research, it is more common for BIPOC than White youth to have limited access to legitimate adult jobs, leaving them more likely to partake in criminal activity as they struggle with their transition into adulthood [1]. Coupled with the poor treatment of Indigenous people in society and their overrepresentation in the criminal justice system, this can perpetuate a cycle of criminal behaviour, which puts them at higher risk of committing increasingly severe crimes [10].

## VI. CONCLUSION

This study looked to investigate the relationships between the severity of crime and an offender's demographics, including race, sex, and age. Overall, it was found that the mean severity of crime does vary across the levels of race and age, as well as sex and age of an offender. However, these findings are to be interpreted alongside the complex social fabric in which the society is situated, to consider the social inequalities and biases within the justice system.

In addition, there were several limitations with this study. As a secondary dataset was used, there were restrictions on the explanatory variables that could be assessed in relation to severity of crime, as all potential variables of interest may not have been included in the data collection process. As well, there were instances where the data lacked detail. As an example, when details of a type of crime were not specified, a subjective opinion had to be used in the decision making process to assign levels of severity to a type of crime. Furthermore, when assessing if the dataset met the requirements to perform an ANOVA test, a Shapiro-Wilk's test was used to check for the normality of the data. However, as the sample size exceeded 5000, the p-value may not be accurate. Lastly, as the data reflects arrests over a time period of 2020-2021, it should be considered that this was the same time that the COVID pandemic and resulting lockdowns were occurring. As shown in existing literature, such a major event can result in noticeable shifts in the social and cultural environment, which in turn, can impact crime trends [1, 5]. As such, this may limit the generalizability of the findings to other time periods.

## VII. References


[1] Jeffery T. Ulmer and Darrell Steffensmeier. 2015. The Age And Crime Relationship: Social Variation, Social Explanations. In *The Nurture Versus Biosocial Debate In Criminology: On The Origins Of Criminal Behavior And Criminality*. SAGE Publications, 377–395.

[2] Allen J. Beck. 2021. Race And Ethnicity Of Violent Crime Offenders And Arrestees. (January 2021). Retrieved February 22, 2023 from https://bjs.ojp.gov/content/pub/pdf/revcoa18.pdf

[3] T.L. Meares. Crime and Gender - UNB. Retrieved February 23, 2023 from https://web.lib.unb.ca/instruction/bcull/CrimeGenderIESBSArticle.pdf

[4] Anon. 2022. Research Summary - Incorporating Gender-based Analysis Into Crime Prevention. (August 2022). Retrieved February 22, 2023 from https://www.publicsafety.gc.ca/cnt/rsrcs/pblctns/2020-s002/index-en.aspx

[5] Anon. 2021. After Five Years of Increases, Police-reported Crime In Canada Was Down In 2020, But Incidents Of Hate Crime Increased Sharply. (July 2021). Retrieved February 22, 2023 from https://www150.statcan.gc.ca/n1/daily-quotidien/210727/dq210727a-eng.htm

[6] Anon. 2022. Arrests And Strip Searches (RBDC-arr-TBL-001). (November 2022). Retrieved February 26, 2023 from https://data.torontopolice.on.ca/datasets/TorontoPS::arrests-and-strip-searches-rbdc-arr-tbl-001/about

[7] Anon. 2023. Consolidated Federal Laws of Canada, Criminal code. (February 2023). Retrieved February 26, 2023 from https://laws-lois.justice.gc.ca/eng/acts/C-46/

[8] Anon. 2019. E-laws. (October 2019). Retrieved February 26, 2023 from https://www.ontario.ca/laws

[9] Anon. 2015. Section 1: The Crime Severity Index. (November 2015). Retrieved February 26, 2023 from https://www150.statcan.gc.ca/n1/pub/85-004-x/2009001/part-partie1-eng.htm

[10] Mary Allen. 2020. Crime reported by police serving areas where the majority of the population is Indigenous, 2018. (November 2020). Retrieved February 27, 2023 from https://www150.statcan.gc.ca/n1/pub/85-002-x/2020001/article/00013-eng.htm

# Appendix

## Appendix A

***Table 6: Statistically Significant Tukey HSD Results Of One-way ANOVA Between Severity Of Crime And Levels Of Perceived Race***

