

## ABSTRACT

Title of Thesis: STATE GUN LEGISLATION STRENGTH AND KILLINGS BY LAW ENFORCEMENT: AN EMPIRICAL ANALYSIS OF THE DANGER PERCEPTION THEORY

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The Danger Perception Theory hypothesizes that the use of lethal force by a law enforcement officer can be explained by the level of threat (real or perceived) that an individual officer feels during an encounter. With firearms being ubiquitous throughout the country, I theorize that a state's gun law permissiveness may contribute to an officer's perception of "threat" by increasing the probability that a citizen will have a firearm during any given encounter. Using the strength of gun legislation as a proxy for the level of threat an officer might feel, this thesis aims to empirically test the Danger Perception Theory. This thesis uses three years of data (2017 - 2019) from Mapping Police Violence, a crowd-sourced database that tracks police killings, and the legislative scorecards given by Gifford's Law Center that measures the strength of state gun legislation, to look at individual state variations and test the Danger Perception Theory (DPT). States were matched on thirteen demographic, social, and economic variables, and states that fit the criteria of falling within one standard deviation on each variable and being contiguous with each other, were compared to see if they aligned with the DPT by showing a higher Gifford's score and a lower rate of police killing per million residents. Using an equal-tailed Jeffrey's prior interval, two confidence intervals were constructed for each of the three years to find the probability of support for the DPT. None of the tests conducted were statistically significant, but while the tests lacked statistical significance, the results show a pattern of state that tend to follow the reasoning of the DPT, following the conclusions drawn in previous literature on the topic. These findings suggest that more research is needed in this area, specifically analyzing a greater number of comparable two-state comparisons, could strengthen the argument for (or against) the DPT. This thesis adds to the literature suggesting that a possible avenue for reducing the rate of police killings could be in gun legislation.

STATE GUN LEGISLATION STRENGTH AND KILLINGS BY LAW  
ENFORCEMENT: AN EMPIRICAL ANALYSIS OF  
THE DANGER PERCEPTION THEORY

by

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## Dedication

I would like to dedicate this thesis to my Mom and to my Dad (7/31/53 – 12/9/17). To my mom who answered a phone call almost every day throughout my entire graduate school career, in various states of every emotion and was the backbone of my support system. To my Dad, who I miss every day and I know was also there, albeit in a different way, throughout this whole process.

Finally, I would like to dedicate my thesis to one of my best friends, Mike Lara (4/27/82 – 7/15/22), whose support during my first year of grad school was absolutely foundational to my success. Who supported me during the hard times and when I doubted myself and gave me a reason to laugh every day. Who I know would be right by my side celebrating this monumental moment. To my Mom, my Dad, and Mike: thank you for everything.

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## Table of Contents

<b>Dedication.....</b>	<b>ii</b>
<b>Acknowledgements.....</b>	<b>iii</b>
<b>Table of Contents.....</b>	<b>iv</b>
<b>List of Tables and Figures.....</b>	<b>v</b>
<b>1: Introduction.....</b>	<b>1</b>
<b>2. Literature Review.....</b>	<b>2</b>
2.1 Policing Literature.....	2
2.1.1 History of Policing in America.....	2
2.1.2 Dangers in Policing & Community/Police Relations.....	6
2.2 The History of Firearms in the United States.....	7
2.2.1 Gun Culture in America.....	7
2.2.2 Gun Control in America.....	10
2.3 Historical Problems in Government Collection of Use of Force Data.....	13
2.4 Extant Research & Theories of Police Violence.....	18
2.4.1 Previous Research on Lethal Police Violence.....	18
2.4.2 Gun Legislation and Police Killings.....	21
2.4.3 Theories to Explain Fatal Police Force.....	23
<b>3. Theoretical Framework.....</b>	<b>26</b>
3.1 Danger Perception Theory.....	26
<b>4. The Current Study.....</b>	<b>28</b>
4.1 Data.....	28
4.1.1 Mapping Police Violence.....	28
4.1.2 The Gifford’s Law Center Scorecard.....	30
4.1.3 Household Gun Ownership Proxy (FSS).....	32
4.2 Measures.....	33
4.2.1 Dependent and Independent Variables.....	33
4.2.2 Matching Variables.....	33
4.3 Analytic Strategy.....	34
<b>5. Results.....</b>	<b>38</b>
5.1 Descriptive Statistics.....	38
5.2 Findings & Analysis.....	39
<b>6. Discussion &amp; Conclusion.....</b>	<b>42</b>
6.1 Discussion.....	42
6.2 Limitations & Future Research.....	44
6.3 Concluding Remarks.....	47
<b>7. Appendix.....</b>	<b>49</b>
<b>8. Bibliography.....</b>	<b>58</b>

