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The Culture, the Law, and the Structure: An Explanation of the Variation in Firearm Related Deaths across States

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Abstract

This paper seeks to determine why firearms related deaths vary across states. Three theories are presented stating that gun culture, stringency of state firearm legislation, and structural characteristics of states have an effect on the number of firearm related deaths per 100,000 individuals which occur in a state's boundaries. Hypothesize 1A predicts that states which have a strong gun culture will experience more firearm related deaths, as the likelihood of dying by a firearm increases when firearms are more prevalent. Hypothesize 1C predicts that states with greater differences in structural characteristics, such as high rates of income inequality, high rates of uninsured individuals, and high rates of diagnosed mental illnesses will experience higher rates of firearm related deaths. In contrast, hypothesis 1B predicts that states with more stringent state firearm laws will experience lower rates of firearm related deaths as stringent firearm laws restrict the availability and accessibility of firearms. These hypotheses were tested using multivariate regression analyses, where evidence was found supporting all three hypothesis, and at least one measure of gun culture, stringency of state firearm legislation, and structural characteristics of states exerted a statistically significant effect on state firearm related deaths per 100,000 individuals.

1. Introduction

It is no secret that the United States is a hot spot for firearm related deaths in the Western World, and the global community at large, ranking second in the world in terms of total firearm deaths in 2016 falling just behind Brazil[20]. Moreover, in 2016 the United States ranked 20th in the world in terms of firearm related deaths per capita, and were the only country with a developed economy who broke the top 20[30]. Interestingly, within the United States, the number of firearm related deaths per capita varies greatly across states, where Massachusetts experiences the fewest firearm related deaths at 3.4 per 100,000 individuals, and Alaska experiences the most firearm related deaths at 23.3 per 100,000 individuals, ranking Alaska 7th highest in the world in terms of firearm related deaths per 100,000 individuals[20]. These jarring statistics raise the question of why the most affluent nation in the world experiences one of the highest rates of firearm related deaths, and why do these rates vary so greatly by state?

In the early years of firearm related death research, it was believed that the strength of a state's gun culture greatly influenced the number of firearm related deaths individuals state's experienced[26, 27]. While a majority of studies found a positive correlation between the strength of a state's gun culture and the firearm related deaths experienced in that state, their independent variables were limited in scope, and this positive correlation has become weaker overtime. As this is the case, current researchers have largely abandoned assessing the relationship between the strength of a state's gun culture and its firearm related deaths. However, gun culture is still a relevant factor in order to determine why firearm related deaths vary so greatly by state, thus, the research presented here attempts to broaden the scope of how gun culture is defined in order to more accurately gauge the relationship between the strength of a state's gun culture and its firearm related deaths.

Many contemporary researchers now fault ease of access to firearms as the crux of the firearm related death epidemic occurring in the United States, citing that the United States is one of only three nations in the world who constitutionally enshrines the right for citizens to own firearms[2, 6, 28, 33]. If this were truly the case, passing legislation which restricts an individual's access to firearms would be a simple low cost solution. While passing such legislation has proved difficult on a federal level, various states have passed stringent firearm laws in attempt to decrease the firearm related deaths experienced within those states. However, research has demonstrated weak correlations between the sheer number of stringent firearm related laws in a state, and the number of firearm related deaths experienced in a state. For example, Illinois has the 8th most stringent firearm laws in the nation while experiencing 11.7 firearm related deaths per 100,000 individuals (the median is 12.9), where Arizona has the 47th most stringent firearm laws in the nation, yet experiences 15.2 firearm related deaths per 100,000 individuals[8]. While the legislative differences between Illinois and Arizona are vast, the number of firearm related deaths per 100,000 individuals each state experienced is within one standard deviation of the mean (the mean is 13.1 firearm related deaths per 100,000 individuals with a standard deviation of 4.8 firearm related deaths per 100,000 individuals).

Clearly, the presence of stringent firearm related legislation is not a silver bullet, again, raising the question of why do firearm related deaths vary by state? As this question is the focus of the study at hand, this study attempts to answer this question in relation to stringency of firearm legislation, by only looking at specific types of state firearm laws which attempt to reduce the availability and accessibility of firearms, such as state universal background check laws and child access prevention laws, rather than looking at the sheer number of firearm related laws a state has on its books.

The United States has demonstrated an increasing concern about the number of firearm related deaths occurring within its borders, particularly in relation to the growing instances of mass shootings. Luckily, analyzing the great variation of firearm related deaths between states provides a better understanding of the factors which can predict the rates at which these deaths occur. This study seeks to be as comprehensive as possible, which is why it sought to measure the relationship between the strength of state gun culture and stringency of state firearm legislation, which is intended to directly reduce the availability or accessibility of firearms, in relation to state firearm related deaths. However, these are not the only two factors which contribute to firearm related deaths. Structural characteristics of states has been included as a third independent variable which could explain the variation of firearm related deaths across states. The structural characteristics of states variable attempts to measure the differences between states in terms of economic inequality, healthcare inequality, and population density, in order to test the relationship between the differences of state structural characteristics and firearm related deaths. It is hypothesized that states with more heterogeneous characteristics will experience more firearm related deaths.

The research here will estimate the effect that the three independent variables of gun culture, stringency of state firearm legislation, and structural characteristics of states have on firearm related deaths by using multivariate and simple regression analyses. Doing so will provide a comprehensive assessment determining why firearm related deaths vary by state, where the results of these regression analyses have shown that at least one measure of each independent variable had the predicted effect on firearm related deaths. Moreover, these effects were found to be statistically significant, and had a substantively moderate to large effect on the dependent variable. All of the subcomponents of the three independent variables will also be assessed in conjunction with each other in a multivariate regression analysis, as well as a multivariate regression analysis solely incorporating the most substantively significant measures of the three independent variables, all of which were found to be statistically significant as well.

Following this introductory section, there will be a review of the extant literature, which will be followed by a theory section presenting the three hypothesis laid out in this study. The studies research design will then be explained in order to present the background information necessary to understand the next section, where the results of the research will be presented and analyzed. The paper will close with a conclusion section summarizing the main findings and their implications, as well as this studies shortcoming and avenues for future research.

2. Literature Review

Firearm related deaths have long plagued the United States of America, and recently have become an influential topic in the country's social and political arenas. Over the past 40 years or so, American's have become increasingly concerned about the prevalence of firearm violence which occurs on their soil, and have been seeking means to understand what is causing firearm violence, and how to prevent it[1]. While the United States as a whole has incredibly high rates of firearm related deaths for a developed nation, on average experiencing 13.1 per 100,000 individuals, there is great variation in how many occur across states. States whose firearm related deaths fall at the high end of the

distribution, such as Alaska and Alabama, experience rates of firearm related deaths which rank 7th highest in the world, experiencing rates similar to Honduras and Brazil[20]. However, states such as Massachusetts and Hawaii experience far fewer firearm related deaths compared to the average American state, placing their firearm related death rate on par with the rest of the developed world[20].

While firearm related deaths vary greatly across states, so does the strength of gun culture. As this is the case, many researchers who addressed the problem of firearm related deaths sought to demonstrate a positive relationship between the strength of a state's gun culture and that state's rate of firearm related deaths[26, 27]. How these researchers measured the strength of gun culture varied from study to study, where some researcher's preferred to define gun culture in quantitative terms (e.g. Geling and Kaplan 1998), such as measuring state gun ownership rates, while others preferred to define gun culture in qualitative terms (e.g. Gastil 1971), such as measuring the "southerness" of a state.

Interestingly, many studies measuring the strength of gun culture across states did demonstrate statistically significant relationships in respect to firearm deaths per capita[26, 27]. However, many of these studies only sought to measure state gun culture through one or two variables. This limited breadth of variables excludes potentially critical aspects of gun culture which must be measured in order to comprehensively understand the relationship between the strength of a state's gun culture and their firearm related death rate. Unfortunately, this early research has been abandoned as the time, effort, and costs associated with qualifying every aspect of gun culture and measuring them were quite high. In order to minimize these transaction costs, while also engaging in a comprehensive scope of the issue, researchers have recently shifted their attention towards measuring the stringency of state firearm legislation in order to effectively predict state firearm related death rates.

The existence of a negative relationship between the stringency of state firearm legislation and state firearm related deaths seems intuitive, yet researchers have not been able to reach a consensus on the nature of this relationship. Macro level national studies have consistently failed to identify any statistically significant effects that the stringency of various state firearm laws had on firearm related deaths where those laws were present[2,28].This confounding trend in the data has prompted researchers to turn their attention towards measuring the effect which specific types of state firearm legislation has on state firearm related deaths, rather than addressing every type of state firearm legislation, some of which do not affect firearm related deaths.