| Group 1 | Group 2 | Mean Difference | P-value Adjacent | Lower | Upper |
|---|---|---|---|---|---|
| Black | East/Southeast Asian | 0.5028 | 0.0018 | 0.1166 | 0.889 |
| Black | Indigenous | -1.0656 | 0.001 | -1.6391 | -0.4922 |
| Black | Unknown or Legacy | 0.5684 | 0.001 | 0.1875 | 0.9494 |
| Black | White | -0.399 | 0.001 | -0.6249 | -0.1731 |
| East/Southeast Asian | Indigenous | -1.5684 | 0.001 | -2.2129 | -0.924 |
| East/Southeast Asian | White | -0.9018 | 0.001 | -1.2726 | -0.531 |
| Indigenous | Latino | 1.4222 | 0.001 | 0.6557 | 2.1887 |
| Indigenous | Middle-Eastern | 1.4977 | 0.001 | 0.8207 | 2.1746 |
| Indigenous | South Asian | 1.3023 | 0.001 | 0.6344 | 1.9702 |
| Indigenous | Unknown or Legacy | 1.6341 | 0.001 | 0.9928 | 2.2754 |
| Indigenous | White | 0.6667 | 0.0074 | 0.1035 | 1.2299 |
| Latino | White | -0.7556 | 0.001 | -1.3121 | -0.199 |
| Middle-Eastern | White | -0.831 | 0.001 | -1.2559 | -0.4062 |
| South Asian | White | -0.6356 | 0.001 | -1.046 | -0.2253 |
| Unknown or Legacy | White | -0.9674 | 0.001 | -1.3328 | -0.602 |

## Appendix B

***Table 8: Statistically Significant Tukey HSD Results Of One-way ANOVA Between Severity Of Crime And Levels Of Age Group***

| Group 1 | Group 2 | Mean Difference | P-value Adjacent | Lower | Upper |
|---|---|---|---|---|---|
| Aged 17 years and under | Aged 18 to 24 years | -1.5035 | 0.001 | -2.0049 | -1.0022 |
| Aged 17 years and under | Aged 25 to 34 years | -1.6679 | 0.001 | -2.1369 | -1.199 |
| Aged 17 years and under | Aged 35 to 44 years | -1.6804 | 0.001 | -2.1559 | -1.205 |
| Aged 17 years and under | Aged 45 to 54 years | -1.54 | 0.001 | -2.0419 | -1.0381 |
| Aged 17 years and under | Aged 55 to 64 years | -1.4509 | 0.001 | -2.006 | -0.8959 |
| Aged 18 to 24 years | Aged 65 years and older | 0.9066 | 0.001 | 0.2457 | 1.5676 |
| Aged 25 to 34 years | Aged 65 years and older | 1.071 | 0.001 | 0.4343 | 1.7077 |
| Aged 35 to 44 years | Aged 65 years and older | 1.0835 | 0.001 | 0.442 | 1.7251 |
| Aged 45 to 54 years | Aged 65 years and older | 0.9431 | 0.001 | 0.2817 | 1.6044 |
| Aged 55 to 64 years | Aged 65 years and older | 0.854 | 0.0056 | 0.1515 | 1.5566 |

## Appendix C

***Table 10: Statistically Significant Tukey HSD Results Of Two-way ANOVA Amongst Levels Of Race and Sex***

| Group 1 | Group 2 | Difference in Mean | Lower | Upper | q-value | p-value |
|---|---|---|---|---|---|---|
| ('Black', 'M') | ('South Asian', 'F') | 1.307153 | 0.138659 | 2.475647 | 5.42078 | 0.0121741 |

