An Examination of Gun Control Laws and Lethal Violence in the United States

Matthew D. Moore[1] and Mark H. Heirigs[2]

[1]*University of Central Arkansas, Department of Sociology, Criminology, and Anthropology, 306I Irby Hall, Conway, AR 72035. E-mail: mdmoore@uca.edu*
[2]*University of Montana, Department of Sociology, 323 Social Science Building, Missoula, MT 59812. E-mail: mheirigs@umontana.edu*

Abstract: The United States has a deep and compassionate culture of firearms. Therefore, any restrictions or limitations on access to guns are met with strong opposition. States have enacted different gun control laws aimed at reducing homicide and violence. Past analyses of gun control laws have focused on homicide. However, suicide is also associated with gun violence in the United States. Examining two gun control laws, the current analysis explores if the laws are predictive of decreases in lethal violence, homicide, and suicide. The findings demonstrate that gun control laws are associated with decreased lethal violence and suicide. There was not a significant association between gun control laws and homicide. The analysis illustrates the need to include suicide in examinations of gun violence.

Keywords: Suicide; Homicide; Lethal Violence; Guns; Firearms; Gun Control

Introduction

The United States has a deep and compassionate gun culture (Kalesan *et al.*, 2016). The belief that every individual has the right to bear arms and that owning a gun is a safeguard of democracy is baked into America's values (Hofstadter, 1970). There was a 24% increase in the number of guns purchased in 2020 (Small Arms Survey and Analytics, 2021). Blackman and Baird (2013) noted that after a school shooting, there is a small window for reform with politicians and activists on both sides lobbying. However, public interest in these issues decreases over time, the push for policy change dwindles, and society returns to the status quo. In fact, research suggests that in the

wake of mass shootings, there is a significant increase in first-time handgun owners (Iwama & McDevitt, 2021).

The United States is unique in terms of firearm prevalence and ownership. The country has high gun ownership rates and fewer restrictions on purchasing guns when compared to other industrialized nations (Mencken & Froese, 2019). For example, approximately 30% of adults in the United States own a gun and 11% percent live in households where another member of the household owns a gun (Parker *et al.*, 2017). Gun culture is part of the American fabric, but there is a need to understand how gun ownership and laws that make firearm ownership easier will affect the level of violence and crime in the country.

Researchers have been attempting to unpack the exact relationship between gun ownership and crime (Branas *et al.*, 2009; Kleck, 1988; Kleck & Gertz, 1995; Lott, 1998; Lott & Mustard, 1997; Miller, Azrael, & Hemenway, 2002; Moore & Bergner, 2016). The results of these studies have been mixed. Some researchers have demonstrated that gun ownership predicts increased crime. Other scholars have found that there is no predictive association between gun ownership and crime.

Proponents of gun control argue that making guns easier to acquire would increase the amount of crime and violence in the United States. After all, two-thirds of homicide victims in the United States are killed with a gun (Cummings *et al.*, 1997; Hemenway & Miller, 2000). However, advocates for gun rights argue that making guns easy to acquire would reduce crime and violence (Lott, 1998; Lott & Mustard, 1997). After all, a person could defend themselves from an offender if they had a firearm to deter the would-be offender.

Our study attempts to find the effect gun control laws have on lethal violence in the United States. Previous research examining gun control laws has focused on homicide (Branas *et al.*, 2009; Kleck, 1988; Kleck & Gertz, 1995; Lott, 1998; Lott & Mustard, 1997; Miller *et al.*, 2002; Moore & Bergner, 2016; Siegel *et al.*, 2013). However, firearms are significantly associated with fatal suicide behavior (Anestis & Houtsma, 2018; Cummings *et al.*, 1997; Hemenway *et al.*, 2000; Miller *et al.*, 2002). Therefore, gun control laws could have the effect of reducing fatal suicide behavior as well. Using data that was collected for all 50 states and Washington D.C., the analysis examines the lethal violence, homicide, and suicide rates to explore the association that gun control laws have on each fatal outcome.

Gun Culture in the United States

The United States has a robust culture that is based on gun ownership and the right to own a firearm (Kalesan *et al.*, 2016). Many individuals in the United States believe that gun ownership is vital to the protection of their property and family (Kalesan *et al.*,

2016). Many people will also argue that the Constitution grants them the right to own a firearm and that any restriction on that right is not only illegal but immoral.

Mencken and Froese (2019) pointed out that in the United States, there is a popular portrayal of a mythical gun owner who saves the day. Currently, this phenomenon is discussed as a "good guy with a gun" by politicians and other political figures. Television shows and movies portray this myth to people across the country. There is a strong masculine ideal that has developed in the United States. The ideal of the male gun owner who confronts any situation and protects the innocent from danger. As a whole, the male gun-owning protector is a myth, despite antidotal examples such as the individual who stopped a potential mass shooting at an Indiana shopping mall. Empirical evidence has shown that this is not an accurate representation of gun violence in the United States (Kalesan *et al.*, 2016; Mencken & Froese, 2019).

However, the myth of a protective gun owner has prevailed and has become pervasive in the United States. Individuals do believe that gun ownership will protect them from danger. We can see that as homicide rates increased in the United States in 2020, the purchase of guns increased. There was a 65% increase in 2020 in the number of firearms purchased compared to 2019 (Small Arms Survey and Analytics, 2021). Moreover, January 2021 set a monthly record for the number of guns purchased by Americans. According to a survey done by the Pew Research Center (2017), the top reason Americans give for purchasing a gun is for protection. Studies have also pointed out that gun owners argue that their right to own a gun was created by the Constitution. Any call to reduce or restrict gun ownership will produce widespread anger among gun owners (Boine *et al.*, 2020; Kalesan *et al.*, 2016). Boine *et al.* (2020) found that there is a distinct gun culture based on the idea of gun ownership as a right. This distinct culture was centered around the concept that gun ownership was akin to freedom. Any restriction on gun ownership was a direct attack on their freedom. Therefore, any attempt to reduce or restrict gun ownership produces anger in this cultural group.

