Correlation Between Crime Rates and Violence Portrayed in Television

Karina Glavan
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Introduction and Thesis:

This report will look into the correlation between violent crime rates in North America and the portrayal of violence in television. Violent crime rates will be represented through data from Canada and the United States, while the portrayal of violence in television will be measured by examining films produced over the years and rate of watching true crime.

With individuals having access to multiple streaming platforms like Netflix, Disney +, Amazon Prime, etc., it has become a lot easier to access television with violent content. Because of this shift in the way our society entertains itself, the assumption is that an increase in violence portrayed in television will cause an increase in violent crime rates. The independent variable (x) will be violence portrayed in television, while the dependent variable (y) will be violent crime rates. This implies that as violence in television increases, so does violent crime in real life.

Background Information:

It is important to be aware of any possible correlation between violent crime rates and violence portrayed in television. If a positive linear correlation is present, this could demonstrate how our society reacts to an overconsumption of violent content. Understanding this relationship is crucial because it may indicate the need to adjust media consumption habits to ensure that future generations aren't surrounded solely by violence. This awareness could help in forming better media regulations and crime prevention strategies, which would give a healthier societal environment.

Some assumptions had to be made regarding what is a violent movie. Based on specific movie descriptions, the assumption was made that the following genres would be considered violent: Adventure, Action, Thriller / Suspense, Horror, and Drama. While most of these genres are self explanatory, Drama is included because many movies in this category often contain significant violence, such as "Openhimer" and "Saving Private Ryan".

Five various reliable sources were used in the process of this report:

1. **Statista:** Used to gather data on violent crime rates in Canada by province in 2022.

2. **Statistics Canada:** Used to collect data on violent crime rates in Canada over the years.

3. **The FBI official website:** Used to gather information on violent crime rates in the United States in the same time period as the Canadian violent crime rates.

4. **The Numbers:** Used to gather information regarding the popularity of different movie genres.

5. **Vivint:** Used to gather information regarding search volume for true crime in major cities, in comparison to violent crime rates in each of these cities.

Rate of Violent Crimes in Canada by Province and Territory:

Rate of Violent Crimes Per 100,000 Residents vs. Province or Territory (Graph 1)
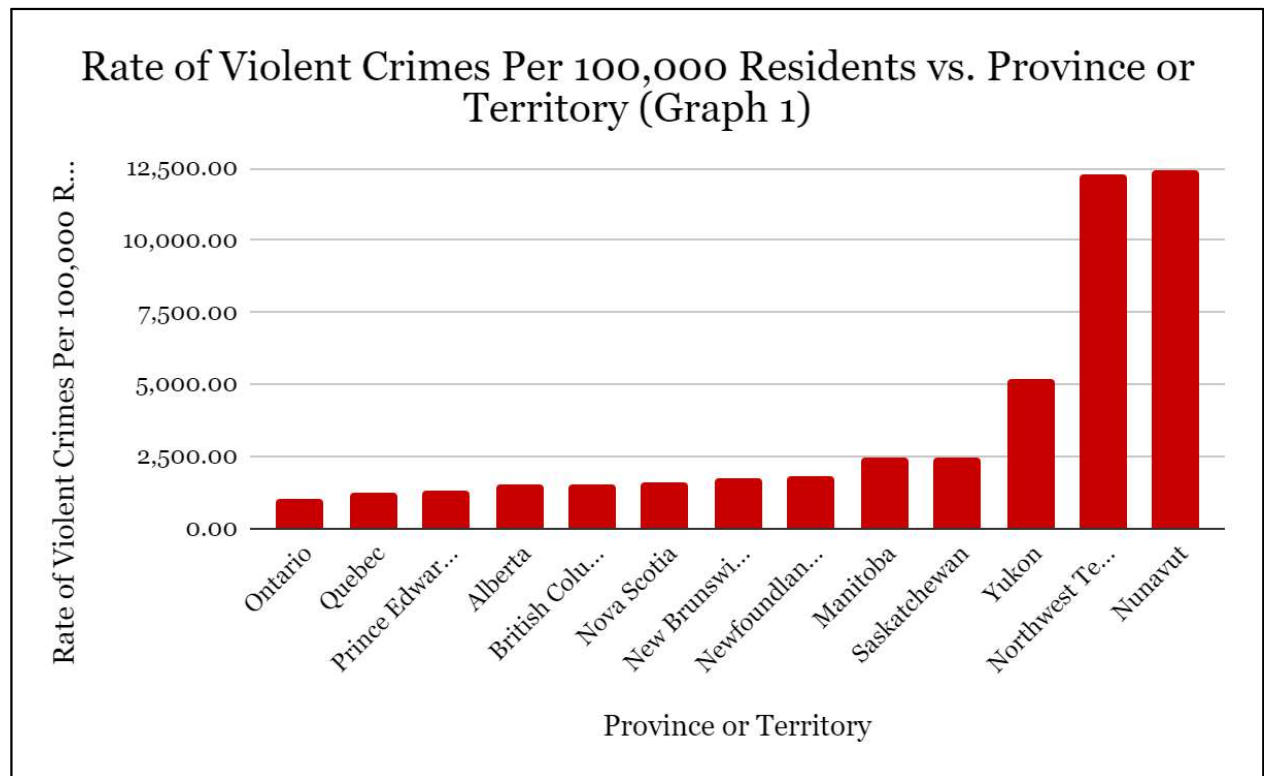
The above graph (Graph 1) demonstrates the rate of violent crimes per 100,000 residents in each province or territory. A bar graph was used due to the categorical nature of the data, as the provinces and territories represent distinct categories and not set values.