The findings in these smaller scale studies have demonstrated that the existence of specific types of gun laws, such as "shall issue" and "may issue" laws do in fact affect firearm related death rates in the states where those laws are present[28]. However, these relationships have rarely been found to be statistically significant, and thus point to weak causal relationships at best. Most of the studies which have demonstrated a statically significant relationship between state firearm legislation and firearm related deaths have been studies focusing on a single piece of firearm legislation, effecting a single location. A 1991 study undertaken by Loftin and his colleagues spurred this micro level study trend as their research demonstrated a statistically significant negative relationship between legislation which banned handgun ownership in the District of Colombia, and firearm related deaths in the District[6]. However, these finding cannot be generalized as the contingent variables at play are incredibly site specific, and this type of legislation has not been so much as proposed in any other state in the union.

The cumulative effect of the studies attempting to explain why firearm related deaths vary across states has been minimal and inconclusive. Researchers have almost exclusively defined their independent variables to either measure stringency of firearm related legislation, or strength of gun culture, where few studies accounted for these factors simultaneously. As these methods have not proven to be effective in the past, it is time to tackle this topic in a more comprehensive manner by broadening the scope of inquiry. Not only must these two broad independent variables be measured in conjunction with one another, other variables which are not so obviously related to firearm related deaths must also be assessed in order to create a more comprehensive and accurate narrative explaining the variation in firearm related deaths across states.

3. Theory

As previously mentioned, researchers studying the variations in firearm related deaths across states have historically fallen into two camps. The first attempting to explain the variation in firearm related deaths across states through the independent variable of gun culture, and the second camp seeking to explain the variation through the independent variable of differences in the stringency of state firearm legislation. While these competing camps have produced persuasive theories, they have failed to produce a comprehensive approach to demonstrating why firearm related deaths vary across states, which is exemplified by their results. Assuredly, both the strength of state gun culture and stringency of state firearm legislation have some effect on firearm related deaths. However, as few studies have

incorporated both of these explanations, the extent to which each component contributes to firearm related deaths is not well understood. Moreover, a third explanation, being structural characteristics of states, has not been widely recognized in the literature as a variable which could affect state firearm related death rates. This study attempts to incorporate and assess the effects of all three of these explanations in order to determine the individual effect each factor has on predicting firearm related deaths.

3.1 Gun Culture

States which have high gun ownership rates, NRA membership rates, and hunting license ownership rates are here considered to possess a strong gun culture. A strong gun culture indicates that firearms are more plentiful, accessible, and socially acceptable to own and use in comparison to states who experience lower rates across these variables. States where firearms are not plentiful, accessible, and socially acceptable to own and use would experience fewer firearm related deaths, as it minimizes the number of individuals who come into contact with firearms. Basic probability suggests that minimizing the number of individuals who come into contact with firearms minimizes the deadly effects associated with them, as an individual cannot be killed by a firearm if the individual was never in proximity to a firearm. Thus:

Hypothesis 1A: States which possess a weaker gun culture will experience fewer firearm related deaths per 100,000 individuals.

3.2 Firearm Legislation

In recent years, research has shifted away from assessing the effects of gun culture on firearm related deaths, and has rather, assessed the effect which the stringency of state firearm legislation has on state firearm related deaths. A measure called the Brady Score has frequently been used in order to determine the stringency of state firearm legislation. The Brady Score System aggregates the presence of individual pieces of state firearm legislation in order to measure broad categories such as a state's ability to restrict firearm trafficking and assault weapon ownership[7]. A high Brady Score is indicative of a state adopting a large number of firearm related laws in the various categories measured. Past researchers have associated high Brady Scores with low rates of firearm related deaths. However, the score is based on the number of individual firearm laws present in a state, where there is no distinction between laws which were intended to reduce firearm related deaths, and those which were not enacted to serve this function, or do not practically serve this function due to legislative loop-holes[7]. For example, Nevada has promulgated a state law which requires background checks for private firearm sales and transfers, including firearm sales and transfers at gun shows. However, Nevada Attorney General Adam Laxalt has openly stated that Nevada does not enforce this law[3]. Yet, the simple fact that Nevada has this law on its books improves its Brady Score, even though the law has no real world effect on firearm availability or accessibility.

There are countless other state firearm related laws which on paper reduce availability or accessibility of firearms but in practice do neither. Most of these ineffective states laws take the form of prohibitions on certain types of ammunition or firearms. However, these prohibitions are ineffective at reducing firearm related deaths as banned types of ammunition and firearms can be easily substituted with legal types of ammunition and firearms. The fungible nature of ammunition and firearms render these types of state firearm laws ineffective as they do not reduce the availability or accessibility of firearms in the aggregate, and have no effect on the potential lethality which a firearm could inflict.

This being said, these types of laws hold a significant weight in determining a states Brady Score, yet have little real-world effect when it comes to reducing firearm related deaths, skewing the correlation between a state's score and the number of firearm related deaths which they experience. Thus, focus must be placed on state legislation which directly intends to curb the availability and/or accessibility of firearms, and does not possess loop-holes, such as the presence of "may issue" laws and state universal background check laws among others. When these types of laws are present and strict, fewer individuals will be able to possess firearms, particularly in public settings. Lower firearm possession rates in public settings will cause lower rates of firearm related deaths as fewer people will interact with firearms.

Hypothesis 1B: States who have passed more firearm legislation which is directly intended to curb firearm availability and/or accessibility, absent of loop-holes, will experience fewer firearm related deaths per 100,000 individuals.

3.3 Structural Characteristics of States

The debate around reducing firearm related deaths has largely ignored the differing structural characteristics of states, which are potentially necessary pieces to solve this puzzle. State variation in income inequality, healthcare inequality, and population density creates differing social conditions which residents live in. The social conditions created by high rates of income and healthcare inequality, and low rates of population density, are likely to produce higher rates of firearm related deaths.

3.3.1 income inequality

High rates of income inequality in a state produces a large number of individuals living below or close to the poverty line. Impoverished communities tend to see higher rates of crime, thus, residents of those communities are likely to have their safety threatened more often, and are likely to perceive their safety as being threatened more often. Individuals who feel threatened may seek means of protecting themselves. As firearms are quite accessible in the United States, one would expect individuals whose safety is, or is perceived to be, under threat to possesses firearms at higher rates in order to protect themselves. Similarly, one would expect individuals who are committing crimes to possess firearms at higher rates, as the nature of committing crime increases the probability of one's safety being threatened by police, the victim, or bystanders. The shear presence of a larger number of firearms in a community increases the likelihood of firearm related deaths occurring in that community. Moreover, individuals who perceive their safety to be under threat are more likely to possess a firearm when leaving the house in order to feel safe, and are more likely to use a firearm upon a potential threat to their physical or financial safety.

3.3.2 healthcare inequality

States which experience high rates of healthcare inequality are likely to have a higher number of individuals with physical or mental illnesses which go untreated. Individuals with untreated physical and mental illnesses are disproportionally unemployed, as they are less likely to be physically and mentally capable of holding a job. Unemployed individuals are likely to find alternative means of generating income, such as under the table work or criminal activity. Neither of these income generating activities present legal means of solving disputes for those involved, making it unclear of how to solve disputes when they arise, and making it more difficult to solve disputes amicably. The ambiguous nature of how to solve these disputes causes remediation efforts to seem hopeless. When individuals perceive a dispute to be unsolvable and permanent through conventional means, they may seek drastic means of solving the issue, which tend to involve violence. This effect may be compounded when individuals suffer from mental health issues, as they are less capable of thinking rationally. When rates of violence increase, rates of firearm use also increases, bolstering the likelihood of firearm related deaths occurring.

3.3.3 population density

Low population density rates create smaller communities. In smaller communities, individuals are more likely to personally know a larger proportion of their community. When disputes arise, a larger proportion of these disputes will involve individuals who personally know each other. A majority of firearm deaths are perpetrated by an individual who has a personal relationship with the victim. Thus, disputes between individuals who personally know each other are more likely to result in a firearm related death, and these disputes are more likely to occur in smaller communities[21]. Moreover, the actions of one individual in a smaller community disproportionately effects community dynamics, as they have a statistically larger share of community influence. This causes disputes to receive more community wide attention and engagement in smaller communities. For example, a dispute between two individuals in a community of 100 people is likely to receive more community wide attention, and have a stronger effect on community dynamics, compared to a dispute between two individuals in a community of one million people. This is because the individuals involved in the former case make up 2% of the community population, but only 0.0002% of the community population in the latter case.