Gun Control Laws in the United States

Due to the culture of firearm ownership that is prevalent in the United States, gun control laws are often points of contention. Some scholars have argued that any gun control law would increase homicide and crime in the United States (Kleck, 1988; Kleck & Gertz, 1995; Lott, 1998; Lott & Mustard, 1997). The argument by these scholars is that when an individual has a firearm, they will be able to deter any would-be offender. Other scholars have proposed the opposite of this argument. Gun control measures that reduce firearm prevalence would reduce the level of homicide and crime in the United States (Branas *et al.*, 2009; Miller *et al.*, 2002; Moore & Bergner, 2016; Siegel *et al.*, 2013).

Scholars have examined the effect that gun control laws have had on crime in the United States. Lott and Mustard (1997) examined whether counties had a shall-issue conceal and carry law or not from 1977 to 1992. Shall-issue conceal-and-carry means that states will issue a conceal-and-carry license to all individuals who prove they are eligible to own a handgun (Zimring, 2018). The scholars created a dummy variable for if the state in which the county is located had a shall-issue law in a particular year. Lott and Mustard (1997) found that the enactment of a shall-issue conceal-and-carry law was associated with a reduction in violent crime rates (i.e., homicide, robbery, rape, and assault). However, the implementation of the law was found to be predictive of an increase in property crime rates. Lott and Mustard (1997) conclude that the reduction in violent crime illustrates that there is a deterrent effect that occurs when firearms are more readily available.

Other scholars have found that gun control laws were predictive of reductions in homicide and crime (Kravitz-Wirtz *et al.*, 2021; Ruddell & Mays, 2005; Siegel *et al.*, 2020). Ruddell and Mays (2005) examined the robustness of each state's background check system from 1999 to 2001. The regression analysis revealed that the more robust state systems did experience a reduction in the homicide rate. Ruddell and Mays's (2005, pg. 134) findings suggest that "some of the people deemed ineligible to purchase firearms might have been temporarily frustrated from gun ownership – serving as a cooling off period." Therefore, the homicide rate is reduced because of their inability to acquire a firearm immediately.

Siegel *et al.* (2020) developed a mass shooting database from 1976 to 2018. Using the database, the researchers examined eight gun control laws. They found that states requiring a permit to purchase a gun associated with a 60% lower likelihood of having a mass shooting. Banning large-capacity magazines was associated with 38% fewer fatalities and 77% fewer nonfatal injuries in mass shootings. The scholars concluded that state laws aimed at large-capacity magazines and permits at the point of purchase would reduce the number of mass shootings and the number of fatalities.

Homicide and Guns

Researchers have examined the association between firearm prevalence, ownership, use, and homicide (Cook & Ludwig, 2006; Cummings *et al.*, 1997; Gold, 2020; Hepburn & Hemenway, 2003; Hoskin, 2006; Killias, 1993; Moore & Bergner, 2016; Siegel *et al.*, 2013). Scholars have argued whether increased firearms were associated with increased homicide (Hemenway *et al.*, 2000; Killias *et al.*, 2001; Miller *et al.*, 2002; Siegel *et al.*, 2013) or if increased firearms were associated with decreased homicide (Kleck & Gertz, 1995; Lott & Mustard, 1997). While there have been arguments made as to how increased firearms could be predictive of decreased homicide, the majority of research

has demonstrated that increased firearm prevalence, ownership, and use are predictive of increased homicide.

The association between gun prevalence, ownership, and use has been examined using states, counties, and individuals in the United States (Cook & Ludwig, 2006; Cummings *et al.*, 1997; Miller *et al.*, 2002; Moore & Bergner, 2016; Siegel *et al.*, 2013). Cummings *et al.* (1997) found that families with a history of handgun purchases were two times more likely to die by homicide than families with no history of handgun purchases. Miller *et al.* (2002) used two proxies for firearm availability and found that both were significantly associated with increased homicide rates. Other analyses of firearm availability have found that increased firearm availability is associated with increased homicide rates in the United States (Branas *et al.*, 2009; Moore & Bergner, 2016; Siegel *et al.*, 2013).

Researchers have also examined the gun prevalence, ownership, and use by exploring cross-national research designs (Hemenway *et al.*, 2000; Hoskin, 2006; Killias, 1993; Killias *et al.*, 2001). Killias *et al.* (2001) examined 21 countries and the association between firearm prevalence and homicide. Examining gun availability in households, the scholars found that there is a correlation between gun availability and homicide. Killias *et al.* (2001) point out that the correlation between homicide and gun availability was especially strong for females. Research in the United States has also found a strong association between firearm availability and violence for females (Gold, 2020; Wallace, 2020). Other researchers have used a collection of countries to examine the association between firearm availability and homicide, finding there is a significant association (Hemenway *et al.*, 2000; Hoskin, 2006).

Suicide and Guns

There are about three times as many suicides in the United States as homicides (Centers for Disease Control and Prevention, 2021). Suicide is often left out of the conversation of gun violence in the media and by politicians. However, researchers have been aware of the strong association between gun prevalence, ownership, use, and suicide (Anestis & Houtsma, 2018; Cummings *et al.*, 1997; Hemenway *et al.*, 2000; Miller *et al.*, 2002). Research has demonstrated that firearm availability is associated with suicide.

Anestis and Houtsma (2018) point out that self-inflicted gunshot wounds account for less than 5% of suicide attempts each year in the United States. However, self-inflicted gunshots make up more than 50% of all fatal deaths by suicide. Anestis and Houtsma (2018) tested a host of variables that could explain fatal suicidal behavior. The scholars found that gun availability and familiarity with guns were a robust risk factor for suicide.