Possible reasons for the territories having higher violent crime rates than the provinces include the extraneous variables of lack of local law enforcement, insufficient support from the government, and higher population of Indigenous people. In Canada, particularly in the territories there is a high rate of Missing and Murdered Indigenous Women and Girls, a problem that has been growing for decades now. These terrible circumstances within the territories are why they have significantly higher violent crime rates and can be considered outliers in comparison to the provinces.

North American Homicide Rate v.s Movies Produced with Violence:

Rate Per 100,000 Population vs. # of Movies Released (Graph 2)
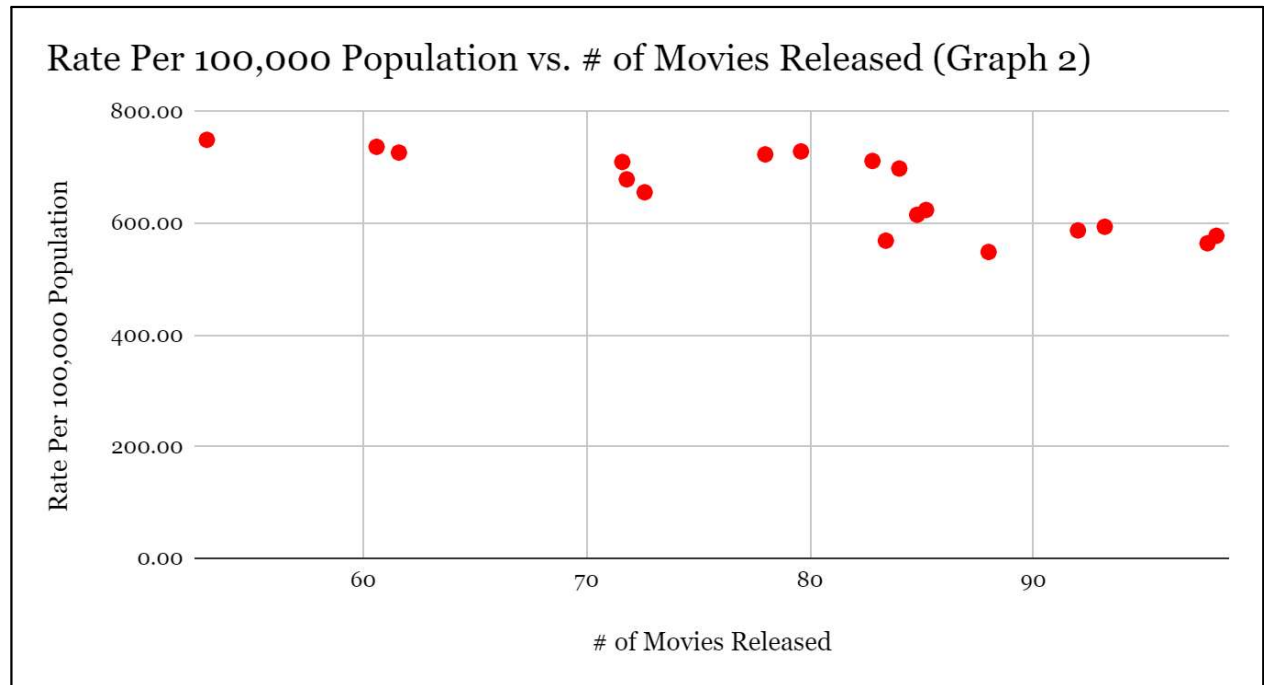
The above graph (Graph 2) represents the correlation between violent crime rates and the number of movies released containing violence, with data representative of the years 2001 to 2018. As can be seen visually from the graph, there appears to be a strong negative correlation, which can be supported by the linear regression.