| | | | | | | |
|---|---|---|---|---|---|---|
| ('Black', 'M') | ('Indigenous', 'M') | 0.938075 | 0.153844 | 1.722305 | 5.796364 | 0.0042869 |
| ('Black', 'M') | ('Indigenous', 'F') | 1.126193 | 0.101871 | 2.150514 | 5.327683 | 0.0155505 |
| ('Black', 'M') | ('Middle-Eastern', 'F') | 1.633628 | 0.233043 | 3.034212 | 5.652047 | 0.0064709 |
| ('Black', 'M') | ('White', 'M') | 0.300903 | 0.023155 | 0.578652 | 5.249731 | 0.0189988 |
| ('Black', 'M') | ('White', 'F') | 0.438316 | 0.046849 | 0.829784 | 5.425675 | 0.0120139 |
| ('Black', 'M') | ('Unknown or Legacy', 'M') | 0.594342 | 0.130021 | 1.058663 | 6.202688 | 0.0012582 |
| ('Black', 'M') | ('East/Southeast Asian', 'F') | 1.281696 | 0.348383 | 2.215008 | 6.654564 | 0.001 |
| ('Black', 'F') | ('Indigenous', 'M') | 1.330841 | 0.441686 | 2.219996 | 7.252878 | 0.001 |
| ('Black', 'F') | ('Indigenous', 'F') | 1.518959 | 0.412246 | 2.625672 | 6.650784 | 0.001 |
| ('Black', 'F') | ('White', 'M') | 0.69367 | 0.190953 | 1.196387 | 6.686381 | 0.001 |
| ('Black', 'F') | ('White', 'F') | 0.831083 | 0.257648 | 1.404517 | 7.022996 | 0.001 |
| ('South Asian', 'M') | ('Indigenous', 'M') | 1.081468 | 0.198904 | 1.964033 | 5.937853 | 0.0028279 |
| ('South Asian', 'M') | ('Indigenous', 'F') | 1.269586 | 0.168162 | 2.371011 | 5.585593 | 0.0077874 |
| ('South Asian', 'M') | ('Middle-Eastern', 'F') | 1.490234 | 0.032311 | 2.948156 | 4.953154 | 0.0391893 |
| ('South Asian', 'M') | ('White', 'F') | 0.58171 | 0.01855 | 1.14487 | 5.005376 | 0.0346549 |
| ('South Asian', 'M') | ('East/Southeast Asian', 'F') | 1.138302 | 0.120965 | 2.155639 | 5.421936 | 0.0121359 |
| ('South Asian', 'F') | ('Indigenous', 'M') | 2.245228 | 0.871154 | 3.619301 | 7.917944 | 0.001 |
| ('South Asian', 'F') | ('Indigenous', 'F') | 2.433346 | 0.909438 | 3.957253 | 7.737614 | 0.001 |
| ('South Asian', 'F') | ('White', 'M') | 1.608056 | 0.446074 | 2.770039 | 6.705998 | 0.001 |
| ('South Asian', 'F') | ('White', 'F') | 1.745469 | 0.551188 | 2.93975 | 7.082191 | 0.001 |
| ('Indigenous', 'M') | ('Middle-Eastern', 'M') | 1.307344 | 0.420118 | 2.19457 | 7.140316 | 0.001 |
| ('Indigenous', 'M') | ('Middle-Eastern', 'F') | 2.571702 | 0.995525 | 4.147879 | 7.906377 | 0.001 |
| ('Indigenous', 'M') | ('Unknown or Legacy', 'M') | 1.532417 | 0.673177 | 2.391656 | 8.642202 | 0.001 |
| ('Indigenous', 'M') | ('Unknown or Legacy', 'F') | 1.777597 | 0.621779 | 2.933415 | 7.452566 | 0.001 |
| ('Indigenous', 'M') | ('East/Southeast Asian', 'M') | 1.361326 | 0.49946 | 2.223193 | 7.653925 | 0.001 |
| ('Indigenous', 'M') | ('East/Southeast Asian', 'F') | 2.21977 | 1.039189 | 3.400351 | 9.11117 | 0.001 |
| ('Indigenous', 'M') | ('Latino', 'M') | 1.295477 | 0.300214 | 2.29074 | 6.30745 | 0.001 |
| ('Indigenous', 'M') | ('Latino', 'F') | 1.702338 | 0.042155 | 3.362522 | 4.968802 | 0.0377835 |
| ('Indigenous', 'F') | ('Middle-Eastern', 'M') | 1.495462 | 0.390298 | 2.600626 | 6.557082 | 0.001 |
| ('Indigenous', 'F') | ('Middle-Eastern', 'F') | 2.75982 | 1.051443 | 4.468197 | 7.828148 | 0.001 |
| ('Indigenous', 'F') | ('Unknown or Legacy', 'M') | 1.720535 | 0.63771 | 2.80336 | 7.699581 | 0.001 |
| ('Indigenous', 'F') | ('Unknown or Legacy', 'F') | 1.965715 | 0.635252 | 3.296179 | 7.15945 | 0.001 |
| ('Indigenous', 'F') | ('East/Southeast Asian', 'M') | 1.549444 | 0.464534 | 2.634355 | 6.920604 | 0.001 |
| ('Indigenous', 'F') | ('East/Southeast Asian', 'F') | 2.407888 | 1.055857 | 3.759919 | 8.630014 | 0.001 |
| ('Indigenous', 'F') | ('Latino', 'M') | 1.483595 | 0.28996 | 2.677231 | 6.0229 | 0.0021918 |
| ('Indigenous', 'F') | ('Latino', 'F') | 1.890456 | 0.10428 | 3.676632 | 5.128664 | 0.0256829 |
| ('Middle-Eastern', 'M') | ('White', 'M') | 0.670173 | 0.170876 | 1.16947 | 6.504138 | 0.001 |
| ('Middle-Eastern', 'M') | ('White', 'F') | 0.807586 | 0.237147 | 1.378024 | 6.860278 | 0.001 |
| ('Middle-Eastern', 'F') | ('White', 'M') | 1.934531 | 0.539374 | 3.329688 | 6.719155 | 0.001 |
| ('Middle-Eastern', 'F') | ('White', 'F') | 2.071944 | 0.649775 | 3.494113 | 7.05974 | 0.001 |
| ('White', 'M') | ('Unknown or Legacy', 'M') | 0.895246 | 0.447563 | 1.342929 | 9.690216 | 0.001 |
| ('White', 'M') | ('Unknown or Legacy', 'F') | 1.140426 | 0.247094 | 2.033758 | 6.186088 | 0.0013219 |
| ('White', 'M') | ('East/Southeast Asian', 'M') | 0.724155 | 0.271451 | 1.176859 | 7.751387 | 0.001 |
| ('White', 'M') | ('East/Southeast Asian', 'F') | 1.582599 | 0.657451 | 2.507747 | 8.289373 | 0.001 |
| ('White', 'F') | ('Unknown or Legacy', 'M') | 1.032658 | 0.506804 | 1.558512 | 9.515975 | 0.001 |
| ('White', 'F') | ('Unknown or Legacy', 'F') | 1.277839 | 0.342882 | 2.212796 | 6.622871 | 0.001 |
| ('White', 'F') | ('East/Southeast Asian', 'M') | 0.861568 | 0.331433 | 1.391703 | 7.87526 | 0.001 |
| ('White', 'F') | ('East/Southeast Asian', 'F') | 1.720012 | 0.75461 | 2.685414 | 8.633466 | 0.001 |