Other scholars have demonstrated that suicide is more likely to occur in households with a gun (Simon, 2007) and households with a history of firearm

purchases (Cummings *et al.*, 1997). Having a firearm in the household that is loaded and not kept in a safe has also been demonstrated to be associated with increased fatal suicidal behavior (Anestis, 2018; Brent, 2001; Kposowa *et al.*, 2016). Research on the association between suicide and firearms is unequivocal increased firearms are associated with increased suicide.

Lethal Violence, Stream Analogy of Lethal Violence, and Guns

Many of the examinations of lethal violence have not explored the association with firearms (Chon, 2013; He *et al.*, 2003; Tuttle, 2018; Unnitahn & Witt, 1992; Wu, 2003). At the same time, many examinations of firearms have explored the association between homicide and suicide separately (Cummings *et al.*, 1997; Killias, 1993; Killias *et al.*, 2001; Miller *et al.*, 2002). Using the Stream Analogy of Lethal Violence (SALV), the current analysis aims to expand our understanding of firearms and their association with lethal violence.

Unnithan *et al.* (1994) argued that individuals encounter dissatisfaction and anger in their lives. Some of these individuals will blame themselves for this frustration and turn toward suicide for relief. Other individuals will ascribe their dissatisfaction and anger to others and turn to homicide to relieve themselves of this frustration. Research on SALV has focused on economic conditions, such as poverty and unemployment (Chon, 2013; He *et al.*, 2003; Tuttle, 2018; Unnitahn & Witt, 1992; Wu, 2003).

Unnithan *et al.* (1994) suggested that to measure the overall amount of lethal violence in an area, researchers need to combine the homicide and suicide rates. The combination of the homicide and suicide rates would create the lethal violence rate (LVR). Past research has demonstrated that homicide and suicide are associated (Fei & Zakrzewski Jr., 2021; Piatkowska, 2020). Therefore, the current research analysis created the LVR to examine if gun control laws are associated with the overall level of violence. Moreover, the current analysis examined the homicide and suicide rates separately to find if gun control laws are associated with a reduction in either homicide or suicide.

Methods

Outcome Variables

The suicide rate was acquired from the Centers for Disease Control and Prevention (CDC) (2021). The CDC provides information on its website for intentional self-harm in all 50 states and Washington D.C. The year 2019 was selected to match the other variables in the analysis. The homicide rate was collected from the FBI Uniform Crime Report (2021) for the year 2019. The FBI also provides the homicide rate for

all 50 states and Washington D.C. To create the lethal violence rate, the suicide rate was added to the homicide rate, which has been done in analyses of lethal violence previously (Tuttle, 2018).

Predictor Variable

To examine if laws restricting firearms have an effect on lethal violence two laws were used in the current analyses: (1) background checks on private gun sales and (2) permit to buy a handgun. A state with at least one of the two laws was classified as having gun control laws. If a state did not have any of the two laws, the state was classified as having no gun control laws. The two gun control laws were selected based on their inclusion in previous analyses of firearm violence (Miller *et al.*, 2017; Kravitz-Wirtz *et al.*, 2021; Ruddell & Mays, 2005; Siegel et al., 2020). Table 1 displays the states and the laws in each state.

Table 1: Gun Control Laws used in the Analysis (0 = No Law and 1 = Law)

	Background Check	*Permit to Buy*
Alabama	0	0
Alaska	0	0
Arizona	0	0
Arkansas	0	0
California	1	1
Colorado	1	0
Connecticut	1	1
Delaware	1	0
District of Columbia	1	1
Florida	0	0
Georgia	0	0
Hawaii	1	1
Idaho	0	0
Illinois	1	1
Indiana	0	0
Iowa	1	1
Kansas	0	0
Kentucky	0	0
Louisiana	0	0
Maine	0	0
Maryland	1	1

	Background Check	Permit to Buy
Massachusetts	1	1
Michigan	1	0
Minnesota	0	1
Mississippi	0	0
Missouri	0	0
Montana	0	0
Nebraska	1	1
Nevada	1	0
New Hampshire	0	0
New Jersey	1	1
New Mexico	1	0
New York	1	1
North Carolina	1	1
North Dakota	0	1
Ohio	0	0
Oklahoma	0	0
Oregon	1	0
Pennsylvania	1	0
Rhode Island	1	1
South Carolina	0	0
South Dakota	0	0
Tennessee	0	0
Texas	0	0
Utah	0	0
Vermont	1	0
Virginia	1	0
Washington	1	0
West Virginia	0	0
Wisconsin	0	0
Wyoming	0	0

Twenty-three states require a background check at the time of purchase for private sales of firearms. Firearm acquisition may not be reduced if individuals can buy guns in private sales. Kravitz-Wirtz *et al.* (2021) found that after California passed a background check law, the percentage of individuals who purchased a firearm without a background check dropped from 44.6% to 17.2%.

Fifteen states have a permit to buy a handgun at the point of purchase. Siegel *et al.* (2020) demonstrated that a permit requirement for the purchase of a firearm is associated with a 60% reduction in the odds of a mass shooting. A dummy variable was created to capture the states with laws and the states without laws. States with laws were coded as a 1, and states with no laws were the reference category.

Control Variables

The gross domestic product (GDP) of each state and Washington D.C. was attained from the U.S. Census Bureau's Annual Survey of State Government Finances for 2019. The GDP has been incorporated into previous analyses on lethal violence (He *et al.*, 2003; Tuttle, 2018; Unnithan & Whitt, 1992), homicide (Jacobs & Richardson, 2008; Neumayer, 2003; Pampel & Gartner, 1995), and suicide (Asevedo *et al.*, 2018). Studies examining firearm prevalence often include a measure of economic level (Mencken & Froese, 2017; Moore, 2017; Siegel *et al.*, 2020), and the GDP is a measure of the economic level in the state. The distribution of GDP was skewed. To correct the skewed distribution, the natural logarithmic transformation was used.