Linear Regression: -0.7978769084

Graphically, this means that as the number of movies released with violence increases, violent crime rates decreases. However, this strong correlation doesn't equal causation. The reasoning behind this strong negative correlation could be due to an external variable.

When looking at the raw data (Appendix A), it can be seen that the number of movies released with violence is slowly increasing, while violent crime rates are decreasing at a more rapid pace. This slow increase in violent movie production can be attributed to the slow process involved in developing films. Given the decently strong correlation between the two variables, this suggests that there may be a common cause variable that is causing this negative correlation.

A potential common cause variable could be the increased use of the internet and overall digital media. Internet use became a lot more common and normalized during the early 2000s and has been steadily increasing each year. Therefore, with more people now having easy access to streaming services, social media, and online gaming, it encourages people to remain indoors.

With this shift due to technology, more people would be more likely to watch more violent films while also reducing outdoor activities which include violent criminal activities.

While movies with violence may be constantly increasing every year, it is important to also look into how often people watch these violent films. The following graph (Graph 3) represents violent crime rates v.s number of tickets sold:

Rate Per 100,000 Population vs. Tickets Sold (Graph 3)
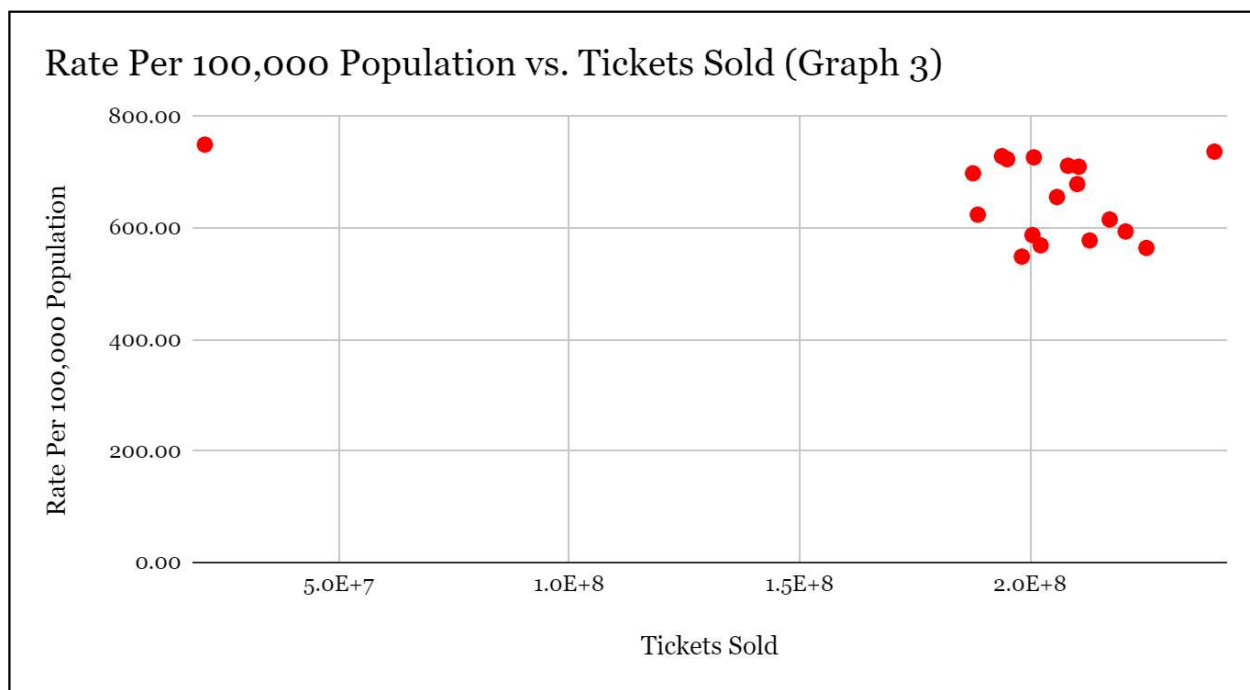
By looking at the above graph (Graph 3), visually there appears to be a weak to possibly moderate negative correlation. However, it can also be noted that there are two outliers, one on the far right and one on the far left. The two outliers are as follows:

Tickets Sold	Rate Per 100,000 Population
20976365	749.75
240041720.8	737.20

**Linear Regression (With Outliers)**: -0.3396868525

However, once you remove the two outliers from the regression calculation, it changes from being a weak to moderate negative correlation to a more prominent moderate negative correlation.

Rate Per 100,000 Population vs. Tickets Sold (Graph 4)
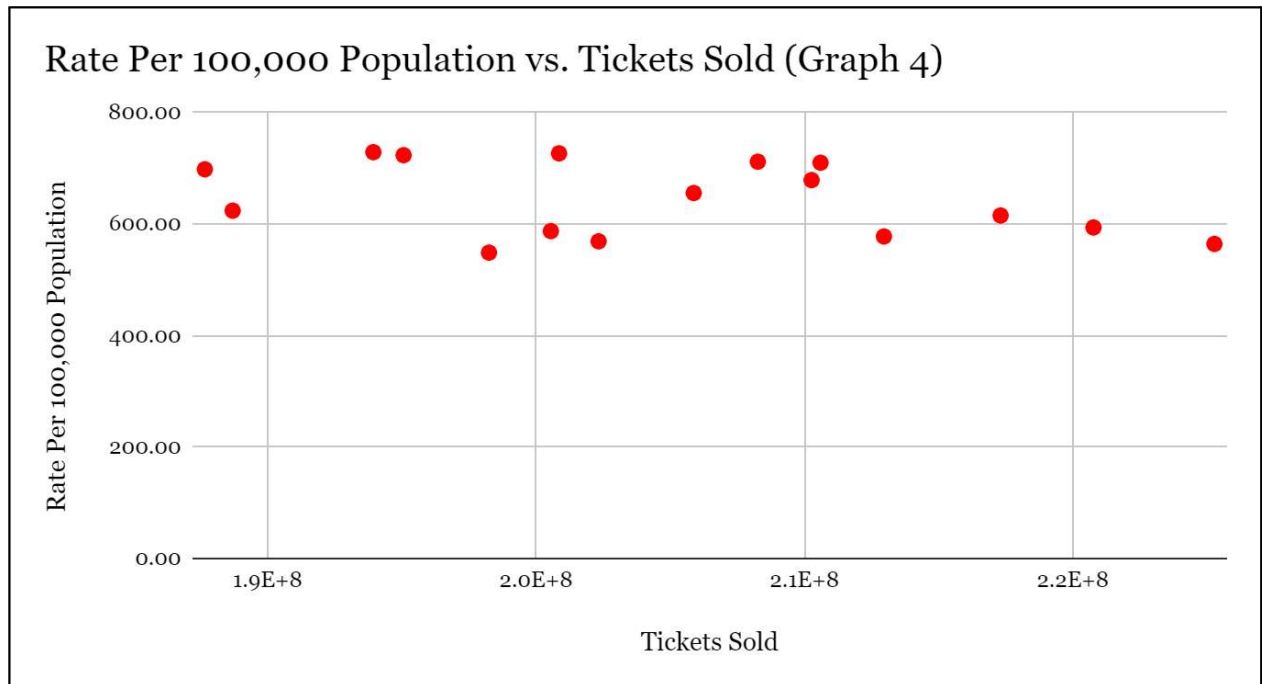
Linear Regression (W/O Outliers): -0.3730706826