When disputes receive more community wide attention, community members are more likely to possess and express their sentiments in regard to the dispute, often causing the community to choose a de facto winner and loser. Those who lose in the eyes of the community receive negative community wide attention, and may be socially out cast by their community. Individuals who lack social relationships, suffer in the quality of their social relationships, or suffer

significant social stigmatism, are more likely to develop mental health symptoms such as depression and anxiety. Those who experience depression, anxiety, and other forms of mental health symptoms are likely to seek drastic means of solving the social dispute which subsequently led them to be out-cast by their community. These drastic means of solving social disputes increases the likelihood of violence occurring, as extreme and radical solutions to problems frequently involve violence. Increased levels of violence increase the probability of a firearm related death occurring, whether it was accidental, purposeful (homicide), or self-imposed (suicide).

Hypothesis 1C: States with high rates of income and health care inequality, and low rates of population density, will experience social conditions which make firearm related deaths per 100,000 individuals more likely to occur.

4. Research Design

4.1 Section I: Overall Research Strategy

In order to test the aforementioned theories, a quantitative correlational study using regression analyses will be undertaken. The concepts will be measured quantitatively as there are many subjects to observe, and they will be assessed through a correlational study as we seek to compare various observable properties between the many subjects. A regression analysis is suitable for this purpose as it is the ideal tool to disentangle the effect that multiple independent variables, and their components, have on the dependent variable.

For the purposes of this study, the unit of analysis, or subject, is a state, which encompasses all 50 US states and the District of Colombia. The District of Colombia is not a formal state, but for the purposes of this study, functions the same as a state. The purpose for using states as the unit of analysis is that the term state, for this study, refers to a geographic area with clearly defined borders, sovereignty to pass firearm legislation which is exclusively applied within those borders, and possess the ability to keep records on the firearm related deaths which occur within those borders. The District of Colombia fits these three categories as the district is defined by clear borders, where firearm legislation which is exclusively applicable in the district can be enacted, and records are kept for the firearm related deaths which occur within its borders.

4.2 Section II: Observing and Operationalizing Concepts

The dependent variable being assessed is state firearm related deaths. *Firearm related deaths* refers to the number of individuals whose death was directly caused by a firearm, per 100,000 individuals within a prescribed boundary. Firearm related deaths is measured by aggregating firearm homicides, firearm suicides, and accidental deaths which were caused by a firearm. Homicides, suicides and accidental deaths are the only three ways in which a firearm could have a fatal effect on an individual. This being said, this study does not attempt to distinguish between these three types of firearm related deaths, as all three types produce the same outcome. Each of these three types of firearm related deaths will be combined under the broader category of firearm related deaths, which is the phenomenon of interest in this study.

As previously mentioned, three independent variables have been identified for this study. They are gun culture, stringency of state firearm legislation, and structural characteristics of states. These variables are conceptually defined below.

4.2.1 independent variable one: gun culture

Gun culture is the measure of how plentiful, accessible, and socially acceptable the ownership and use of firearms are. The term plentiful refers to a relatively large number of firearms per capita, firearm accessibility refers to the capacity of individuals to use and possess firearms, and the term socially acceptable refers to a population's general acceptance of the use and possession of firearms in both private and public settings. When firearms are plentiful, accessible, and socially acceptable to own and use, gun culture is said to be strong. Groups of individuals who interact with firearms frequently establish societal norms and values associated with firearms. The norms and values associated with firearms demonstrates in what capacity it is socially acceptable for individuals of that group to interact with firearms, creating a culture around firearms.

Gun culture will be measured by observing (1) hunting license ownership rates, (2) the number of NRA (National Rifle Association) field representatives per one million state residents, and (3) the percentage of state residents who own one or more firearms. All of these factors can validly be aggregated to measure the independent variable of gun culture. This is the case as those who possess a hunting license are likely to possess firearms and use firearms more often than the average individual. However, the hunting license ownership rate variable is not measuring the percentage of state residents who own hunting licenses. Rather, it measures the number of individuals who own a hunting license which is valid in that state, divided by the state's population. This is the case as individuals must obtain a hunting license for every state they wish to hunt in, thus, individuals frequently own hunting licenses for a state which they do not actually live in themselves. Measuring gun culture through this metric is valid as high rates of hunting license ownership for a state demonstrates that hunting is a strong part of that states culture, even if some of the individuals who own a hunting license for that state do not live there. Moreover, most hunting scenarios promote the use of a firearm, thus hunting license ownership rates demonstrate which states have the most individuals using firearms to hunt in comparison to their population. The same logic follows for gun ownership, as high rates of gun ownership measures gun culture by reflecting how plentiful, accessible, and socially acceptable it is to use and possess firearms.

When NRA field representative rates are high, it is likely that more individuals in the state are NRA members. NRA members are more likely to own a firearm compared to an average individual, as that is the crux of NRA membership, and thus, reflects how plentiful, accessible, and socially acceptable firearm usage and possession is in a given state.

4.2.2 independent variable two: *stringency of state firearm legislation*

Stringency of state firearm legislation refers to the presence of firearm laws that a state has enacted and subsequently enforces, which directly curtail the availability or accessibility of firearms for state residents. As previously mentioned, state firearm legislation which does not directly curtail the availability or accessibility of firearms, due to the presence of loop-holes which circumvent the laws effectiveness at reducing availability or accessibility, are not included in this measure. Firearm availability refers to the *ability* to obtain a firearm, whereas firearm accessibility refers to the *capacity* to use and possess a firearm. These terms are distinct from each other as in a certain state, an individual may have the ability to obtain a firearm, but may not have the capacity to use or possess that firearm under certain circumstances proscribed by state laws. Additionally, the variation of state laws which attempt to curtail, or promote, the ability to obtain a firearm and the capacity to use and possess a firearm vary greatly, causing availability and accessibility to also vary greatly across states.

The independent variable, stringency of state firearm legislation, will be measured by (1) the presence of shall issue, may issue, or de facto no issue laws (in reference to the ability to obtain a concealed carry permit) (2) the extent to which the boyfriend loop-hole has been closed, (3) presence of a universal background check system, (4) presence of the child access prevention law, and (5) the extent to which state laws restrict or prohibit the open carry of firearms.

4.2.3 independent variable three: structural characteristics of states.

The structural characteristics of states refers to the variation in the underlying social conditions which states experience and operate in. There are several factors which affect the underlying social conditions of a state, which are referred to as structural characteristics. Structural characteristics include, but are not exclusive to, a state's level of economic inequality, healthcare inequality, and its population density.

4.3. Section III: Description

4.3.1 dependent variable: firearm related deaths per 100,000 individuals

The median US state experiences 12.9 firearm related deaths per 100,000 individuals (Ohio). The most deadly state to live in is Alaska, which experiences 23.3 firearm related deaths per 100,000 individuals, and the safest state to live in is Massachusetts, which experiences 3.4 firearm related deaths per 100,000 individuals. The data varied significantly, with a range of 19.9 firearm related deaths per 100,000 individuals, and had no outliers.

4.3.2 independent variable one: gun culture

The components of the variable gun culture presented several key statistics which must be analyzed. The first measure of the gun culture independent variable was gun ownership rates, where the median and mean values were almost identical. The median value was 32.2% (Kansas) and the mean was 32.5%, demonstrating a normal distribution whose range was 56.5%.

The hunting license ownership measure had a median value of 13.7% (Kentucky), where the mean value was 18.9%, which roughly fell between the hunting license ownership rates of Pennsylvania (18.5%) and Iowa (19.1%). The discrepancies in these two measures of central tendency are due to outliers on the upper bounds of the distribution. Montana (91%), North Dakota (68.5%) and Idaho (65.5%) all fall outside of two standard deviations from the mean, demonstrating that they are incredibly conducive to hunting, where many non-state residents visit these states to hunt.

The NRA representatives per one million resident's component also had three states (Alaska, Vermont, and Wyoming) which skewed the upper ends of this measures distribution, leading it to be non-normal. The upper bound outliers for both the hunting license ownership rate measure and NRA field representative's measure demonstrate that there are several states where gun culture is incredibly strong, while most other states experience roughly the same strength of gun culture. Figures 1 and 2 below depict the distribution of hunting license ownership rates and NRA field representative per one million state residents. The distribution for gun ownership rates was normal and was thus omitted from depiction. The full summary statistics for all three measures are shown in Table 1: Gun Culture Summary Statics below.

Table 1. Gun Culture Summary Statistics

Variables	Mean	Max	Min	Median	STD
Firearm Related Deaths per 100,000 Individuals	13.07	23.30	3.40	12.90	4.88
Hunting License Ownership Rate	18.8%	91.1%	0%	14%	19.1%
NRA Reps per One Million Residents	0.47	2.71	0	0.24	0.53
Gun Ownership Rate	32.6%	61.7%	5.2%	32%	13.7%

Notes: Shown above are the mean, maximum, minimum, median and standard deviation values for each component of the independent variable of gun culture and the dependent variable of firearm related deaths per 100,000 Individuals.