To control for the income inequality present in each state, the analysis included the GINI Index. The GINI Index is a measure of income inequality, with lower scores on the index indicating more equality and higher scores representing more inequality. The GINI index was included in the analysis and was acquired from the U.S. Census Bureau for 2014 – 2018. The Census Bureau released a report with the GINI Index average over this period. It was included in the analysis because it was the closest year available to 2019. The GINI Index has been included in analyses on lethal violence (Huff-Corzine *et al.*, 1991; He *et al.*, 2003; Tuttle, 2018; Wu, 2003), homicide (Fajnzylber *et al.*, 2002: Jacobs & Richardson, 2008: Neumayer, 2003), and suicide (Inagaki, 2010; Shah *et al.*, 2008).

The unemployment rate for 2019 was included in the analysis. Past analyses have used the unemployment rate as a control variable for lethal violence (He *et al.*, 2003; Wu, 2003), homicide (Jacobs & Richardson, 2008; Pampel & Gartner, 1995), and suicide (Ellison *et al.*, 1997; Flavin & Radcliff, 2009; Milner *et al.*, 2020). Analyses have also included the unemployment rate when examining firearms (Boine *et al.*, 2020; Moore, 2017; Siegel *et al.*, 2020; Siegel *et al.*, 2013). The percentage of the state living in urban areas was collected from the U.S. Census Bureau for 2019. The percent of the population living in urban areas has been used in previous studies on firearms (Boine *et al.*, 2020; Ruddell & Mays, 2005), lethal violence (Tuttle, 2018), homicide (Jacobs & Richardson, 2008; Neumayer, 2003; Pratt & Godsey, 2003), and suicide (Milner *et al.*, 2020).

Past analyses of lethal violence have included the marriage-to-divorce ratio (Tuttle, 2018; He *et al.*, 2003). Analyses on firearms (Mencken & Froese, 2017; Moore, 2017;

Siegel *et al.*, 2020), lethal violence (Wu, 2003), homicide (Pampel & Gartner, 1995), and suicide (Ellison *et al.*, 1997; Flavin & Radcliff, 2009) have included a measure of divorce. The divorce-to-marriage ratio was calculated by dividing the divorce rate by the marriage rate for each state and was collected from the U.S. Census Bureau for 2019.

We created the ethnic fractionalization index based on Alesina *et al.*'s (2003) model. To produce the ethnic fractionalization index, the racial/ethnic makeup of each state was collected from the U.S. Census Bureau for 2019. The percent of White, Black, Native American, Asian, Native Hawaiian, and Other in each state were used in the construction of the index. These groups were chosen based on the classification system of the U.S. Census Bureau. The index ranges from zero to one. A state with a score of zero would have perfect homogeneity, and a state with a score of one would have perfect heterogeneity. Analyses on firearms (Boine *et al.*, 2020; Mencken & Froese, 2017; Moore, 2017; Ruddell & Mays, 2005; Siegel *et al.*, 2020), lethal violence (Tuttle, 2018), homicide (Osgood & Chambers, 2000), and suicide (Moore, 2019).

Finally, a control for the South was included in the analysis. To identify if the state was in the South, we used the classification used by the U.S. Census Bureau. Previous analyses on firearms (Jiobu & Curry, 2001) and homicide (Blau & Blau, 1982; Gastil, 1971; Nisbett & Cohen, 1996) have included controls for the South. Moreover, Kalesan *et al.* (2016) demonstrated that gun ownership rates were higher in the South than in other regions of the country. Furthermore, studies examining gun ownership rates and culture have controlled for the South (Jiobu & Curry, 2001; Yamane, 2017). A dummy variable was created called South.

States in the South were coded as a 1, and states not in the South were the reference category.

Findings

Scholars have suggested that correlations of .80 or above may potentially produce problems with the results and should be considered high (Berry & Feldman, 1985; Knoke *et al.*, 2002). Berry and Feldman (1985) argued that in analyses with small sample sizes, the threshold for a correlation should be .70. Having a sample size of 51, the current analysis falls into the small sample size that Berry and Feldman (1985) suggested. Appendix A provides the correlations for the variables in the current analysis. No correlation reached the threshold of .70. The highest correlation was between unemployment and homicide at .65.

Other researchers have suggested that scholars check for multicollinearity by investigating the Variance Inflation Factors (VIFs). Neter *et al.* (1989) state that any VIF score above 10 would need to be examined further. Ouimet (2012) argued that studies with small sample sizes would need to investigate any VIF above 5. Hair *et*

al. (2014) argued that 5 was too high for any study with a small sample size and suggested that 4 and above needed to be investigated. The current analysis meets all the requirements set with the highest VIF score of 2.741. Thus, the current analysis did not experience any multicollinearity issues.

To further ensure that studies with small sample sizes do not violate the assumption, researchers stated that studies could regress each independent variable on all the other variables in the analysis (Berry & Feldman, 1985; Hair *et al.*, 2014). The closer to one the R^2 the more likely there has been a violation in the assumption. We followed this procedure and regressed the independent variables on each other. There were no R^2 that approached one, therefore the current analysis is confident in the models.

Table 2 displays the descriptive statistics for the variables used in the analysis. The mean lethal violence rate was 21.76, with Alaska having the highest rate at 38.11. New Jersey had the lowest lethal violence rate at 11.48. The mean homicide rate was 5.15. Washington D.C. had the highest rate in the current analysis at 23.50 and Maine had the lowest rate at 1.50. The suicide rate had a mean of 16.62, with Wyoming having the highest suicide rate at 29.37 and Washington D.C. having the lowest at 6.23.