Even with the removal of outliers, the correlation is still much weaker in comparison to Graph 2. However, the correlation still demonstrates graphically that as ticket sales increase, violent crime rates decrease.

The still relatively low correlation is interesting given the similarities in structure of this graph (Graph 4) and Graph 2. If the range of the y-values is adjusted from 0-800 to 550-750, the graph looks as follows:

Rate Per 100,000 Population vs. Tickets Sold (Graph 5)
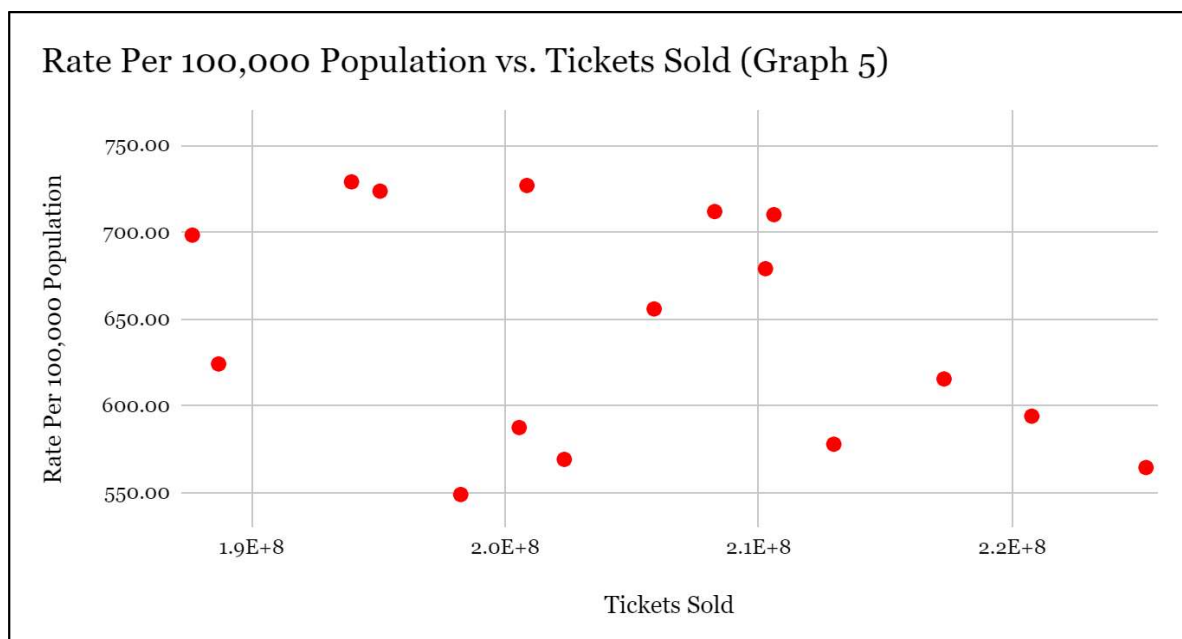
It can be seen that once the range changes, the linear regression seems to match its graphical representation a great deal more.