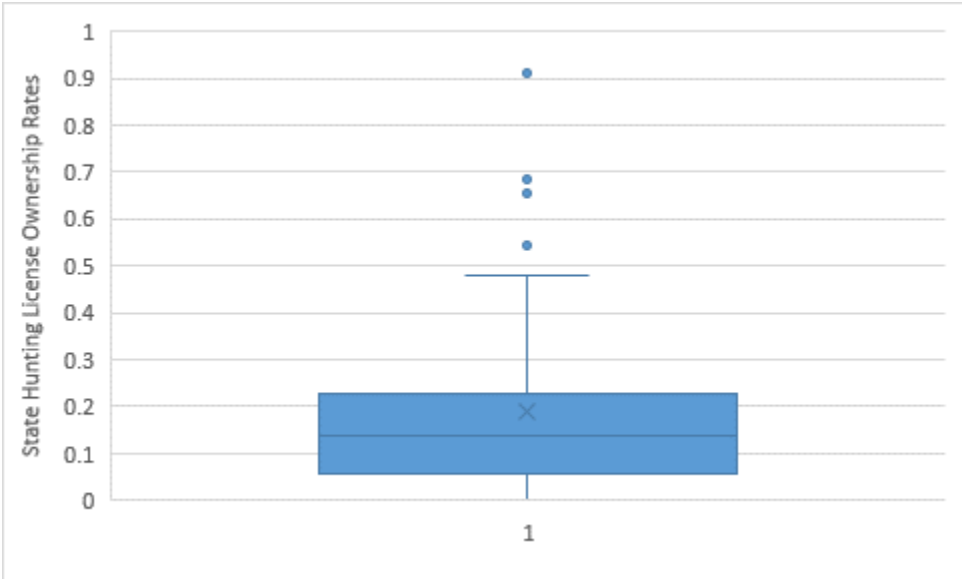

Figure 1. State Hunting License Ownership Rates

Notes: Figure 1 depicts the measure of central tendency, distribution, and variation of the data measuring hunting license ownership rates.

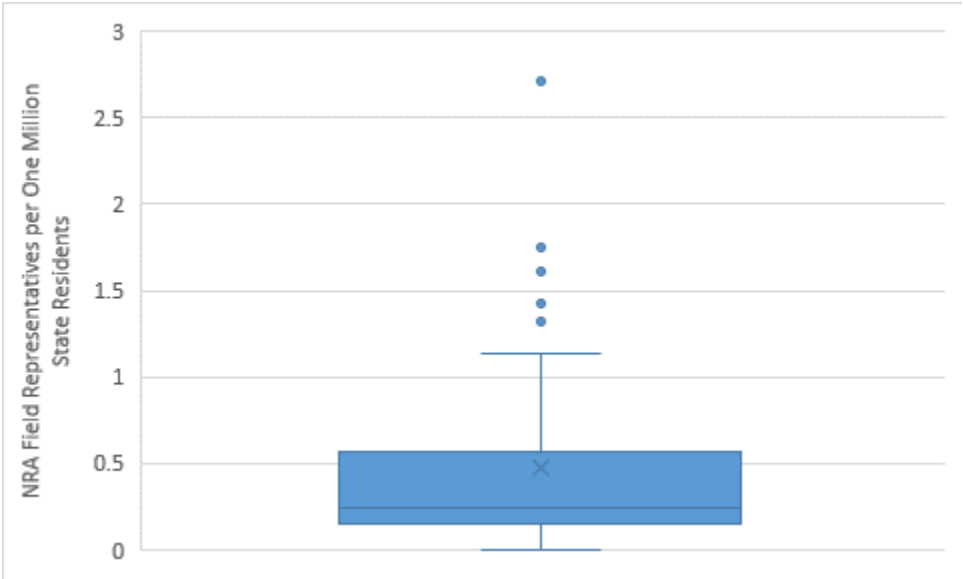

Figure 2. NRA Field Representatives per One Million State Residents

Notes: Figure 2 depicts the measure of central tendency, distribution, and variation of the data measuring NRA field representatives per one million state residents.

4.3.3 independent variable two: stringency of state firearm legislation

The first measure of the independent variable stringency of state firearm legislation is the boyfriend loop-hole score, which is measured on a scale of 0-3. A score of 0 represents that a state has not closed the loop-hole in anyway and a score of 3 represents that a state has fully closed the loophole. A score of 1 indicates that a state has taken one of the three steps to close the loop-hole, and a score of 2 indicates that a state has taken two of the three steps to close the loop-hole. All of the steps are weighted equally, thus, two states which both receive a boyfriend loop-hole score of 1 may have enacted differing steps, though they each have enacted one step to close the loop-hole, which is the point of concern. To fully close the loophole, a state must have enacted legislation which (1) prohibits convicted domestic abusers from purchasing or possessing firearms or ammunition (2) compels convicted domestic abusers to surrender their firearms and ammunition and (3) places convicted domestic abusers on the NICS database. Four states have fully closed the loophole, 22 states have taken no means to close the loop-hole, and 25 states have taken some means (taking one or two steps) to close the loop-hole. The average score across the subjects was a score of 0.94, showing that a majority of states have either not taken any steps to close the loop-hole or have only taken one of the three steps. Figure 3: Boyfriend Loop-Hole Score below depicts the distribution of the data.

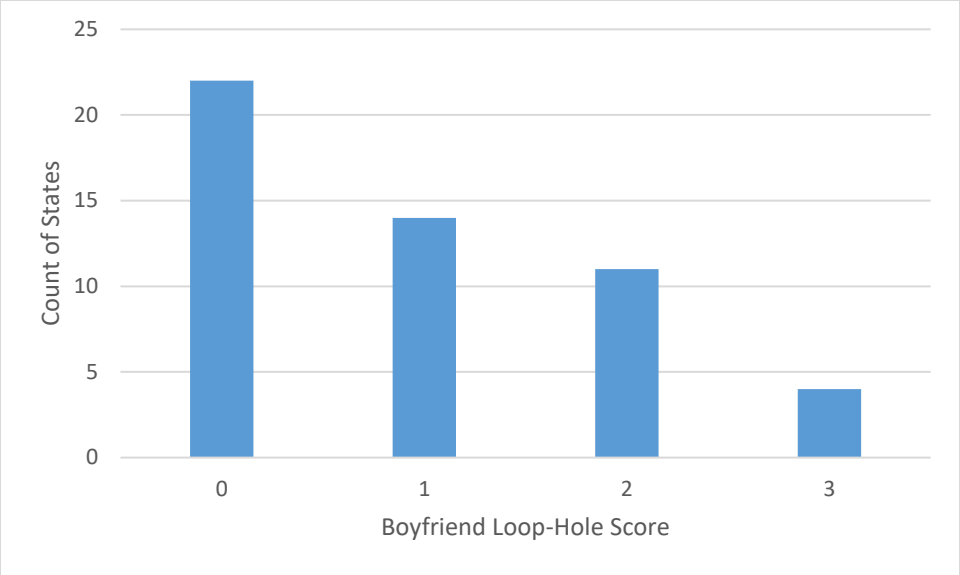

Figure 3. Boyfriend Loop-Hole Score

Notes: Figure 3 depicts the frequency of states receiving a boyfriend loop-hole score ranging from 0 (weakest) to 3 (strongest).

The concealed carry permit score was also measured on a scale where scores range from 0-3, where a higher score demonstrates that it is more difficult to obtain a concealed carry permit. A score of 0 demonstrates that there are no state specific requirements to obtain a concealed carry permit, and a score of 1 demonstrates that any individual who meets the legal criteria to obtain it must be issued one. A score of 2 demonstrates that any individual who meets the legal criteria to obtain a permit can be issued one, though the issuing official is afforded limited discretion to deny an individual a permit based on non-legal criteria, where a score of 3 affords the issuing official broad discretion to deny a permit based on non-legal criteria. The mean for this component was 1.41, demonstrating that the average observation requires adhering to specific state requirements in order to obtain the permit, but there may or may not be limited discretion in the issuance of that permit. The distribution for this measure is depicted in Figure 4: Concealed Carry Permit Score below.