Table 2: Descriptive Statistics for Variables in the Model (N = 51)

	Minimum	*Maximum*	*Mean*	*Standard Deviation*
LVR	11.48	38.11	21.76	5.40
Homicide	1.50	23.50	5.15	3.70
Suicide	6.23	29.37	16.62	4.85
Unemployment	2.60	6.60	4.39	.88
Urban	38.70	100.00	74.11	14.89
GDP (logged)	4.52	6.50	5.36	.46
Divorce-to-marry Ratio	.16	.30	.23	.03
Ethnic Fractionalization Index	.12	.78	.38	.15
GINI Index	42.37	53.50	46.59	2.09

Figure 1 illustrates the homicide rates of states with and without gun control laws. States with gun control laws have a homicide rate of 4.82, while states without gun control laws have a rate of 5.46. Examining Figure 2 illustrates that states with gun control laws have a lower suicide rate than states with no gun control laws. States with gun control laws have a suicide rate of 14.49 and the rate is 18.66 for states with no gun control laws.
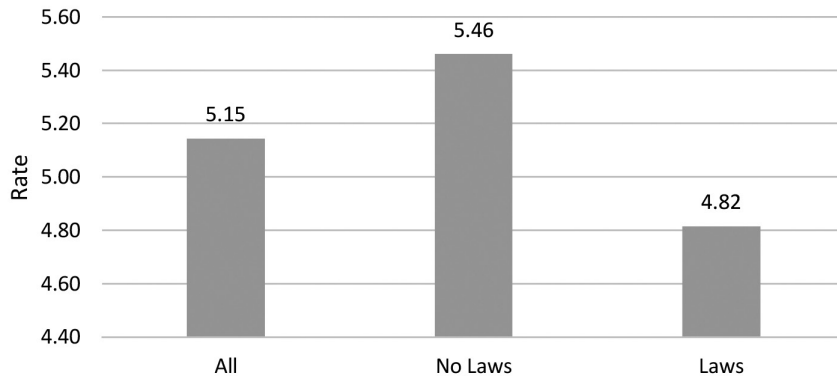
Figure 1: Homicide Rates for States with and without Gun Laws
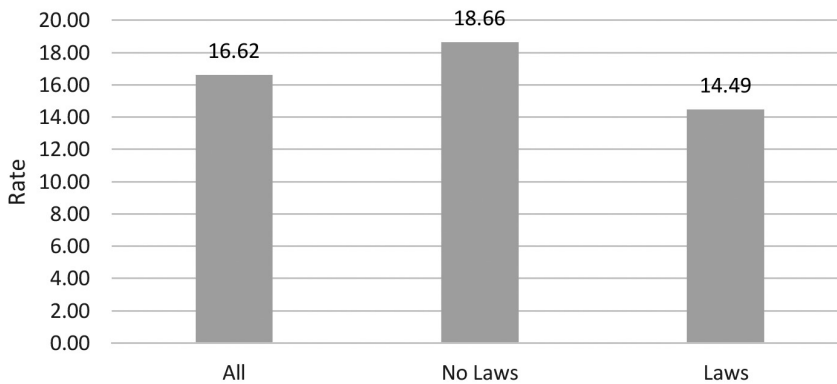
Figure 2: Suicide Rates for States with and without Gun Laws

Lethal Violence Rate

Table 3 displays the results of the regression analysis. Gun control laws were significant and negative (β = -.330; p < .01). The negative coefficient suggests that states with gun control laws have an LVR that is 3.532 times less than states that have no gun control laws. In other words, states that have implemented laws controlling the purchase of guns have a significantly lower rate of lethal violence. The GDP of the state was also significant and negative (β = -.300; p < .05). As the GDP decreased, the LVR increased. Finally, the divorce-to-marry ratio was significant and positive (β = .375; p < .05). As the ratio increased (i.e., divorce became more prevalent), the LVR increased.

Homicide Rate

The presence of gun control laws was not a significant predictor of the homicide rate in the analysis. In fact, no variable reaches the level of significance in the current analysis for the homicide rate.

<div align="center">Table 3: Regression Results for LVR, Homicide, and Suicide (N = 51)</div>

	LVR	Homicide	Suicide	
	β	*β*	*β*	*V.I.F.*
	B	*B*	*B*	
	(S.E.)	*(S.E.)*	*(S.E.)*	
Gun Control Laws	-.330*	-.120	-.276*	1.541
	-3.532	-.881	-2.652	
	(1.325)	(.876)	(1.080)	
Unemployment	.231	.231	.082	2.623
	1.422	.971	.451	
	(.944)	(.657)	(.811)	
Urban	-.007	.087	-.074	2.510
	-.003	.022	-.024	
	(.057)	(.038)	(.047)	
GINI Index	-.262	.274	-.501**	2.221
	-.677	.487	-1.164	
	(.385)	(.254)	(.314)	
GDP (logged)	-.300*	-.260	-.136	1.975
	-3.525	-2.091	-1.434	
	(1.650)	(1.090)	(1.346)	
Divorce-to-Marry Ratio	.375*	.127	.321*	2.077
	61.311	14.197	47.114	
	(23.482)	(15.517)	(19.148)	
Ethnic Fractionalization Index	.215	.281	.025	2.741
	7.815	6.991	.824	
	(6.007)	(3.969)	(4.898)	
South	-.095	.203	-.260*	1.925
	-1.077	1.574	-2.651	
	(1.507)	(1.038)	(1.281)	
R^2	.582	.611	.655	

*$p < .05$; **$p < .01$; ***$p < .001$

Suicide Rate

Gun control laws were a significant predictor of the suicide rate. Table 3 illustrates that gun control laws were significant and had a negative standardized coefficient ($β$ = -.276; $p < .05$). States with gun control laws have a suicide rate that is 2.652 times less than states that do not have gun control laws. Therefore, states that have laws restricting the purchase of a firearm have a significantly lower suicide rate than states that have not implemented any laws restricting the purchase of a firearm.

The GINI index was significant and had a negative coefficient ($β$ = -.501; $p < .01$). As the GINI index decreased, the suicide rate increased. In other words, as the state

became more equal economically the suicide rate increased. The divorce-to-marry ratio was also significant and positive (β = .321; p < .05). As divorce becomes more prevalent, the suicide rate increases. The dummy variable South was significant and negative (β = -.260; p < .05). The South has a lower suicide rate than the other regions of the country.