This correlation can be argued as a presumed relationship. The observed negative correlation between ticket sales (x) and violent crime rates (y) seems logical and consistent, but there does not seem to be an established direct causal relationship. This means that while a connection is plausible, no actual reason seems present.

Therefore, the stronger negative correlation represented through Graph 2 likely involves a common cause variable: increased internet use and digital media consumption. Graph 3 and its developments can be considered a presumed relationship, showing a logical and consistent negative correlation but no established direct causal relationship.

Search Volume for True Crime per Capita in the U.S v.s Total Offenses:
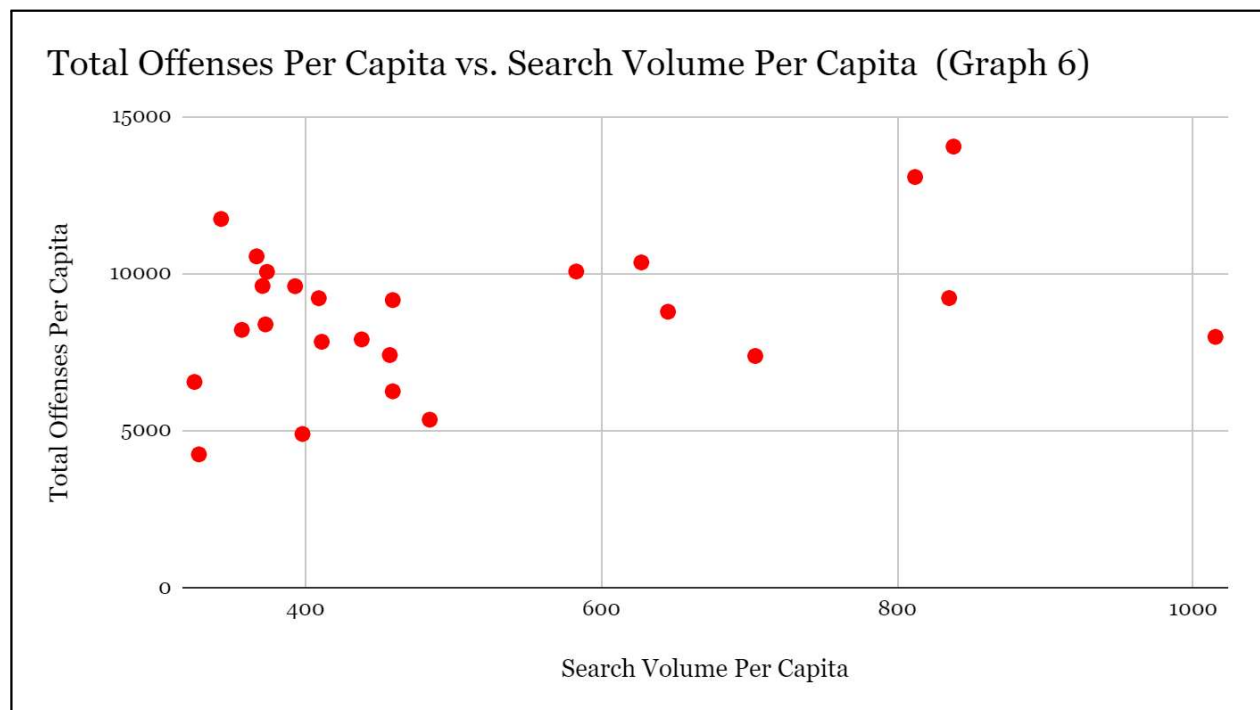
The above graph (Graph 6) represents total violent crime offenses within a city v.s the number of times that individuals in the city search for true crime. Visually, there is a moderate positive linear correlation.