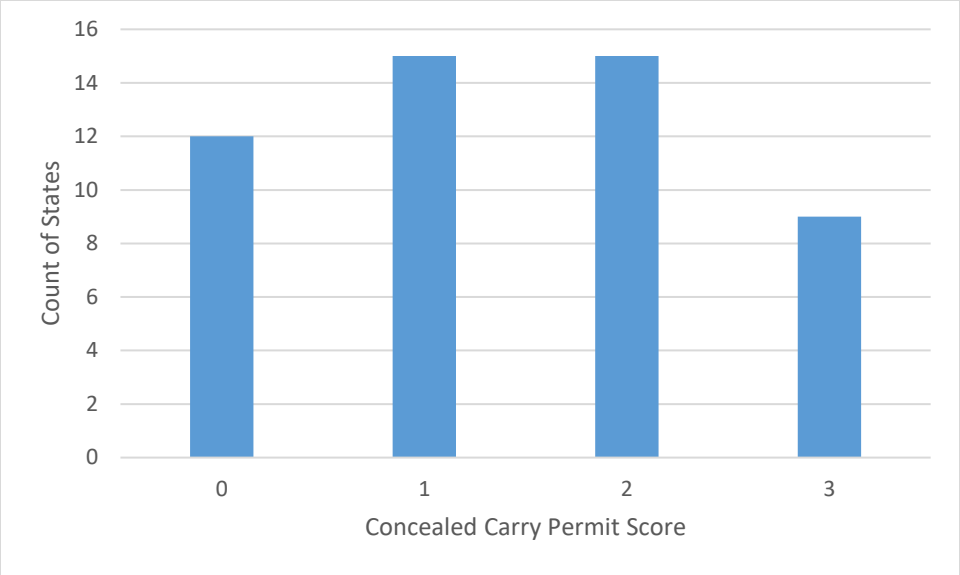

Figure 4. Concealed Carry Permit Score

Notes: Figure 4 depicts the frequency of states receiving a concealed carry permit score ranging from 0 (weakest) to 3 (strongest).

The last three measures of stringency of state firearm legislation were all measured using dummy variables, where a 1 indicates the presence of the legislation under question and a 0 indicates that a state has not passed the legislation under question. The measures of central tendency for these types of legislation all hovered around 50%, indicating that roughly 50% of states have passed such legislation. The three components under question are universal background check laws (mean of 41.2%), child access prevention laws (mean of 54.9%) and open carry license laws (mean of 51%). Summary statistics for all five measures of stringency of state firearm legislation are depicted below in Table 2: Stringency of State Firearm Legislation, where the three measures using a dummy variable are presented as percentages.

Table 2: Stringency of State Firearm Legislation

Variables	Mean	Max	Min	Median	STD
Firearm Related Deaths Per 100,000 Individuals	13.07	23.30	3.40	12.90	4.88
Boyfriend Loop-Hole Score	0.94	3.00	0.00	1.00	0.99
Universal Background Check Dummy	41.2%	100%	0%	0%	50%
Concealed Carry Permitting Score	1.41	3.00	0.00	1.00	1.04
Child Access Prevention Law Dummy	54.9%	100%	0%	100%	50%
Open Carry Licensing Law Dummy	51%	100%	0%	100%	50%

Notes: Shown above are the mean, maximum, minimum, median, and standard deviation values for each component of stringency of state firearm legislation and the dependent variable of firearm related deaths per 100,000 individuals.

4.3.4. independent variable three: structural characteristics of states

The structural characteristics of states was divided into three main categories being, (1) economic inequality, (2) healthcare inequality, and (3) population density. Each of these categories and respective measures will be discussed in individual sections for organizational purposes.

4.3.5 economic inequality

Three different measures were considered when attempting to measure the variation in economic inequality across the 50 states and DC. These measures were (1) income inequality as measured by the Gini coefficient, (2) unemployment rates and (3) violent crimes per 100,000 state residents.

The Gini coefficient was used in order to measure income inequality, where values range between 0 and 1. A score of 0 demonstrates that a subject has no income inequality and a score of 1 represents that a subject has maximum income inequality. The mean value across subjects was .463, which compared to Gini coefficient values by country, puts the typical observation in the mid to higher end of the global distribution[22]. The data measuring unemployment rates was distributed close to the mean (3.7%), where a majority of states experienced unemployment rates between 2.9% and 4.5%. These statistics represent that in general, one would not experience a drastic change in unemployment upon moving from one state to another.

The third measure of economic inequality, violent crimes per 100,000 state residents, experienced a considerable amount of variation. If one was to move from New Hampshire (lowest violent crime rate) to DC (highest violent crime rate), they would experience 4,298 more violent crimes per 100,000 state residents. This is quite high when taking into account that the mean value was 2,895 violent crimes per 100,000 state residents. It also must be noted that DC was an outlier in all three of these measures, demonstrating that DC has vast economic inequality issues. The summary statistics for each measure can be found in Table 3: Structural Characteristics of States at the end of this section, and are displayed visually in Figures 5-8 below, where DC is the outlying subject in each figure.

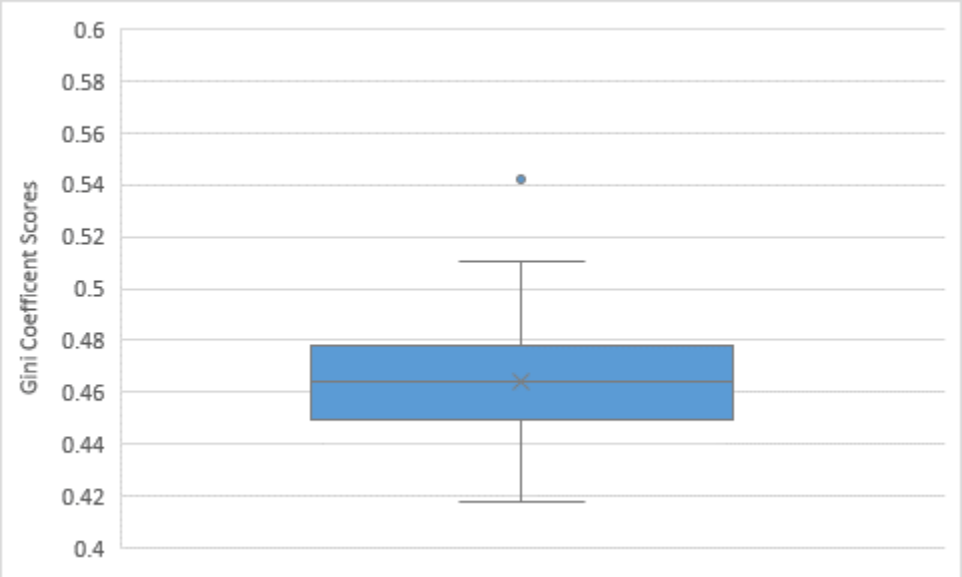

Figure 5. Gini Coefficient Scores

Notes: Figure 5 depicts the measures of central tendency, distribution, and variation of the data measuring Gini coefficient scores.

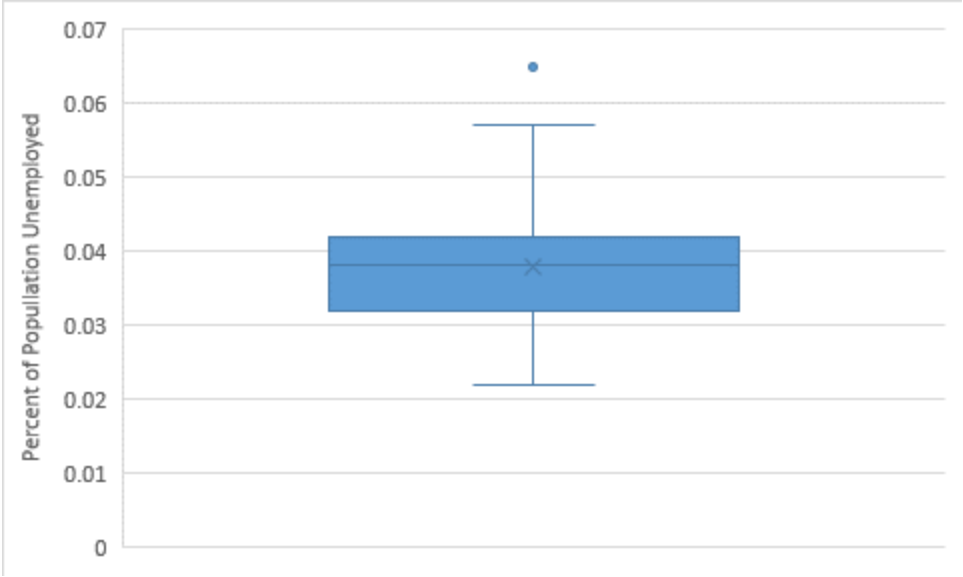

Figure 6. Unemployment Rates

Notes: Figure 6 depicts the measure of central tendency, distribution, and variation of the data measuring unemployment rates.