| | | | | | | |
|---|---|---|---|---|---|---|
| ('White', 'F') | ('Latino', 'M') | 0.795719 | 0.068547 | 1.52289 | 5.30255 | 0.0166001 |

## Appendix D

***Table 12: Statistically Significant Tukey HSD Results Of Two-way ANOVA Amongst Levels of Race And Age Group***

| Group1 | Group2 | Difference in Mean | Lower | Upper | q-value | p-value |
|---|---|---|---|---|---|---|
| ('Black', 'Aged 25 to 34 years') | ('Black', 'Aged 17 years and under') | 1.131207 | 0.176361 | 2.086052 | 6.776448 | 0.002174 |
| ('Black', 'Aged 25 to 34 years') | ('White', 'Aged 25 to 34 years') | 0.50811 | 6.08E-05 | 1.01616 | 5.720648 | 0.049918 |
| ('Black', 'Aged 25 to 34 years') | ('White', 'Aged 17 years and under') | 2.209198 | 1.045182 | 3.373215 | 10.85597 | 0.001 |
| ('Black', 'Aged 45 to 54 years') | ('Black', 'Aged 17 years and under') | 1.146999 | 0.004016 | 2.289982 | 5.74006 | 0.04759 |
| ('Black', 'Aged 45 to 54 years') | ('White', 'Aged 17 years and under') | 2.22499 | 0.90226 | 3.54772 | 9.621664 | 0.001 |
| ('Black', 'Aged 55 to 64 years') | ('White', 'Aged 17 years and under') | 2.2945 | 0.691622 | 3.897379 | 8.188056 | 0.001 |
| ('Black', 'Aged 35 to 44 years') | ('Black', 'Aged 17 years and under') | 1.019445 | 0.017394 | 2.021496 | 5.819252 | 0.038855 |
| ('Black', 'Aged 35 to 44 years') | ('White', 'Aged 25 to 34 years') | 0.619872 | 0.027849 | 1.211895 | 5.989032 | 0.024431 |
| ('Black', 'Aged 35 to 44 years') | ('White', 'Aged 17 years and under') | 2.097437 | 0.894394 | 3.300479 | 9.972434 | 0.001 |
| ('Black', 'Aged 18 to 24 years') | ('Black', 'Aged 17 years and under') | 1.027192 | 0.009417 | 2.044967 | 5.772885 | 0.043819 |
| ('Black', 'Aged 18 to 24 years') | ('White', 'Aged 17 years and under') | 2.105183 | 0.889013 | 3.321354 | 9.90122 | 0.001 |
| ('Black', 'Aged 17 years and under') | ('Indigenous', 'Aged 25 to 34 years') | 2.151591 | 0.68251 | 3.620672 | 8.377362 | 0.001 |
| ('Black', 'Aged 17 years and under') | ('Indigenous', 'Aged 45 to 54 years') | 2.92595 | 0.864088 | 4.987812 | 8.117093 | 0.001 |
| ('Black', 'Aged 17 years and under') | ('Indigenous', 'Aged 35 to 44 years') | 2.11029 | 0.578939 | 3.641642 | 7.882437 | 0.001 |
| ('Black', 'Aged 17 years and under') | ('White', 'Aged 25 to 34 years') | 1.639317 | 0.701827 | 2.576806 | 10.00207 | 0.001 |
| ('Black', 'Aged 17 years and under') | ('White', 'Aged 45 to 54 years') | 1.357982 | 0.379381 | 2.336582 | 7.937466 | 0.001 |
| ('Black', 'Aged 17 years and under') | ('White', 'Aged 55 to 64 years') | 1.432131 | 0.36853 | 2.495731 | 7.70189 | 0.001 |
| ('Black', 'Aged 17 years and under') | ('White', 'Aged 35 to 44 years') | 1.524385 | 0.586241 | 2.462529 | 9.294341 | 0.001 |
| ('Black', 'Aged 17 years and under') | ('White', 'Aged 18 to 24 years') | 1.416074 | 0.3534 | 2.478747 | 7.622181 | 0.001 |
| ('South Asian', 'Aged 25 to 34 years') | ('White', 'Aged 17 years and under') | 1.954213 | 0.548615 | 3.359812 | 7.952505 | 0.001 |
| ('South Asian', 'Aged 45 to 54 years') | ('White', 'Aged 17 years and under') | 1.892114 | 0.129574 | 3.654653 | 6.14047 | 0.015942 |
| ('South Asian', 'Aged 35 to 44 years') | ('Indigenous', 'Aged 45 to 54 years') | 2.135601 | 0.00209 | 4.269112 | 5.725567 | 0.049322 |