Linear Regression: 0.3560217158

Given the shape of the graph, a non linear correlation might demonstrate a stronger type relationship. The strongest non linear correlation (Appendix B) was the natural logarithmic function, y = ln(x).

Non Linear Regression: 0.3568707212

The difference between the values of the two different types of regressions is 0.0008, which is practically negligible. This means the trend can be described by either a linear regression (y = x) or a natural logarithmic function (y = ln(x)). Those functions, however, look relatively different:

Comparison between y = x & y = ln(x)
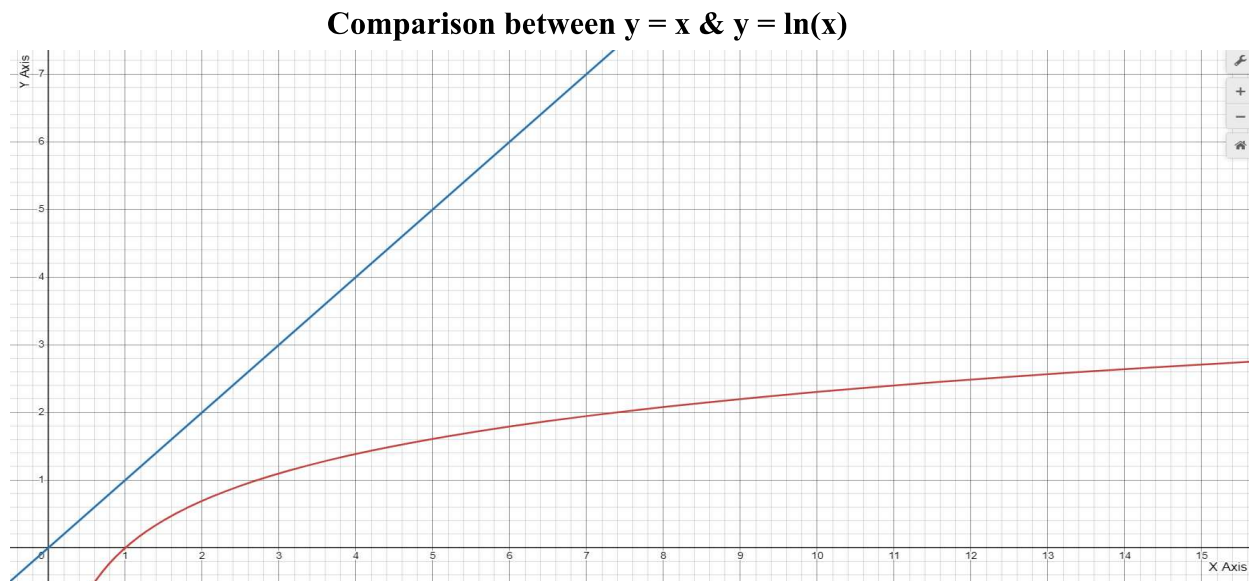
As seen in the examples of the base functions, the linear function increases at a constant rate, forming a straight line. In contrast, the natural logarithm increases but at a slower rate compared to the x value.

Therefore, depending on the type of regression used, the interpretation of the data in Graph 6 can differ. Using linear regression, the analysis suggests that as search volume increases, violent crime rate increases at an equal rate. Using the natural logarithm, the increase in violent crime rates is slower compared to the increase in search volume. The natural logarithm fits the data slightly better, due to the more gradual increase in the y value.

Overall, both regressions indicate a similar idea: a change in x(search volume) causes a change in y(violent crime rates). The trend in Graph 6 suggests a cause and effect relationship. A possible explanation is that the rising popularity of true crime gives criminals the idea that they can gain fame through violent acts. Therefore, as interest in true crime increases, so do violent illegal acts, demonstrating that a change in x causes a change in y.