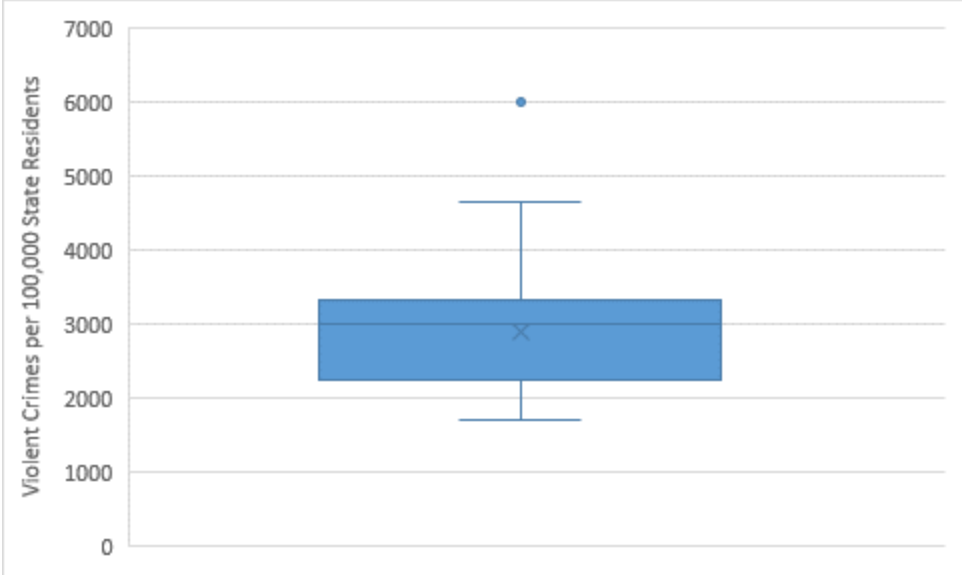

Figure 7. Violent Crimes Committed per 100,000 State Residents

Notes: Figure 7 depicts the measure of central tendency, distribution, and variation of the data measuring violent crimes committed per 100,000 state residents.

4.3.6 healthcare inequality

Healthcare Inequality incorporated three measurements, being (1) uninsured rates (2) Medicaid expansion and (3) mental health prevalence. The summary statistics for these components are shown in Table 3: Structural Characteristics of States at the end of this section.

The percentage of a state's population who did not possess healthcare insurance ranged from 5% (various states) to 15% (Texas). This range articulates that there was not a great amount of variation between the subjects. Moreover,

the median value of 8% (various states) was close to the mean value of 8.2%, articulating that the subjects were distributed normally. A lack of variation and the presence of a normal distribution was also found in the mental health prevalence measure. The Medicaid expansion measure was set up as a dummy variable where a value of 0 represented that a state did not expand Medicaid and a value of 1 represented that a state did expand Medicaid. The mean value was 66.7%, demonstrating that two thirds of the subjects expanded Medicaid. Additionally, none of these datasets possessed outliers.

4.3.7 population density

The subjects for population density demonstrated a considerable amount of variability, as the maximum population density was 11,534 individuals per square mile (DC) and the minimum population density was 1.29 individuals per square mile (Alaska). However, the distribution was skewed as five states were outliers at the upper bounds of the distribution, where DC and New Jersey were strong outliers falling five standard deviation above the mean. These outliers severely skewed the data, exemplified by the discrepancies between the median value of 108 individuals per square mile and mean value of 650 individuals per square mile, where one standard deviation from the mean was 2,210 individuals per square mile. The summary statistics for this measure are shown in Table 3: Structural Characteristics of States below and visually depicted in Figure 8: Population Density below.

Table 3. Structural Characteristics of States

Variables	Mean	Max	Min	Median	STD
Firearm Related Deaths per 100,000 Individuals	13.07	23.30	3.40	12.90	4.88
Income Inequality	0.46	0.54	0.42	0.46	0.02
Unemployment Rate	4.6%	6.5%	2.2%	4%	0.8%
Violent Crime per 100,000 State Residents	2,895	6,007	1,709	2,998	818
Uninsured Rate	8.3%	15%	5%	8%	2.6%
Medicaid Expansion Dummy	66.7%	100%	0%	100%	48%
Mental Health Prevalence	18.9%	22.7%	16%	19%	1.6%
Population Density	650	11,534	1.29	108	2,210

Notes: Shown above are the mean, maximum, minimum, median, and standard deviation values for each component of structural characteristics of states and the dependent variable of firearm related deaths per 100,000 individuals.

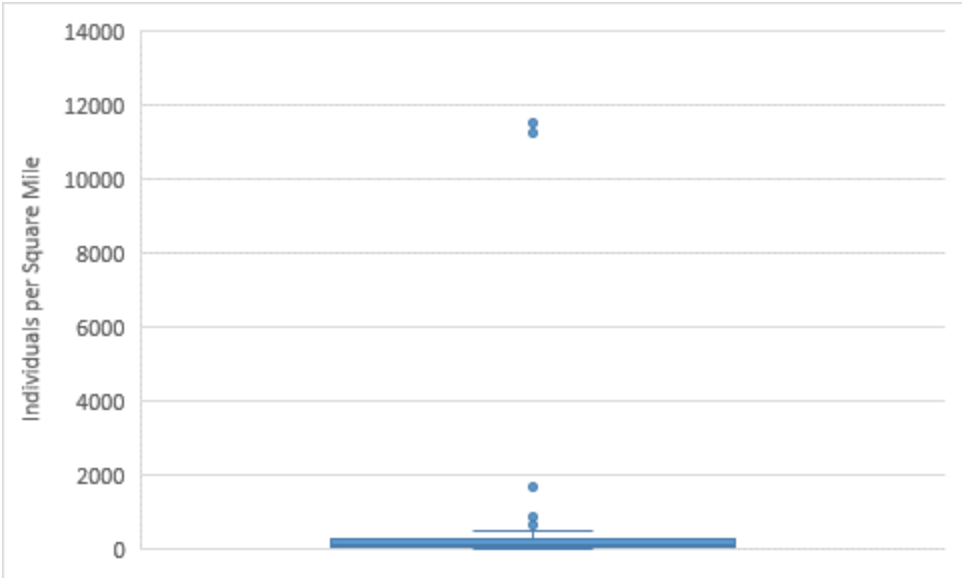

Figure 8. Population Density

Notes: Figure 8 depicts the measure of central tendency, distribution, and variation of the data measuring population density.

5. Analysis

5.1 Analysis 1: Gun Culture Variable

This section starts with a discussion about the multivariate regression analysis which included all three of the measures of gun culture (hunting license ownership rates, gun ownership rates and NRA representatives per one million state residents). A multivariate regressions analysis is necessary in order to view how these variables interacted with each other. Next, bivariate regressions will be discussed in order to demonstrate the specific effects each subcomponent had on the dependent variable. It is necessary to undertake bivariate regression analyses in order to disentangle the effects which hunting license ownership rates, NRA field representatives per one million state residents, and gun ownership rates had on firearm related deaths per 100,000 individuals. The full statistics generated by these bivariate (Models 1-3) and multivariate (Model 4) regression analyses can be found in Table 4: Gun Culture Bivariate and Multivariate Regression Results below.

Table 4. Gun Culture Bivariate and Multivariate Regression Results

Variables	Model 1	Model 2	Model 3	Model 4
Hunting License Ownership	8.33 (3.45)			-2.11 (3.5)
NRA Field Reps		1.67 (1.29)		0.22 (1.12)
Gun Ownership			24.27 (3.7)	25.65 (4.5)
Intercept	11.5 (0.92)	12.28 (0.91)	5.15 (1.31)	4.99 (1.37)

Notes: Table 4 shows the coefficient and intercept values for each measure in their isolated bivariate regressions (Models 1-3), and in a comprehensive multivariate regression (Model 4), with standard error values in parenthesis.

The effect of hunting license ownership rates is negative and reduces firearm related deaths, which was not expected. The multivariate regression results show that a one unit shift (100% increase), or roughly a shift from DC (0% hunting license ownership) to Montana (91% hunting license ownership), results in a decrease in firearm related deaths by 2.11 deaths per 100,000 individuals. This result is not substantively significant as the largest possible shift in subjects reduces firearm related deaths by 2.11 individuals, which is roughly half the value of one standard deviation. Though these results were not substantively or statistically significant, they were confounding. The unpredicted negative relationship is due to the hunting license measure being highly correlated with the gun ownership measure, which the model was unable to disentangle. When isolating hunting license ownership rates to deal with this issue, the coefficient became positive, statistically significant and substantively significant. In isolation, a one unit shift (100% increase), or roughly a shift from DC (0%) to Montana (91%), results in an additional 8.33 firearm related deaths per 100,000 individuals, which is depicted in Model 1 of Table 4: Gun Culture Bivariate and Multivariate Regression Results above.