Conclusion

This study aimed to explore the association between gun control laws and lethal violence. Past analyses on gun control laws have focused almost exclusively on homicide (Branas *et al.*, 2009; Kleck, 1988; Kleck & Gertz, 1995; Lott, 1998; Lott & Mustard, 1997; Miller *et al.*, 2002; Moore & Bergner, 2016; Siegel *et al.*, 2013). However, firearms play a significant role in fatal suicide behavior (Anestis & Houtsma, 2018; Cummings *et al.*, 1997; Hemenway *et al.*, 2000; Miller *et al.*, 2002). Scholars have also demonstrated that the level of lethal violence in an area should be seen as the combination of suicide and homicide (Chon, 2013; He *et al.*, 2003; Tuttle, 2018; Unnitahn & Witt, 1992; Wu, 2003).

The current analysis found that states with gun control laws had a significantly lower rate of lethal violence than a state without gun control laws. Thus, states that want to see a reduction in the amount of lethal violence could implement laws that would reduce and restrict the availability of firearms. Past research has demonstrated that increased firearm prevalence, ownership, and use are associated with increased rates of homicide (Hemenway *et al.*, 2000; Killias *et al.*, 2001; Miller *et al.*, 2002; Siegel *et al.*, 2013) and suicide (Anestis & Houtsma, 2018; Cummings *et al.*, 1997; Hemenway *et al.*, 2000; Miller *et al.*, 2002).

When examining if gun control laws were predictive of the rate of homicide in a state, the current analysis did not find a significant value. The gun control laws had no effect in reducing or increasing the homicide rate. Past research has been mixed on whether gun control laws would lead to an increase in homicide (Kleck, 1988; Kleck & Gertz, 1995; Lott, 1998; Lott & Mustard, 1997) or lead to a decrease in the homicide rate (Kravitz-Wirtz *et al.*, 2021; Ruddell & Mays, 2005; Siegel *et al.*, 2020). We did not find support for either position. Instead, the findings of the current analysis suggest that gun control laws do not affect homicide.

Examining if gun control laws are predictive of the state's suicide rate, we found that the suicide rates are significantly lower in states that have gun control laws. Therefore, to decrease fatal suicide behavior, a state could implement gun control policies and laws that would restrict and reduce the number of firearms in the area. Past analyses have shown that firearm prevalence, ownership, and use are associated with increased levels of suicide (Anestis & Houtsma, 2018; Cummings *et al.*, 1997; Hemenway *et al.*, 2000; Miller *et al.*, 2002).

Anestis (2018) pointed out that suicide attempts involving a firearm result in the death of the person between 85% to 95% of the time. Moreover, Anestis (2018) points out that having a firearm in the home increases the likelihood of a fatal suicide. An estimated 90% of individuals who make a suicidal attempt never make another attempt. Thus, restrictions on guns, which are extremely lethal, could reduce the suicide rate. Anestis (2018, pg. 38) states that "the data make a fairly clear statement that suicidal people in the presence of a gun are more likely to shoot themselves – and that when they do, they are likely to die."

The current analysis demonstrates that examinations of gun control laws should include suicide in their analysis. Previous research on gun control laws has focused on homicide (Kravitz-Wirtz *et al.*, 2021; Ruddell & Mays, 2005; Siegel *et al.*, 2020). However, suicide is a part of the overall level of gun violence in the United States. Death by a firearm suicide is more common than homicide by a firearm in the United States. Therefore, researchers should be cognizant of the role that suicide plays in our overall firearm violence.

There are some notable policy implications that can be drawn from the current analysis. According to the CDC (2022), suicidal behaviors cost nearly 70 billion dollars annually. Therefore, there is not just the loss of human life to consider but economic facets as well. The American Foundation for Suicide Prevention (2022) noted that President Biden has invested 697 million dollars to ensure individuals will have access to mental health services during a crisis via the suicide prevention hotline. However, our findings suggest that without legislation pertaining to gun control, this investment may be a moot point.

References

Alesina, A., Devleeschauwer, A., Easterly, W., Kurlat, S., & Wacziarg, R. (2003). Fractionalization. *Journal of Economic growth*, *8*(2), 155-194.

American Foundation for Suicide Prevention (2022). ***Statement by the American Foundation for Suicide Prevention on President Biden's Fiscal Year 2023 Budget Proposal.*** *https://afsp.org/story/ statement-on-president-bidens-fiscal-year-2023-budget-**proposal?fbclid=IwAR2qthbupZilyTYI xgOfH88D-RO0lOWf_HkugSUzXsJQUVHjSvf0aybowVE***

Anestis, M. D. (2018). *Guns and suicide: An American epidemic*. Oxford University Press: New York.

Anestis, M. D., & Houtsma, C. (2018). The association between gun ownership and statewide overall suicide rates. *Suicide and Life-Threatening Behavior*, *48*(2), 204-217.

Asevedo, E., Ziebold, C., Diniz, E., Gadelha, A., & Mari, J. (2018). Ten-year evolution of suicide rates and economic indicators in large Brazilian urban centers. *Current Opinion in Psychiatry*, *31*(3), 265-271.

Berry, W. D., & Feldman, S. (1985). *Multiple regression in practice* (No. 50). Sage.

Blackman, J., & Baird, S. (2013). The shooting cycle. *Conn. L. Rev.*, *46*, 1513.

Blau, J. B., & Blau, P. M. (1982). The cost of inequality: Metropolitan structure and violent crime. *American Sociological Review*, 47(1), 114–129.

Boine, C., Siegel, M., Ross, C., Fleegler, E. W., & Alcorn, T. (2020). What is gun culture? Cultural variations and trends across the United States. *Humanities and Social Sciences Communications*, *7*(1), 1-12.