| | | | | | | |
|---|---|---|---|---|---|---|
| ('South Asian', 'Aged 35 to 44 years') | ('White', 'Aged 17 years and under') | 1.868341 | 0.3596 | 3.377082 | 7.083284 | 0.001 |
| ('South Asian', 'Aged 18 to 24 years') | ('Indigenous', 'Aged 45 to 54 years') | 2.208602 | 0.00299 | 4.414214 | 5.727717 | 0.049063 |
| ('South Asian', 'Aged 18 to 24 years') | ('White', 'Aged 17 years and under') | 1.79534 | 0.186254 | 3.404425 | 6.382056 | 0.007736 |
| ('Indigenous', 'Aged 25 to 34 years') | ('Middle-Eastern', 'Aged 25 to 34 years') | 1.518709 | 0.021137 | 3.016281 | 5.800697 | 0.04079 |
| ('Indigenous', 'Aged 25 to 34 years') | ('Middle-Eastern', 'Aged 55 to 64 years') | 3.014888 | 0.475035 | 5.554741 | 6.789783 | 0.00208 |
| ('Indigenous', 'Aged 25 to 34 years') | ('White', 'Aged 17 years and under') | 3.229583 | 1.616696 | 4.842469 | 11.45344 | 0.001 |
| ('Indigenous', 'Aged 25 to 34 years') | ('Unknown or Legacy', 'Aged 25 to 34 years') | 1.533104 | 0.127003 | 2.939205 | 6.236606 | 0.012009 |
| ('Indigenous', 'Aged 25 to 34 years') | ('Unknown or Legacy', 'Aged 45 to 54 years') | 2.094042 | 0.435214 | 3.75287 | 7.220665 | 0.001 |
| ('Indigenous', 'Aged 25 to 34 years') | ('Unknown or Legacy', 'Aged 65 years and older') | 3.7558 | 0.779249 | 6.732351 | 7.217426 | 0.001 |
| ('Indigenous', 'Aged 25 to 34 years') | ('Unknown or Legacy', 'Aged 17 years and under') | 2.872488 | 0.499622 | 5.245353 | 6.924339 | 0.00132 |
| ('Indigenous', 'Aged 25 to 34 years') | ('East/Southeast Asian', 'Aged 25 to 34 years') | 1.581663 | 0.149574 | 3.013753 | 6.317382 | 0.009421 |
| ('Indigenous', 'Aged 25 to 34 years') | ('East/Southeast Asian', 'Aged 45 to 54 years') | 1.830013 | 0.116975 | 3.543051 | 6.110551 | 0.017381 |
| ('Indigenous', 'Aged 25 to 34 years') | ('East/Southeast Asian', 'Aged 55 to 64 years') | 2.452489 | 0.576107 | 4.32887 | 7.476168 | 0.001 |
| ('Indigenous', 'Aged 25 to 34 years') | ('East/Southeast Asian', 'Aged 65 years and older') | 2.791073 | 0.107732 | 5.474415 | 5.949611 | 0.027262 |
| ('Indigenous', 'Aged 25 to 34 years') | ('East/Southeast Asian', 'Aged 17 years and under') | 2.935165 | 0.086821 | 5.783509 | 5.894314 | 0.03176 |
| ('Indigenous', 'Aged 25 to 34 years') | ('Latino', 'Aged 17 years and under') | 4.558974 | 0.426837 | 8.691111 | 6.310819 | 0.009609 |
| ('Indigenous', 'Aged 45 to 54 years') | ('Middle-Eastern', 'Aged 25 to 34 years') | 2.293068 | 0.21081 | 4.375326 | 6.299059 | 0.009955 |
| ('Indigenous', 'Aged 45 to 54 years') | ('Middle-Eastern', 'Aged 45 to 54 years') | 2.602817 | 0.21664 | 4.988994 | 6.239275 | 0.011912 |
| ('Indigenous', 'Aged 45 to 54 years') | ('Middle-Eastern', 'Aged 55 to 64 years') | 3.789247 | 0.866247 | 6.712247 | 7.415106 | 0.001 |
| ('Indigenous', 'Aged 45 to 54 years') | ('Middle-Eastern', 'Aged 35 to 44 years') | 2.216667 | 0.046361 | 4.386973 | 5.84215 | 0.036569 |
| ('Indigenous', 'Aged 45 to 54 years') | ('White', 'Aged 65 years and older') | 2.398547 | 0.215205 | 4.581889 | 6.283762 | 0.010423 |
| ('Indigenous', 'Aged 45 to 54 years') | ('White', 'Aged 17 years and under') | 4.003942 | 1.837267 | 6.170617 | 10.5703 | 0.001 |
| ('Indigenous', 'Aged 45 to 54 years') | ('Unknown or Legacy', 'Aged 25 to 34 years') | 2.307463 | 0.28999 | 4.324935 | 6.542147 | 0.00468 |

