

University of Virginia

Project 1 Paper

Foundations of Machine Learning

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Summary

Our project looks at the research question: “What role does party affiliation, education level, and race play in the opposition or support of a law which would require a person to obtain a police permit before he or she could buy a gun? We looked at data provided by the General Social Survey and chose specific variables to see how they related to opinions regarding gun laws. The key variables we chose to look at are party affiliation, education level, and race. After determining the key variables we wanted to look at we cleaned the dataset and then visualized the data. We visualized the data using a stacked bar chart to look at the relationship between party affiliation and opinion on a gun law, a grouped bar graph to look at the relationship between race and opinion on a gun law, and three different histograms looking at the relationship between education level and opinion on a gun law. After visualizing the data, we interpreted the data. When looking at the stacked bar chart, we found those who identified as strongly democratic had the highest percentage of being favor of the gun control law and that those who identified as strongly republican had the highest percentage of being opposed to the gun control law. We found that, generally, those who identified as more democratic leaning were more in favor of being in favor of the gun control law and those who identified as more republican leaning were more opposed to the gun control law. When looking at the grouped bar graph, we found that those who identify as black and other were significantly underrepresented than those who identity as white. However, more blacks and whites were in favor of gun control law than opposing the gun control law. However, those who identified as other opposed the gun control law than being in favor. Lastly, when looking at the histograms, we found that those who pursued education beyond high school were more likely to be in favor of a gun law than those who only graduated high school, dropped out of high school, or didn’t attend high school.

Data

The data utilized for this project was obtained from the General Social Survey which provides insight into the social, political, and economic views of Americans over time. Although the survey has been conducted since 1972, the data used for this project was obtained from 2022. The analysis of the question, “What role does party affiliation, education level, and race play in the opposition or support of a law which would require a person to obtain a police permit before he or she could buy a gun?” uses the key variables “partyid,” “educ,” “race,” and “gunlaw” to examine a more recent public opinion. The “partyid” variable indicates an individual’s political affiliation, with a variety of categories including: independent (neither or no response), strong republican, not very strong republican, independent (close to republican), strong democrat, not very strong democrat, independent (close to democrat). For this variable, the counts were not evenly distributed with those being independent (neither or no response) as the mode with 84 individuals and the least amount being from those not of the two parties (other party) with 14 individuals.

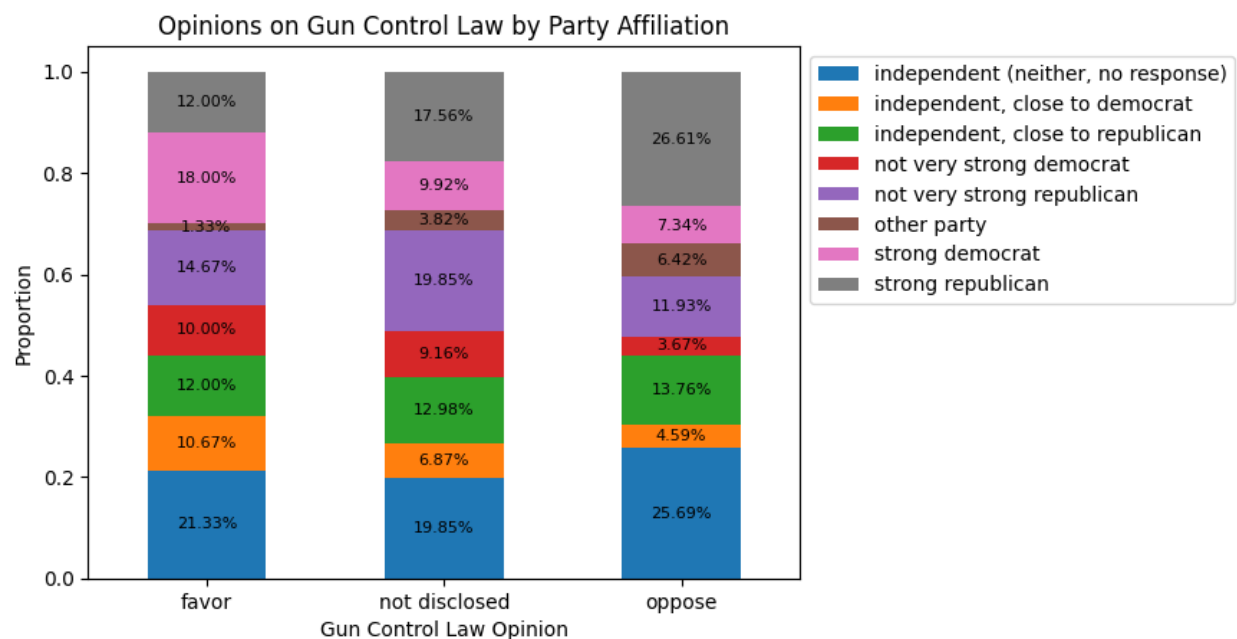
For the variable, “educ,” participants assigned a numerical value to their highest level of formal education, with one representing first grade, and 20 representing eight years of college. Each intervening number in between those two values, corresponds to the sequential years of education. The lowest number, zero, represents no formal education. The “gunlaw” variable measured the the participants opinion for mandating police permits for obtain a gun. Participants were able to choose “in favor” or “oppose.” In contrast with “partyid” and “educ” the choices for “race” were much less extensive. Participants could either pick “black,” “white,” or “other” for the “race” variable.