The NRA field representatives per one million state residents had little substantive effect, and no statistically significant effect on the number of firearm related deaths per 100,000 individuals in the multivariate regression analysis and bivariate regression analysis. Though, both regression results demonstrated a positive relationship between NRA field representatives per one million residents and the dependent variable which was consistent with the prediction made in hypothesis 1A. The bivariate regression results for NRA field representatives per one million can be found in Model 2 of Table 4: Gun Culture Bivariate and Multivariate Regression Results located above.

The multivariate regression analysis demonstrated that gun ownership rates have a positive relationship with the dependent variable, and produces both substantively and statistically significant results, as predicted. Substantively, a half unit shift (50% increase), or moving from Delaware (5% gun ownership) to West Virginia (54% gun ownership) would result in an increase of 12.5 firearm related deaths per 100,000 individuals. This is a significant coefficient value as the median value for the dependent variable was 12.9 firearm related deaths per 100,000 individuals represented by Ohio. Thus, half a unit shift in either direction from the median state of Ohio would result in Ohio either experiencing the least amount of firearm related deaths (downwards shift), or the most firearm related deaths (upward shift). When isolated in a bivariate regression, gun ownership rates remained positively correlated with the dependent variable, remained statistically significant, and did not have a substantial difference in its coefficient value. The bivariate regression results for gun ownership rates are depicted in Model 3 of Table 4: Gun Culture Bivariate and Multivariate Regression Results above.

5.2 Analysis 2: Stringency of State Firearm Legislation Variable

The multivariate regression analysis measuring stringency of state firearm legislation presented one substantively and statistically significant measure, which was that of universal background checks. Moving from a state with a universal background check system, to a state which does not have a universal background check system, would result in an additional 4.28 firearm related deaths per 100,000 individuals. Isolating this measure in a bivariate regression caused its effect on the dependent variable to increase, where the aforementioned scenario would then cause an additional 5.28 firearm related deaths per 100,000 individuals to occur.

The other four measures of stringency of state firearm legislation did not have a statistically significant, or substantively significant effect on the dependent variable when incorporated into the multivariate regression. Isolating these components in bivariate regression analyses caused each measure to gain substantive significance, and caused all measures expect child access prevention laws to become statistically significant. The reason for the discrepancies between the results of the two types of regression analyses was most likely due to the fact that the laws themselves are highly correlated, meaning that the presence of any one of these laws in a given state makes it more likely that the same state has also adopted a combination of the other four laws. For this reason, the multivariate regression analysis was unable to distinguish between their individual effects, and credited the relationship to the strongest measure, being universal background checks. Table 5: Stringency of State Firearm Legislation Bivariate and Multivariate Regression Analysis Results below depicts the statistics for the bivariate regression analyses for stringency of state firearm legislation (Models 1-5) and the multivariate regression analysis (Model 6).

Table 5. Stringency of State Firearm Legislation Bivariate and Multivariate Regression Analysis Results

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Boyfriend Loop-Hole Score	-2.54 (0.6)					-0.96 (0.72)
Universal Background Checks		-5.85 (1.13)				-4.28 (1.4)
Concealed Carry Permit Score			-2.28 (0.58)			-0.23 (0.75)
Child Access Prevention Laws				-2.57 (1.34)		-0.51 (1.24)
Open Carry Laws					-3.43 (1.29)	-1.32 (1.39)
Intercept	15.46 (0.82)	15.48 (0.72)	16.29 (1.02)	14.48 (0.99)	14.82 (0.92)	17.01 (0.98)

Notes: Table 5 shows the coefficient and intercept values for each measure of stringency of state firearm legislation in their isolated bivariate regressions (Models 1-5), and in the comprehensive multivariate regression (Model 6), with standard error values in parenthesis.

5.3 Analysis 3: Structural Characteristics of States Variable

The multivariate regression analysis for the independent variable structural characteristics of states resulted in three measures being statistically significant, which were the unemployment rate, the violent crime rate, and the Medicaid expansion dummy. However, the only measure out of the three that had a large effect was unemployment, where a one unit shift (0% to 100%) resulted in an increase of 208.62 firearm related deaths per 100,000 individuals. To put this in substantive terms, a 4% shift (1/25th of a shift), or a shift from the state with the lowest unemployment rate, (Hawaii 2.2%) to the state with the highest unemployment rate (Alaska 6.5%) would result in the occurrence of an additional 8.3 firearm related deaths per 100,000 individuals. The Gini coefficient measure was the only measure which had an unexpected relationship with firearm related deaths. The nature of the relationship was negative, meaning that when income inequality grew firearm deaths per 100,000 individuals shrunk. This is a puzzling finding as one would expect a state with larger class differences to have more firearm deaths per capita. Table 6: Structural Characteristics of States Multivariate Regression Analysis Results depicts the statistics for each measure when incorporated into a multivariate regression analysis.

Table 6. Structural Characteristics of States Multivariate Regression Analysis Results

Variables	Model 1
Gini Coefficient	-42.19 (26.22)
Unemployment Rate	208.62 (76.94)
Violent Crime Rate per 100,000 State Residents	0.002 (0.0007)
Uninsured Rate	31.14 (26.31)
Medicaid Expansion Dummy	-2.69 (1.31)
Mental Health Prevalence	34.64 (31.99)
Population Density	-0.0004 (0.0002)
Intercept	11.23 (13.76)

Notes: Table 6 shows the coefficient and intercept values for each measure of structural characteristics of states when incorporated into a multivariate regression analysis with standard error values in parenthesis.

There are three categories which the different measures of structural characteristics of states fall into being economic inequality (Gini Coefficient, unemployment rate, and violent crimes), healthcare inequality (uninsured rate, Medicaid expansion dummy, and mental health prevalence) and population density. A multivariate regression analysis will be tested with all of the measures, for each category, as well as bivariate regressions for each measure to show their individual effects on firearm related deaths.

5.3.1 economic inequality

The multivariate regression analysis for economic inequality resulted in all three measures being statistically significant. The measures for the unemployment rate and the Gini coefficient also have substantively significant values, demonstrating that these two forces are the main drivers behind the type of economic inequality which effects firearm related deaths. However, the Gini Coefficient has a negative relationship with the dependent variable, which was unexpected. Further isolating these measures in bivariate regression analyses resulted in each measures relationship with the dependent variable, substantive significance, and statistical significance to look similar to the results presented in Table 6: Structural Characteristics of States Multivariate Regression Analysis, located above. Table 7: Economic Inequality Bivariate and Multivariate Regression Analysis Results below shows the results of the economic inequality multivariate and bivariate regression analyses.

Table 7. Economic Inequality Bivariate and Multivariate Regression Analysis Results

Variables	Model 1	Model 2	Model 3	Model 4
Gini Coefficient	-18.18 (31.5)			-75.49 (27.39)
Unemployment Rate		224.69 (76.77)		165.75 (77.18)
Violent Crime Rate			0.003 (0.000)	0.002 (0.0007)
Intercept	21.5 (14.63)	4.56 (2.98)	4.08 (2.18)	33.25 (11.87)

Notes: Table 7 shows the coefficient and intercept values for each measure in their isolated bivariate regressions (Models 1-3), and in a comprehensive multivariate regression (Model 4), with standard error values in parenthesis.

5.3.2 healthcare inequality

The multivariate regression analysis results for healthcare inequality were not much different than the results of the bivariate regression analyses isolating each measure, particularly in regards to the uninsured rate measure, which remained statistically and substantively significant with nearly the same values for each respective categories. This measure also had the strongest effect on firearm related deaths per 100,000 individuals. This being said, uninsured individuals seem to be the driving force in the healthcare inequality category which is influencing the number of firearm related deaths occurring in a state. However, the uninsured rate measure was neither substantively nor statistically significant in the Structural Characteristics of States Multivariate Regression Analysis Results (results in Table 6). The analysis was not able to distinguish between the uninsured rate and the Medicaid expansion measure, as these measures are highly correlated, and allocated the effect of the uninsured rate to Medicaid expansion. When this problem arose in the Healthcare Inequality Multivariate Regression analysis, the opposite effect was observed. However, it is clear that the uninsured individuals measure is the influencing factor here as it had the most substantively significant effect when isolated. Table 8: Healthcare Inequality Bivariate and Multivariate Regression Analyses Results below shows the results of these regressions.

Table 8. Healthcare Inequality Bivariate and Multivariate Regression Analyses Results

Variables	Model 1	Model 2	Model 3	Model 4
Uninsured Rate	102.66 (22.93)			100.13 (25.83)
Medicaid Expansion		-3.37 (1.38)		-0.88 (1.38)
Mental Health Prevalence			57. 29 (24.86)	78.28 (35.91)
Intercept	4.59 (1.98)	15.32 (1.13)	2.27 (8.11)	-9.37 (7.46)

Notes: Table 8 shows the coefficient and intercept values for each measure in their isolated bivariate regressions (Models 1-3), and in the comprehensive multivariate regression (Model 4), with standard error values in parenthesis.