| | | | | | | |
|---|---|---|---|---|---|---|
| ('Indigenous', 'Aged 45 to 54 years') | ('Unknown or Legacy', 'Aged 45 to 54 years') | 2.868401 | 0.667313 | 5.069489 | 7.454108 | 0.001 |
| ('Indigenous', 'Aged 45 to 54 years') | ('Unknown or Legacy', 'Aged 55 to 64 years') | 2.561404 | 0.119841 | 5.002966 | 6.000722 | 0.023663 |
| ('Indigenous', 'Aged 45 to 54 years') | ('Unknown or Legacy', 'Aged 35 to 44 years') | 2.164176 | 0.085192 | 4.243159 | 5.954354 | 0.026903 |
| ('Indigenous', 'Aged 45 to 54 years') | ('Unknown or Legacy', 'Aged 18 to 24 years') | 2.248683 | 0.065341 | 4.432025 | 5.891146 | 0.032036 |
| ('Indigenous', 'Aged 45 to 54 years') | ('Unknown or Legacy', 'Aged 65 years and older') | 4.530159 | 1.220637 | 7.83968 | 7.829634 | 0.001 |
| ('Indigenous', 'Aged 45 to 54 years') | ('Unknown or Legacy', 'Aged 17 years and under') | 3.646847 | 0.867716 | 6.425977 | 7.505883 | 0.001 |
| ('Indigenous', 'Aged 45 to 54 years') | ('East/Southeast Asian', 'Aged 25 to 34 years') | 2.356022 | 0.320351 | 4.391694 | 6.620107 | 0.003642 |
| ('Indigenous', 'Aged 45 to 54 years') | ('East/Southeast Asian', 'Aged 45 to 54 years') | 2.604372 | 0.362146 | 4.846597 | 6.643805 | 0.003372 |
| ('Indigenous', 'Aged 45 to 54 years') | ('East/Southeast Asian', 'Aged 55 to 64 years') | 3.226848 | 0.857484 | 5.596211 | 7.790045 | 0.001 |
| ('Indigenous', 'Aged 45 to 54 years') | ('East/Southeast Asian', 'Aged 65 years and older') | 3.565432 | 0.516925 | 6.61394 | 6.689877 | 0.002899 |
| ('Indigenous', 'Aged 45 to 54 years') | ('East/Southeast Asian', 'Aged 17 years and under') | 3.709524 | 0.514818 | 6.904229 | 6.641721 | 0.003395 |
| ('Indigenous', 'Aged 45 to 54 years') | ('Latino', 'Aged 17 years and under') | 5.333333 | 0.955248 | 9.711419 | 6.967994 | 0.001134 |
| ('Indigenous', 'Aged 35 to 44 years') | ('Middle-Eastern', 'Aged 55 to 64 years') | 2.973587 | 0.397215 | 5.549959 | 6.601846 | 0.003865 |
| ('Indigenous', 'Aged 35 to 44 years') | ('White', 'Aged 17 years and under') | 3.188282 | 1.518479 | 4.858085 | 10.92156 | 0.001 |
| ('Indigenous', 'Aged 35 to 44 years') | ('Unknown or Legacy', 'Aged 25 to 34 years') | 1.491803 | 0.020763 | 2.962843 | 5.800698 | 0.04079 |
| ('Indigenous', 'Aged 35 to 44 years') | ('Unknown or Legacy', 'Aged 45 to 54 years') | 2.052741 | 0.338521 | 3.766961 | 6.849531 | 0.001699 |
| ('Indigenous', 'Aged 35 to 44 years') | ('Unknown or Legacy', 'Aged 65 years and older') | 3.714499 | 0.706726 | 6.722271 | 7.063964 | 0.001 |
| ('Indigenous', 'Aged 35 to 44 years') | ('Unknown or Legacy', 'Aged 17 years and under') | 2.831187 | 0.419273 | 5.243101 | 6.714288 | 0.002674 |
| ('Indigenous', 'Aged 35 to 44 years') | ('East/Southeast Asian', 'Aged 25 to 34 years') | 1.540362 | 0.044462 | 3.036263 | 5.889974 | 0.032138 |
| ('Indigenous', 'Aged 35 to 44 years') | ('East/Southeast Asian', 'Aged 45 to 54 years') | 1.788712 | 0.021981 | 3.555442 | 5.791128 | 0.041813 |
| ('Indigenous', 'Aged 35 to 44 years') | ('East/Southeast Asian', 'Aged 55 to 64 years') | 2.411188 | 0.485663 | 4.336713 | 7.162672 | 0.001 |
| ('Indigenous', 'Aged 35 to 44 years') | ('East/Southeast Asian', 'Aged 65 years and older') | 2.749772 | 0.031839 | 5.467705 | 5.78697 | 0.042265 |
| ('Indigenous', 'Aged 35 to 44 years') | ('East/Southeast Asian', 'Aged 17 years and under') | 2.893864 | 0.012908 | 5.774819 | 5.745592 | 0.046942 |