During the data cleaning process, there were issues with missing values. There were gaps across all of the variables. To mitigate this, different strategies were used depending on the particular variable. As a way to maintain the integrity of the data, for numerical variables such as “educ,” the average was taken and put in place of the gap, while for those that were categorical were input as “not disclosed,” “no response,” or “other.” The most challenging variable was “gunlaw” as it had 131 missing values, which was resolved using the method mentioned above. Reading and preparing the data for analysis however, went smoothly.

Results

When examining party affiliation and its association with attitudes towards firearm policy, there does appear to be a trend. The bar chart in figure 1 illustrates a polarization of views based on the individual’s party affiliation. This trend, however, is not seen in those who identify themselves as completely independent.

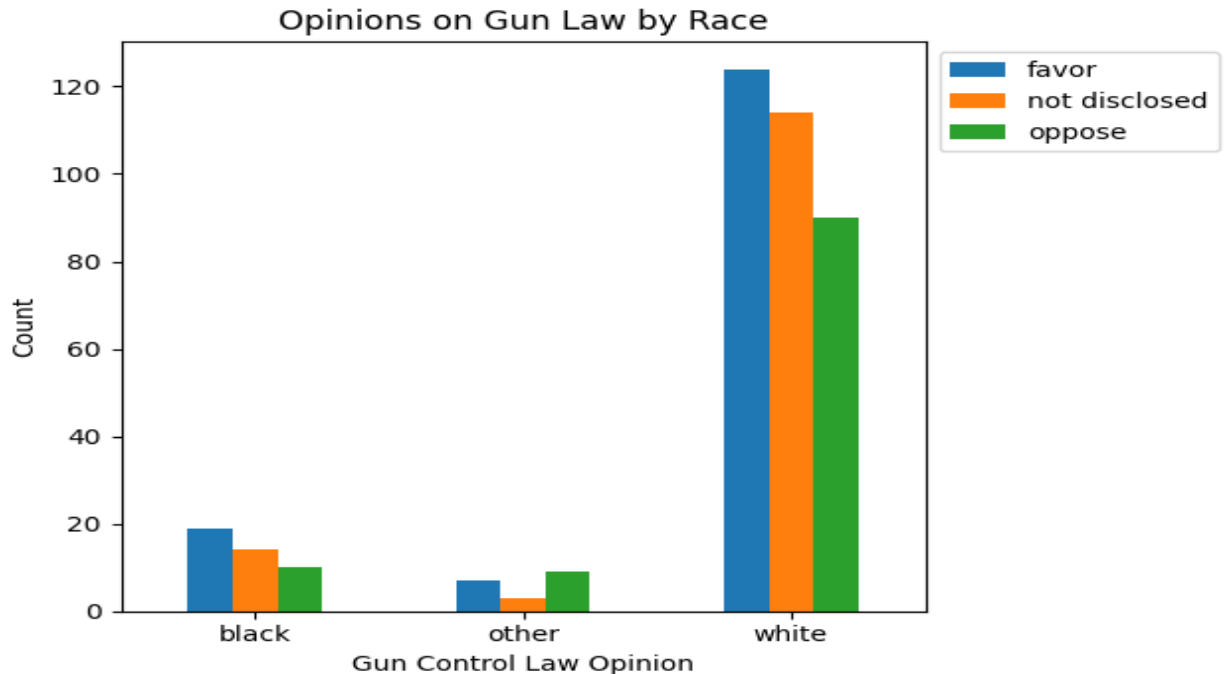
Figure 1: Stacked Bar Chart of Opinions on Gun Control Law Across Party Affiliation