Branas, C. C., Richmond, T. S., Culhane, D. P., Ten Have, T. R., & Wiebe, D. J. (2009). Investigating the link between gun possession and gun assault. *American Journal of Public Health*, 99, 2034–2040.

Brent, D. A. (2001). Firearms and suicide. *Annals of the New York Academy of Sciences*, *932*(1), 225-240.

Center for Disease Control and Prevention. (2021). *CDC Wonder*. https://wonder.cdc.gov/

Center for Disease Control and Prevention. (2022). *Facts About Suicide. https://www.cdc.gov/suicide/facts/index.html*

Chon, D. S. (2013). Economic development, change of age distribution, and stream analogy of homicide and suicide: A cross-national assessment. *Justice Quarterly*, *30*(1), 169-193.

Cook, P. J., & Ludwig, J. (2006). The social costs of gun ownership. *Journal of Public Economics*, *90*(1-2), 379-391.

Cummings, P., Koepsell, T. D., Grossman, D. C., Savarino, J., & Thompson, R. S. (1997). The association between the purchase of a handgun and homicide or suicide. *American Journal of Public Health*, *87*(6), 974-978.

Ellison, C. G., Burr, J. A., & McCall, P. L. (1997). Religious homogeneity and metropolitan suicide rates. *Social Forces*, *76*(1), 273-299.

Fajnzylber, P., Lederman, D., & Loayza, N. (2002). Inequality and violent crime. *Journal of Law and Economics*, 45(1), 1–40.

FBI Uniform Crime Report. (2021). *2019 crime in the United States*. https://ucr.fbi.gov/crime-in-the-u.s/2019/crime-in-the-u.s.-2019

Fei, J., & Zakrzewski Jr, W. J. (2021). Institutional Imbalance as a Force of Direction: The Implication of Institutional Anomie Theory in Stream Analogy of Lethal Violence. *The Sociological Quarterly*, *62*(1), 161-186.

Flavin, P., & Radcliff, B. (2009). Public policies and suicide in the American states. *Social Indicators Research*, 90(3), 195–209.

Gastil, R. D. (1971). Homicide and a regional culture of violence. *American Sociological Review*, 36, 412–427.

Gold, L. H. (2020). Domestic violence, firearms, and mass shootings. *The journal of the American Academy of Psychiatry and the Law*, *48*(1), 35-42.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). *Multivariate data analysis*. Person Education Limited.

He, N., Cao, L., Wells, W., & Maguire, E. R. (2003). Forces of production and direction: A test of an expanded model of suicide and homicide. *Homicide Studies*, *7*(1), 36-57.

Hemenway, D., & Miller, M. (2000). Firearm availability and homicide rates across 26 high income countries. *The Journal of TRAMA Injury, Infection, and Critical Care*, 49, 985–988.

Hepburn, L. M., & Hemenway, D. (2004). Firearm availability and homicide: A review of the literature. *Aggression and Violent behavior*, *9*(4), 417-440.

Hofstadter, R. (1970). *America as a gun culture*. American Heritage Publishing Company, Incorporated.

Hoskin, A. W. (2001). Armed Americans: The impact of firearm availability on national homicide rates. *Justice Quarterly*, *18*(3), 569-592.

Huff-Corzine, L., Corzine, J., & Moore, D. C. (1991). Deadly connections: Culture, poverty, and the direction of lethal violence. *Social Forces*, *69*(3), 715-732.

Inagaki, K. (2010). Income inequality and the suicide rate in Japan: evidence from cointegration and LA-VAR. *Journal of Applied Economics*, *13*(1), 113-133.

Iwama, J., & McDevitt, J. (2021). Rising gun sales in the wake of mass shootings and gun legislation. *The Journal of Primary Prevention*, *42*(1), 27-42.

Jacobs, D., & Richardson, A. M. (2008). Economic inequality and homicide in the developed nations from 1975 to 1995. *Homicide Studies*, 12(1), 28–45.

Jiobu, R. M., & Curry, T. J. (2001). Lack of confidence in the federal government and the ownership of firearms. *Social Science Quarterly*, *82*(1), 77-88.

Kalesan, B., Villarreal, M. D., Keyes, K. M., & Galea, S. (2016). Gun ownership and social gun culture. *Injury Prevention*, *22*(3), 216-220.

Killias, M. (1993). International correlations between gun ownership and rates of homicide and suicide. *CMAJ: Canadian Medical Association Journal*, *148*(10), 1721.

Killias, M., Van Kesteren, J., & Rindlisbacher, M. (2001). Guns, violent crime, and suicide in 21 countries. *Canadian Journal of Criminology*, *43*(4), 429-448.

Kleck, G. (1988). Crime control through the private use of armed force. *Social Problems*, 35, 1–21.

Kleck, G., & Gertz, M. (1995). Armed resistance to crime: The prevalence and nature of self-defense with a gun. *Journal of Criminal Law & Criminology*, 86, 150–187.

Knoke, D., Bohrnstedt, G. W., & Mee, A. P. (2002). *Statistics for social science data analysis*. Itasca.

Kposowa, A., Hamilton, D., & Wang, K. (2016). Impact of firearm availability and gun regulation on state suicide rates. *Suicide and Life-Threatening Behavior*, *46*(6), 678-696.

Kravitz-Wirtz, N., Pallin, R., Kagawa, R. M., Miller, M., Azrael, D., & Wintemute, G. J. (2021). Firearm purchases without background checks in California. *Preventive Medicine*, *145*, 106414.

Lott, J. R., Jr. (1998). Concealed-handgun debate. *The Journal of Legal Studies*, 27, 221–243.

Lott, J. R., Jr., & Mustard, D. B. (1997). Crime, deterrence, and right-to-carry concealed handguns. *The Journal of Legal Studies*, 26, 1–68.

Mencken, F. C., & Froese, P. (2019). Gun culture in action. *Social Problems*, *66*(1), 3-27.