5.3.3 population density

The results from the bivariate regression analysis measuring population density did not change its negligible effect which was also demonstrated in the Structural Characteristics of States Multivariate Regression Analysis Results (Table 6). Moving from the least densely populated state (Alaska) to the most densely populated state (DC) would only result in roughly four additional firearm related deaths per 100,000 individuals. However, DC is roughly 11 times more densely populated then the median state and is a strong outlier. Other than DC and four other outliers at the upper end of the distribution, there is not much variation in state population density, meaning that the population density coefficient is not substantively significant unless a shift occurs from a low population density state to an outlying state at the high end of the distribution.

5.4 Analysis 4: Combined Independent Variable Regression Analysis

When the measures of all three independent variables were incorporated into a single multivariate regression analysis, gun ownership rates, unemployment rates, and violent crimes per 100,000 state residents were the only components which were found to be statistically significant. This is not surprising considering that these three variables were statistically significant in every regression analysis which they were previously incorporated into. The unemployment rate measure had the largest effect on firearm related deaths per 100,000 individuals, where a one unit shift (0% unemployment to 100% unemployment) results in an additional 203.31 firearm related deaths per 100,000 individuals. A more realistic shift of 4%, or roughly moving from Hawaii (2.2%) to Alaska (6.4%), results in 8.12 additional firearm related deaths per 100,000 individuals, which was the same effect that was demonstrated by the unemployment component in the Structural Characteristics of States Multivariate Regression Analysis depicted in Table 6.

Gun ownership rates had the next strongest effect on firearm related deaths, where a half unit shift, or moving from Delaware (5% gun ownership rate) to West Virginia (54% gun ownership rate), results in an additional 5.8 firearm deaths per 100,000 individuals. While the violent crime measure was found to be statistically significant, it had a negligible effect on firearm related deaths per 100,000 individuals. NRA field representatives, CAP laws, and the Gini coefficient demonstrated different relationships with firearm related deaths than was expected, where all the other components demonstrated the predicted relationship. Table 9: Combined Multivariate Regression Analysis below shows the statistics from this regression analysis.

Table 9. Combined Multivariate Regression Analysis

Variables	Coefficients	Standard Error
Hunting License Ownership Rates	2.79	3.33
NRA Field Reps	-1.24	1.03
Gun Ownership Rates	11.66	4.40
Boyfriend Loophole Score	-0.71	0.55
Background Check Dummy	-1.51	1.23
Concealed Carry Permit Score	-0.22	0.57
CAP Laws	0.77	0.99
Open Carry Dummy	-0.70	1.08
Gini Coefficient	-17.05	25.63
Unemployment Rate	203.31	67.04
Violent Crimes	0.00	0.00
Uninsured Individuals	2.26	23.82
Medicaid Expansion Dummy	-1.64	1.08
Mental Health Prevalence	6.99	28.39
Population Density	0.00	0.00
Intercept	5.96	12.89

Notes: Table 9 depicts the coefficient and standard error values for each measure of all three independent variables effects on the dependent variable.

5.5 Analysis 5: Significant Measures Affecting Firearm Related Deaths per 100,000 Individuals

The final regression analysis incorporated the measures which proved to have the largest effect on firearm related deaths per 100,000 individuals throughout all of the regression analyses. In this analysis, all of the measures had a statistically significant effect, and relatively large substantive effect on the dependent variable other than mental health prevalence. This exemplifies that gun ownership rates (measuring the independent variable gun culture), universal background checks (measuring the independent variable stringency of state firearm legislation), unemployment rates, and violent crimes per 100,000 individuals (measuring the independent variable of structural characteristics of states) are the primary forces causing firearm related deaths.

However, the independent variable of structural characteristics of states had three categories, all of which were predicted to have a substantive effect on firearm related deaths per 100,000 individuals. This analysis found that economic inequality was the only category to actually have a significant effect on firearm related deaths per 100,000 individuals, where the unemployment rate and violent crimes per 100,000 state residents were part of the economic inequality category. As this is the case, structural characteristics of states should not be the focus when attempting to determine what predicts firearm related deaths per 100,000 individuals. Rather, differences of economic inequality should receive emphasis as this component category proved to have a significant effect on the dependent variable.

Substantively, gun ownership rates, universal background checks and unemployment rates exert the largest force on firearm related deaths per 100,000 individuals. The substantial effect each of these variables had on firearm related deaths was demonstrated in every regression analysis which incorporated them. This work provides support for all three of the hypotheses presented, as each of these components are a measure of one of each respective independent variable. Moreover, each had a large substantive effect and a statistically significant effect on the dependent variable while demonstrating the predicted relationship.

Table 10. Significant Measures Multivariate Regression Analysis Results

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Gun Ownership Rates		20.5 (3.4)	14.07 (3.76)	15.95 (3.67)	13.52 (3.53)	13.7 (3.57)
Universal Background Checks	-5.46 (0.93)		-3.2 (1.01)	-3.5 (1.02)	-3.63 (0.93)	- 3.5 (0.97)
Unemployment Rates	143.23 (61.11)	110.82 (59.89)		196.93 (51.18)	138.52 (53.05)	134.65 (53.66)
Violent Crime Rates	0.002 (0.0006)	0.001 (0.0006)	0.002 (0.0005)		0.001 (0.0005)	0.0015 (0.0006)
Mental Health Prevalence	10 (28.88)	36.1 (27.98)	24.15 (26.68)	18.2 (17)		17.4 (25.41)
Intercept	2.18 (5.75)	-8.94 (5.5)	-0.88 (5.4)	-1.59 (5.5)	0.58 (2.15)	-2.65 (-5.2)

Notes: Shown are the coefficients for each variable with standard error values in parenthesis for Models 1-6 depicting their effects on the dependent variable: firearm related deaths per 100,000 individuals. Model 6 is the comprehensive model with all variables interacting and each Model 1-5 excludes one variable.

6. Conclusion

The results presented here demonstrate that firearm related deaths per 100,000 individuals varies so greatly across states due to the fact that the variables which either reduce or increase firearm related deaths also varies greatly across states. The variation across the states in terms of their gun culture, stringency of state firearm legislation, and structural characteristics provides us with examples of states where many of the variables that reduce firearm related deaths are present, and states where most of these variables are not present. Hawaii is an example of a state where many of the variables that reduce firearm related deaths are present, and experience very few firearm related deaths per 100,000 individuals as a result. Alaska is an example of a state where these variables are largely not present, resulting in Alaska having the highest number of firearm related deaths per 100,000 individuals. This is not to say that the states must or should be homogenized to replicate the gun culture, stringency of state firearm legislation, and structural characteristics of states like Hawaii, as that is unfeasible to say the least. However, states which experience high rates of firearm related deaths per 100,000 individuals could adopt certain practices and policies from states such as Hawaii, which have been demonstrated to reduce firearm related deaths, and are conducive to the circumstances of those states.

From a policy prospective, it must be noted that some of these factors are easier to institute then others. For example, reducing gun ownership rates is not an easy task, as the right to own a firearm is enshrined in the U.S. constitution, and there are few means to strip individuals of their firearms when they already own them. On the other hand, instituting a universal background check system is fairly easy to implement in terms of logistics, and there is a fair amount of political support across the country to do so. Only 41% of states have instituted a universal background check system, and as they have shown to be effective at reducing firearm related deaths by significant margins, they should be the starting point for policy makers in the 59% of states where they are not present. Moreover, universal background check systems prevent firearms from getting in the hands of individuals who are most prone to commit violent crimes, where firearm related deaths are likely to occur, compounding the effect they have on reducing firearm related deaths. The tangential effects which a universal background check system creates, mixed with its ease of institution, makes it an ideal starting point for policy makers in regards to reducing firearm related deaths.

The findings here show that the three independent variables tested (gun culture, state firearm legislation, and structural characteristics of states) had at least one factor which substantively reduced firearm related deaths per 100,000 individuals, and was found to be statistically significant. These factors were gun ownership rates (gun culture independent variable), presence of a universal background check system (stringency of state firearm legislation), unemployment rate, and violent crimes per 100,000 state residents (structural characteristics of states). The effects that these factors had on firearm related deaths per 100,000 individuals exemplifies where our efforts should be

focused on when attempting to reduce firearm related deaths in the future, while also keeping in mind the plausibility of their institution.

This being said, there is still need for further research on the topic. This study attempted to be as comprehensive as possible, though not all of the variables which could plausibly affect firearm related deaths were tested here. Future research should expand upon these results by including untested variables in order to see how they affect firearm related deaths, and how those affects vary when interacting with other tested and untested variables. Doing so would further the understanding of what causes firearm related deaths, and provide effective means to prevent firearm related deaths from occurring.

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