For those who appear to be more right-leaning (strong republican, not very strong republican, and independent - close to republican) there is a much greater opposition for a gun law, with more than half (52.3%) identifying as opposed. There is a much lower percentage for those in favor of the law(38.67%). Individuals that lean towards the left (strong democrat, not very strong democrat, and independent close to democrat) conversely have a lower proportion in favor of the law as compared to those who lean more towards the right in opposition (38%). They do, however, exhibit a similar trend as those who are right-leaning with an even lower percentage of those on the opposing side (15.6%). Independents have a much more balanced distribution throughout the categories with similar percentages (21.33% in favorand 25.69% in opposition) despite most individuals in the dataset identifying as independent. It is worth noting that others who identify themselves with other parties constitute a smaller proportion of (less than 10%) across all three categories. Additionally, It should be noted that those who opted to not disclose their opinion on the topic make up a sizable portion as well (131 individuals).

When examining race, it is apparent the vast majority of the individuals surveyed are white Americans, with black and other races making up only 62 participants of the total 390. Across these categories however, there are some trends that can be identified as shown in figure 2.

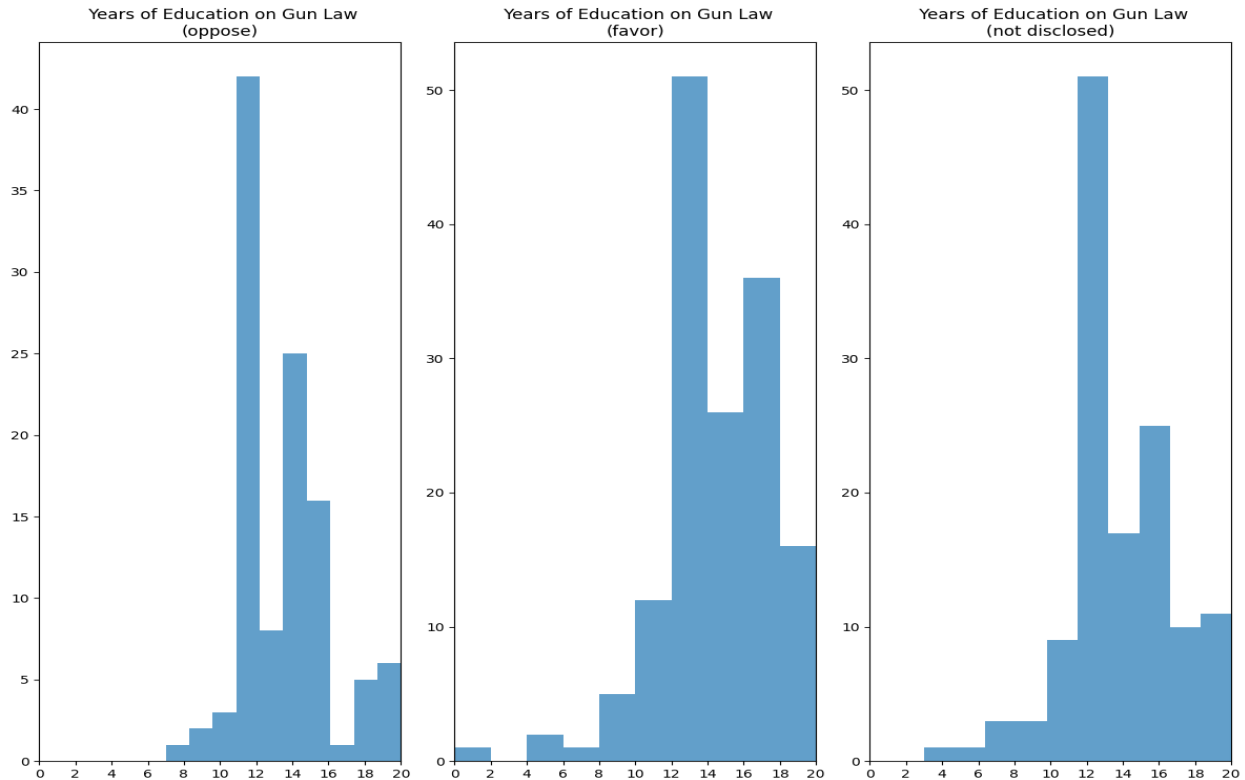
Figure 2: Grouped Bar Chart of Opinions on Gun Control Law Across Race