| | | | | | | |
|---|---|---|---|---|---|---|
| ('Indigenous', 'Aged 35 to 44 years') | ('Latino', 'Aged 17 years and under') | 4.517673 | 0.36299 | 8.672357 | 6.21971 | 0.01263 |
| ('Indigenous', 'Aged 18 to 24 years') | ('White', 'Aged 17 years and under') | 2.838246 | 0.434664 | 5.241828 | 6.754362 | 0.00234 |
| ('Middle-Eastern', 'Aged 25 to 34 years') | ('White', 'Aged 25 to 34 years') | 1.006435 | 0.024901 | 1.987969 | 5.865073 | 0.034386 |
| ('Middle-Eastern', 'Aged 25 to 34 years') | ('White', 'Aged 17 years and under') | 1.710874 | 0.275523 | 3.146224 | 6.817942 | 0.001892 |
| ('Middle-Eastern', 'Aged 55 to 64 years') | ('White', 'Aged 25 to 34 years') | 2.502614 | 0.228512 | 4.776716 | 6.294731 | 0.010084 |
| ('Middle-Eastern', 'Aged 55 to 64 years') | ('White', 'Aged 35 to 44 years') | 2.387682 | 0.11331 | 4.662054 | 6.004935 | 0.023391 |
| ('Middle-Eastern', 'Aged 35 to 44 years') | ('White', 'Aged 17 years and under') | 1.787275 | 0.226936 | 3.347615 | 6.551874 | 0.004536 |
| ('Middle-Eastern', 'Aged 18 to 24 years') | ('White', 'Aged 17 years and under') | 2.220471 | 0.637581 | 3.80336 | 8.023941 | 0.001 |
| ('White', 'Aged 25 to 34 years') | ('White', 'Aged 17 years and under') | 2.717309 | 1.567486 | 3.867131 | 13.51766 | 0.001 |
| ('White', 'Aged 25 to 34 years') | ('Unknown or Legacy', 'Aged 25 to 34 years') | 1.02083 | 0.185481 | 1.856178 | 6.990024 | 0.001049 |
| ('White', 'Aged 25 to 34 years') | ('Unknown or Legacy', 'Aged 45 to 54 years') | 1.581768 | 0.368343 | 2.795192 | 7.456296 | 0.001 |
| ('White', 'Aged 25 to 34 years') | ('Unknown or Legacy', 'Aged 65 years and older') | 3.243526 | 0.490247 | 5.996804 | 6.738456 | 0.002468 |
| ('White', 'Aged 25 to 34 years') | ('Unknown or Legacy', 'Aged 17 years and under') | 2.360214 | 0.274266 | 4.446162 | 6.472039 | 0.00585 |
| ('White', 'Aged 25 to 34 years') | ('East/Southeast Asian', 'Aged 25 to 34 years') | 1.069389 | 0.190999 | 1.947779 | 6.963728 | 0.00115 |
| ('White', 'Aged 25 to 34 years') | ('East/Southeast Asian', 'Aged 45 to 54 years') | 1.317738 | 0.031198 | 2.604279 | 5.858668 | 0.034983 |
| ('White', 'Aged 25 to 34 years') | ('East/Southeast Asian', 'Aged 55 to 64 years') | 1.940215 | 0.443052 | 3.437377 | 7.412658 | 0.001 |
| ('White', 'Aged 25 to 34 years') | ('Latino', 'Aged 17 years and under') | 4.0467 | 0.072377 | 8.021023 | 5.824131 | 0.038357 |
| ('White', 'Aged 45 to 54 years') | ('White', 'Aged 17 years and under') | 2.435973 | 1.252393 | 3.619554 | 11.77248 | 0.001 |
| ('White', 'Aged 45 to 54 years') | ('Unknown or Legacy', 'Aged 45 to 54 years') | 1.300432 | 0.054972 | 2.545892 | 5.972432 | 0.025576 |
| ('White', 'Aged 45 to 54 years') | ('Unknown or Legacy', 'Aged 65 years and older') | 2.96219 | 0.194643 | 5.729737 | 6.122252 | 0.016806 |
| ('White', 'Aged 45 to 54 years') | ('East/Southeast Asian', 'Aged 55 to 64 years') | 1.658879 | 0.135637 | 3.182122 | 6.229296 | 0.012276 |
| ('White', 'Aged 55 to 64 years') | ('White', 'Aged 17 years and under') | 2.510122 | 1.255351 | 3.764893 | 11.44257 | 0.001 |
| ('White', 'Aged 55 to 64 years') | ('Unknown or Legacy', 'Aged 45 to 54 years') | 1.374581 | 0.061281 | 2.687882 | 5.986866 | 0.024574 |
| ('White', 'Aged 55 to 64 years') | ('Unknown or Legacy', 'Aged 65 years and older') | 3.036339 | 0.237607 | 5.835072 | 6.205577 | 0.013171 |
| ('White', 'Aged 55 to 64 years') | ('Unknown or Legacy', 'Aged 17 years and under') | 2.153027 | 0.007442 | 4.298613 | 5.739803 | 0.047619 |