Miller, M., Azrael, D., & Hemenway, D. (2002). Firearm availability and unintended firearm deaths, suicide, and homicide among 5-14 year olds. *The Journal of TRAMA Injury, Infection, and Critical Care*, 52, 267–275.

Milner, A., Scovelle, A. J., Hewitt, B., Maheen, H., Ruppanner, L., & King, T. L. (2020). Shifts in gender equality and suicide: A panel study of changes over time in 87 countries. *Journal of Affective Disorders*, *276*, 495-500.

Moore, M. D. (2017). Firearm prevalence and homicide: An examination of urban and suburban counties. *Criminal Justice Review*, *42*(3), 315-326.

Moore, M. D., & Bergner, C. M. (2016). The relationship between firearm ownership and violent crime. *Justice Policy Journal*, 13, 1–20.

Neter, J., Wasserman, W., & Kutner, M. H. (1989). *Applied linear regression methods*. Richard D Irwin Inc.

Neumayer, E. (2003). Good policy can lower violent crime: Evidence from a cross-national panel of homicide rates, 1980-97. *Journal of Peace Research*, 40(6), 619–640.

Nisbett, R. E., & Cohen, D. (1996). *Culture of honor: The psychology of violence in the south*. Boulder, CO: Westview.

Osgood, D. W., & Chambers, J. M. (2000). Social disorganization outside the metropolis: An analysis of rural youth violence. *Criminology*, 38(1), 81–116.

Ouimet, M. (2012). A world of homicides: The effect of economic development, income inequality, and excess infant mortality on the homicide rate for 165 countries in 2010. *Homicide Studies*, 16(3), 238–258.

Pampel, F. C., & Gartner, R. (1995). Age structure, socio-political institutions, and national homicide rates. *European Sociological Review*, *11*(3), 243-260.

Parker, K., Horowitz, J., Igielnik, R., Oliphant, B., & Brown, A. (2017). America's complex relationship with guns: An in-depth look at the attitudes and experiences of US adults. *Pew Research Center*.

Pew Research Center. (2017). *The demographics of gun ownership*. https://www.pewresearch.org/social-trends/2017/06/22/the-demographics-of-gun-ownership/

Piatkowska, S. J. (2020). Poverty, inequality, and suicide rates: A Cross-National Assessment of

the Durkheim Theory and the Stream Analogy of Lethal Violence. *The Sociological Quarterly*, *61*(4), 787-812.

Pratt, T. C., & Godsey, T. W. (2003). Social support, inequality, and homicide: A cross-national test of an integrated theoretical model. *Criminology*, *41*(3), 611-644.

Ruddell, R., & Mays, G. L. (2005). State background checks and firearms homicides. *Journal of Criminal Justice*, *33*(2), 127-136.

Shah, A., Bhat, R., MacKenzie, S., & Koen, C. (2008). A cross-national study of the relationship between elderly suicide rates and life expectancy and markers of socioeconomic status and health care. *International Psychogeriatrics*, *20*(2), 347-360.

Siegel, M., Goder-Reiser, M., Duwe, G., Rocque, M., Fox, J. A., & Fridel, E. E. (2020). The relation between state gun laws and the incidence and severity of mass public shootings in the United States, 1976–2018. *Law and Human Behavior*, *44*(5), 347.

Siegel, M., Ross, C. S., & King III, C. (2013). The relationship between gun ownership and firearm homicide rates in the United States, 1981–2010. *American Journal of Public Health*, *103*(11), 2098-2105.

Simon, R. I. (2007). Gun safety management with patients at risk for suicide. *Suicide and Life-Threatening Behavior*, *37*(5), 518-526.

Small Arms Survey and Analytics. (2021, January 5). *U.S. firearms sales December 2020: Sales increases slowing down, year's total sales clock in at 23 million units*. http://smallarmsanalytics.com/v1/pr/2021-01-05.pdf

Tuttle, J. (2018). Specifying the effect of social welfare expenditures on homicide and suicide: A cross-national, longitudinal examination of the stream analogy of lethal violence. *Justice Quarterly*, *35*(1), 87-113.

Unnithan, N. P., & Whitt, H. P. (1992). Inequity, economic development and lethal violence: A cross-national analysis of suicide and homicide. *International Journal of Comparative Sociology*, *33*(3), 182.

Wallace, L. N. (2020). Gun violence: an introduction. *Violence & Gender* 7(1), 1-2.

Wu, B. (2003). Testing the Stream Analogy for Lethal Violence: A Macro Study of Suicide and Homicide. *Western Criminology Review*, *4*(3).

Yamane, D. (2016). Awash in a sea of faith and firearms: Rediscovering the connection between religion and gun ownership in America. *Journal for the Scientific Study of Religion*, *55*(3), 622-636.

Zimring, F. E. (2018). Firearms and violence. In *Gun Studies* (pp. 294-308). Routledge.

Appendix A: Correlation Matrix

	1	2	3	4	5	6	7	8	9	10	11
1. LVR	1.00										
2. Homicide	.48**	1.00									
3. Suicide	.75**	-.22	1.00								
4. Gun Control Laws	-.45**	-.09	-.43**	1.00							
5. Unemployment	-.29*	.65**	-.17	.00	1.00						
6. Urban	-.32*	.13	-.45**	.46**	.18	1.00					
7. GDP (logged)	-.45**	.06	-.55**	.19	.20	.55**	1.00				
8. Divorce-to-Marry Ratio	.55**	.46**	.27	-.29*	.53**	-.22	-.23	1.00			
9. Ethnic Fractionalization	-.06	.50**	-.44**	.30*	.53**	.58**	.42**	-.03	1.00		
10. GINI	-.18	.53**	-.60**	.17	.56**	.34*	-.49**	.27	.46**	1.00	
11. South	.15	.54**	-.25	-.28*	.44**	-.15	.13	.33*	.38*	.41**	1.00

*p < .05; **p < .01