A majority of white Americans are in favor of a gun law, (124 individuals), but those who chose not to disclose are very similar in number (114 individuals). Those who did not disclose are trailing behind (90 individuals). Similarly, with black Americans the majority favor of a gun law (19 individuals), followed by those who did not disclose (14 individuals) and those who are in opposition (10 individuals). Individuals of other races or chose not to identify do not follow this same pattern as there are more who oppose gun law (9 individuals) versus those who are in favor (7 Individuals). Three of the individuals in this category chose not to disclose.

At the educational level, it does appear that those who have at least completed high school are more in favor of a gun law on firearms, or choose not to disclose their opinion. Additionally, there does appear to be some left-skewness in the distribution of those who have higher education levels as shown in figure 3.

Figure 3: Histograms of Opinions on Gun Control Law Across Educational Level



For those in favor of a gun law, it can be said that those in favor of mandating permits have a higher number of individuals who have completed at least one year of college (86 individuals), in comparison to those who are in opposition (75 individuals). A similar trend is recognized for those who have completed high school in favor of a gun law (43 individuals) versus those in opposition (35 individuals). The education levels for those in favor also appear to be a bit more varied compared to those who are in opposition as well. Those who did not disclose their opinion had a similar histogram to those who were in favor with 75 completing at least one year of college, and 39 completing high school as the highest level of education.

Conclusion

In summary, party affiliation, education level, and race appear to be factors that play a role in the opinion of a law that would require a permit before buying a gun. Of these variables, it is most clearly observed with party affiliation, where there is a distinct polarization.

Individuals who typically identify themselves as more left-leaning are shown to be more in favor of a gun law that requires a permit, whereas right-leaning individuals tend to be more opposed to this. Those who are independent do not have this polarization, and typically are more dispersed in terms of opinion. Regarding race, the result is not as clear, as though most white and black Americans are in favor of a gun law, those who are in opposition are not significantly far behind in number. Education level appears to have an effect, as those who have a higher education level appear to be more in favor of a gun law that permits a gun law before those buy a gun. It can be concluded that those who have a higher education level, that are more right leaning are more in favor of a gun law that requires a permit.

There may be some issues regarding the variable race, however. The sample disproportionately had many white Americans compared with other groups. Not only that, but the only other option was black and other, which is not inclusive to other groups. It would have been much more helpful if other races could have a category as well. The other issue presents itself with the variable, “gunlaw” as there were many individuals who did not disclose their view on the question which impacted how the results were interpreted. There also appeared to be some level skewness in the education level, as the sample had much higher representation for those with higher education. Despite these issues, a trend can still be distinguished based on the given charts.

While this small dataset does provide insight into a cross-section of an opinion regarding the issue of a particular gun law, there are still ongoing studies regarding how these specific variables (education, race, and party affiliation) shape the public opinion. According to Pew Research Center, approximately 86% of democrats (and left-leaning individuals) believe that there should be stricter laws on gun ownership, whereas republicans (and right-leaning

individuals) are at a much lower percentage, with 38%. Not only that, but it appears that gun ownership appears to have a promising relationship with laws concerning gun control as gun owners are more in favor of fewer restrictions to obtain a gun. The subject of gun restrictions and how other factors play a role in public policy decisions.

Works Cited

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