| | | | | | | |
|---|---|---|---|---|---|---|
| ('White', 'Aged 55 to 64 years') | ('East/Southeast Asian', 'Aged 55 to 64 years') | 1.733028 | 0.153834 | 3.312223 | 6.27716 | 0.010634 |
| ('White', 'Aged 35 to 44 years') | ('White', 'Aged 17 years and under') | 2.602377 | 1.452021 | 3.752732 | 12.93991 | 0.001 |
| ('White', 'Aged 35 to 44 years') | ('Unknown or Legacy', 'Aged 25 to 34 years') | 0.905898 | 0.069815 | 1.74198 | 6.197595 | 0.013487 |
| ('White', 'Aged 35 to 44 years') | ('Unknown or Legacy', 'Aged 45 to 54 years') | 1.466836 | 0.252906 | 2.680766 | 6.91164 | 0.001376 |
| ('White', 'Aged 35 to 44 years') | ('Unknown or Legacy', 'Aged 65 years and older') | 3.128594 | 0.375092 | 5.882095 | 6.499158 | 0.005367 |
| ('White', 'Aged 35 to 44 years') | ('Unknown or Legacy', 'Aged 17 years and under') | 2.245282 | 0.15904 | 4.331524 | 6.156012 | 0.015238 |
| ('White', 'Aged 35 to 44 years') | ('East/Southeast Asian', 'Aged 25 to 34 years') | 0.954457 | 0.07537 | 1.833545 | 6.210371 | 0.012984 |
| ('White', 'Aged 35 to 44 years') | ('East/Southeast Asian', 'Aged 55 to 64 years') | 1.825283 | 0.32771 | 3.322855 | 6.97165 | 0.001118 |
| ('White', 'Aged 18 to 24 years') | ('White', 'Aged 17 years and under') | 2.494065 | 1.24008 | 3.74805 | 11.3765 | 0.001 |
| ('White', 'Aged 18 to 24 years') | ('Unknown or Legacy', 'Aged 45 to 54 years') | 1.358524 | 0.045974 | 2.671074 | 5.920315 | 0.029572 |
| ('White', 'Aged 18 to 24 years') | ('Unknown or Legacy', 'Aged 65 years and older') | 3.020282 | 0.221902 | 5.818662 | 6.173537 | 0.014476 |
| ('White', 'Aged 18 to 24 years') | ('East/Southeast Asian', 'Aged 55 to 64 years') | 1.716971 | 0.138401 | 3.295541 | 6.22146 | 0.012563 |
| ('White', 'Aged 65 years and older') | ('White', 'Aged 17 years and under') | 1.605395 | 0.026974 | 3.183816 | 5.817713 | 0.039013 |
| ('White', 'Aged 17 years and under') | ('Unknown or Legacy', 'Aged 25 to 34 years') | 1.696479 | 0.356842 | 3.036116 | 7.243602 | 0.001 |
| ('White', 'Aged 17 years and under') | ('Unknown or Legacy', 'Aged 35 to 44 years') | 1.839766 | 0.40917 | 3.270362 | 7.355951 | 0.001 |
| ('White', 'Aged 17 years and under') | ('Unknown or Legacy', 'Aged 18 to 24 years') | 1.755259 | 0.176838 | 3.33368 | 6.360797 | 0.008257 |
| ('White', 'Aged 17 years and under') | ('East/Southeast Asian', 'Aged 25 to 34 years') | 1.647919 | 0.281029 | 3.01481 | 6.895973 | 0.00145 |
| ('White', 'Aged 17 years and under') | ('East/Southeast Asian', 'Aged 35 to 44 years') | 2.033183 | 0.626247 | 3.44012 | 8.266001 | 0.001 |
| ('White', 'Aged 17 years and under') | ('East/Southeast Asian', 'Aged 18 to 24 years') | 1.875264 | 0.286667 | 3.463861 | 6.752147 | 0.002359 |
| ('White', 'Aged 17 years and under') | ('Latino', 'Aged 25 to 34 years') | 1.875303 | 0.283215 | 3.467392 | 6.73748 | 0.002476 |
| ('White', 'Aged 17 years and under') | ('Latino', 'Aged 35 to 44 years') | 1.890723 | 0.091451 | 3.689995 | 6.010692 | 0.023024 |