Conclusion:

The original belief/hypothesis was that as violence portrayed in television increases, violent crime rates will also increase. Graphs 2-5 disprove this hypothesis, while Graph 6 supports the original hypothesis.

Graph 2 represented a strong negative linear correlation, and Graphs 3-5 showed a moderate negative correlation. In contrast, Graph 6 demonstrated a moderate positive linear and nonlinear regression. These opposing results suggest different interpretations of the relationship between violent crime rates and violence in television. The negative correlations indicate that as violence in television increases, violent crime rates decrease. Meanwhile, the positive correlations suggest that an increase in true crime causes an increase in violent crime.

Therefore, given the conflicting results, it can be concluded that there is no definitive evidence to support the hypothesis that an increase in violence in television causes an increase in violent crime rates. However, due to the strong negative correlation in Graph 2 (around -0.80)1 a plausible conclusion is that an increase in violence in movies causes a decrease in violent crime rates.

Evaluation of Techniques and Future Work:

In terms of bias within the sources used throughout this report, very little, if any bias is present. The data collected comes from a variety of reputable sources, primarily government databases, which are generally reliable and unbiased. The data used is either sourced directly from the government or publicly available information, such as tickets sold.

The only type of potential bias that could affect the data is the underreporting of violent crimes. If violent crimes go unreported, they are not incorporated into government statistics, which could alter the violent crime rates and potentially change the graph results. This type of bias is not one of the main 4 biases typically considered (sampling, non response, measurement, response bias), given the lack of survey questions in the information used. Instead, this bias could be considered as underreporting, meaning that the underreporting of crimes could lead to different violent crime rates than those reported.

Overall, this report went pretty well. However, the fact that my final conclusion was inconclusive due to the contradicting results indicates a need for further research. In the future, I would gather even more information from a variety of different sources to come up with a more definitive conclusion, and I would want to look into violence in television v.s violent crime rates within other countries and not just Canada and the United States. To gather more information and finish the report on time, I would need to work on this project more consistently. I tended to work on it

in major chunks, which limited the amount of data I could work with. Giving myself more time would allow me to work with larger scale data.

This project changed my stance slightly on what I originally thought was the correlation between violence portrayed in television and crime rates. I originally believed it would be a strong positive correlation, and the most I found was a moderate positive correlation. This showed me that there is some relationship, but it is nowhere near as strong as I initially thought, and further research is needed to draw more definitive conclusions.

Given the overall reliance on reputable sources and the consistency throughout the data, the level of confidence in my findings is reasonably high. The sample sizes are at a large enough scale to be deemed reliable. For the rate of violent crimes in Canada and North American homicide rate, the data was based on every 100,000 people, while search volume was based on 50 American cities. However, the potential underreporting of violent crimes suggests that actual crime rates could be higher than recorded, which may affect the overall conclusions drawn.

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Appendix:

All graphs were generated using google sheets but were created using multiple sources and averaging them. All calculations done regarding linear regressions were done within the google sheets documents using the provided functions which is on the submissions page. Because the numbers used are too big to conveniently calculate by hand is why google sheets were used. All non linear regressions were done using a graphing calculator.

Appendix A:

# of Movies Released	Rate Per 100,000 Population
53	749.75
60.6	737.20
61.6	726.90
71.6	710.10
79.6	729.00
78	723.65
82.8	711.90
84	698.30
71.8	678.95
72.6	655.75
85.2	624.05
84.8	615.40

Appendix B:

Regressions of Totals Offenses Per Capita v.s Search Volume Per Capita	
Linear Regression	*0.3560217158*
Quadratic Regression	0.1346901675
Exponential Regression	0.3369067924
Power Regression	0.3428620382
Cubic Regression	0.2361241166
Ln Regression	*0.3568707212*