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Professor McCabe Data Analysis for Political Science Final

**Intro:**

My research question asks how different states' legal attitudes to 2nd Amendment rights affect the rates of gun violence in those states. This question entered my mind as two mass shootings entered the news cycle in the same month. The right to bear arms is quite unique to American society and a consistently hot topic in political discourse. I have always believed that firearms are largely unnecessary in modern society, and that facilitating access to them has done more harm than good. With this project, I would like to see the data for myself and form a truly informed opinion.

My approach in gathering this data was a regression model. I used the "Mass Shootings in the US" dataset that was provided, and data from worldpopulationreview.com containing the gun death rates, gun law strictness grades, and gun law strictness state rankings. I also used population data downloaded from Github. I performed regression analyses comparing the effect of gun law strictness on the frequency of mass shootings and gun death rates. At the end of the regression process, it was clear that there is a negative relationship between the strictness of gun laws and the rates of gun violence. The correlation between gun law strictness and frequency of mass shootings was, surprisingly, negative.

I believe this data to be important because, ideally, it would inform policymakers of the dangers of not tightening restrictions on gun ownership. The states with the worst rates of gun violence tend to have the worst strictness ratings. The 2nd Amendment has always been a political issue, but it should really be more of a public health issue.

**Background:**

According to the Pew Research Center, lax gun laws were indirectly responsible for the premature deaths of nearly 40000 people in 2017. Guns are the principal tool in three-quarters of murders and half of suicides (Gramlich 2021). Looking at the strictness of gun laws through the lens of public health, the focus can clearly shift from a question of the people's right to bear arms, to a question of whether people have the right to live in a safe and free society. Before doing the research, I predicted that the states with the most lenient gun laws would also have the highest rates of gun violence.

  The hypotheses that I tested were gun law strictness having a positive correlation with both the frequency of mass shootings and gun death rates. The preliminary research I did revealed that there is a higher percentage of gun deaths in states with lax gun laws. I was expecting to find a similarly positive correlation with mass shootings but was surprised to find the opposite. I assumed that states with laws that facilitated access to guns would have more mass shootings. I assumed that since firearms were easier to obtain, that they would be used in more mass shootings. Since the correlation between mass shootings and law strictness proved to be negative, I decided to test the correlation between mass shootings and another X variable, population. For this causal question, I hypothesized that states with a higher population would have more mass shootings regardless of gun law strictness.

**Data and Approach:**

I used the "Mass Shootings in the US" dataset that was provided from Mother Jones, data about the strictness of each state's gun laws from worldpopulationreview.com, and population data that I gathered from Github. The mass shooting data originally contained 124 observations of mass shootings since 1982. I pared 26 variables down to four that I thought would be most relevant to answering my research question: the number of fatalities, the number injured, the state where the incident took place, and the year in which they took place. I cleaned and merged the state law and population data to create one data frame, **massdata**. The key variables were:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **state** | **lawsRank** (X) | **grade2019** (X) | **popmean** (X) | **gunDeathRate** (Y) | **Freq** (Y) |
| The US state | The ranking of the strictness of the state's gun law (1 to 50) | The letter grade assigned to the state for the strictness of its gun laws. (A, B+, B, C+, C, C-, D, D-, or F) | Average population of every state since 1990 | Percentage of people in the state that are killed by a gun annually | The total number of mass shootings in a state |

The **lawsRank**, **grade2019**, and **popmean** variables are dependent variables. I used these to predict **gunDeathRate** and **Freq**. My original goal was to find a relationship between the strictness of gun laws and rates of gun violence, and later to find correlations between state population and gun violence as well. I believe this is a suitable approach to answer my research question because I am finding how rates of gun violence change as the strictness of gun laws and population sizes change.

**Results:**

To perform these regression analyses, I put all the relevant variables into one data frame and used the **lm** function.

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The positive relationship between gun deaths and lax gun laws was expected. I thought it was common sense that fewer barriers to accessing guns would mean fewer barriers to using guns. I didn't expect that the relationship between mass shootings and gun law strictness would be negative. I believed that mass shootings would account for a larger proportion of gun deaths than they do. Because of this initial result, specifically the California outlier in the first analysis, I decided to rerun the regressions with population as the X variable. I hypothesized a positive relationship with both mass shootings and death rate. The relationship between population and death rate turned out to be negative. These results support my original hypothesis that easier access to firearms is correlated with a higher rate of gun violence. It does not support my secondary hypothesis that mass shootings specifically increase as gun laws become less strict. These results also support my hypothesis that mass shootings are more frequent in states with a larger population. However, the result did not support my assumption that gun death rates would be higher in states with larger populations. I did a seventh regression comparing gun law grades and population size. More populous states tend to have stricter gun regulations. This would explain why more populous states also have lower rates of gun deaths.

**Conclusion:**

From this data, I can conclude that lax gun laws do contribute to an increase in rates of gun violence. However, they do not contribute to an increased frequency of mass shootings. I hope that data such as this will inform gun control policy in the future. Though the frequency of mass shooting events are not directly related to states' gun control policies, gun death rates can be brought down to reduce the frequency of unnecessary fatalities. The largest weakness in my research comes from the fact that my plots are cluttered. The labels of the outliers are easy to read, but the statistically average states are difficult to make out. This topic can be explored in much more detail in the future. For example, the explicit differences in the states' gun policies can be compared. A successful policy in one state might be worth implementing in another. A state with a high gun death rate might want to compare their gun laws to a similar state with a lower rate of gun violence to see what specifically they are getting right.

**Appendix:**

Chart, histogram, box and whisker chart

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Chart, scatter chart

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**Citations:**

Gramlich, J. (2021, May 28). *What the data says about gun deaths in the U.S.* Pew Research Center. Retrieved December 17, 2021, from https://www.pewresearch.org/fact-tank/2019/08/16/what-the-data-says-about-gun-deaths-in-the-u-s/

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