### List of Tables and Figures

Table 1: Final State Pairs.....	36
Table 2: Descriptive Statistics of Police Killings Decedents.....	39
Table 3: 2017 Pairs Analysis.....	49
Table 4: 2018 Pairs Analysis.....	49
Table 5: 2019 Pairs Analysis.....	50
Table 6: 2017 Race.....	50
Table 7: 2017 Gender.....	50
Table 8: 2017 Allegedly Armed.....	51
Table 9: 2017 Weapon.....	51
Table 10: 2018 Race.....	52
Table 11: 2018 Gender.....	52
Table 12: 2018 Allegedly Armed.....	53
Table 13: 2018 Weapon.....	53
Table 14: 2019 Race.....	54
Table 15: 2019 Gender.....	54
Table 16: 2019 Allegedly Armed.....	54
Table 17: 2019 Weapon.....	55
Figure 1: 95% Probability Distribution of Support for DPT: 5 out of 7.....	39
Figure 1.1: 80% Probability Distribution of Support for DPT: 5 out of 7.....	39
Figure 2: 95% Probability Distribution of Support for DPT: 4 out of 7.....	40
Figure 2.1: 80% Probability Distribution of Support for DPT: 4 out of 7.....	40
Figure 3: 95% Probability Distribution of Support for DPT: 3 out of 6.....	41
Figure 3.1: 80% Probability Distribution of Support for DPT: 3 out of 6.....	41
Figure 4: 95% Probability Distribution of Support for DPT: 4 out of 6.....	42
Figure 4.1: 80% Probability Distribution of Support for DPT: 4 out of 6.....	42
Figure 5: Gifford’s Law Center Data Use and Nondisclosure Agreement.....	56

## 1. Introduction

The killing of individuals by law enforcement officers in the United States has been a disturbingly unique feature of the American justice system. Compared to Western nations with similar colonial roots (Canada and Australia), the United States in 2019 had at least three times more police killings per 10 million residents than the other countries did (United States: 33.5, Canada: 9.8, Australia: 8.5) (Prison Policy Initiative, 2020). The ability of the police to act essentially as judge, jury, and executioner at the earliest stage of the criminal justice system leave no question as to why researchers, activists, and the public give so much attention to the circumstances surrounding these killings. As noted by LeCount (2017), "...There is no greater social power than the legal right to act on behalf of the state in the use of deadly force,".

High profile police killings across the country from the Staten Island borough of New York City, to Sacramento, CA, with many other cities in between like Ferguson, MO, Minneapolis, MN, Louisville, KY, and Baltimore, MD have become rallying calls for transparency and accountability. Despite the amount of attention that has been focused on these types of killings, 2022 was the deadliest year on record for police violence with U.S. law enforcement killing at least 1,176 people across all 50 states and the District of Columbia, and there were only ten days during the year where law enforcement did not kill someone (Mapping Police Violence, 2022). In a sobering statistic, Mapping Police Violence reports that police killed on average three citizens a day, or around 100 per month (Levin, 2023).

Another urgent crisis in the American society is the prevalence of gun violence. For instance, it has been shown that nearly every American, regardless of their racial or ethnic group, will likely know at least one victim of gun violence during their lifetime (Kalesan, Weinberg, and Galea, 2016). Mass shootings, homicides, suicides, and accidental shootings have dominated

headlines. Beyond the threat faced daily by civilians, research has shown that law enforcement officers face an occupational homicide rate (being murdered on the job) three times that of the national average. Furthermore, law enforcement officers who work in states with higher levels of firearm ownership (any kind of firearm) had three times the likelihood of being shot and killed on the job compared to their peers in states with lower gun ownership (Swedler, Simmons, Dominici, and Hemenway, 2015). This thesis will study the nexus of state gun legislation and the rates of police killings through the lens of the Danger Perception Theory. The Danger Perception Theory posits that the more danger an officer feels (real or perceived), the more likely the officer will be to use force against an individual (MacDonald, Alpert, and Tennenbaum, 1999).

## **2. Literature Review**

### *2.1 Policing Literature*

#### *2.1.1 History of Policing in America*

Policing in colonial America approximated the English system with its emphasis on the sheriff, constable, and watch. The American policing system was different in other respects. The early days of American policing encompassed two types including the “watch system” wherein community members essentially kept a look out for impending danger, and the “private-for-profit policing” where official law enforcement officers were paid a fee for warrants served (Potter, 2013). The idea of a centralized municipal police department emerged in the 1830s, and by the 1880s all major cities in the U.S. had municipal police forces. The development of the modern police organization in the American South derived from “slave patrols” (Platt, 1982), with some scholars describing slave patrols as the first publicly funded police departments in the South (Walker, 1980; Durr, 2015). Following the Civil War, these “vigilante-style organizations evolved in modern Southern police departments” controlling freed enslaved persons working as

agricultural laborers and enforcing Jim Crow segregation laws (Potter, 2013). By 1837, Charleston Police Department had 100 officers whose primary duty was to regulate the movement of Black individuals (both enslaved and freed) by checking documents, catching runaway enslaved persons, enforcing slave codes, and preventing revolts (Barlow and Barlow, 1999). It is important to note that historians have shown that the North was not exempt from racial hostility towards Blacks (Litwack, 1961), but the police departments did not evolve from slave patrols like the Southern ones did.

With the Industrial Revolution (late 1800s – early 1900s) came the rise of factories, tenements, and the marketplace, a perceived increase in violent crimes like homicides and robberies, and a readily observable rise in vagrancy, public drunkenness, and prostitution (Uchida, 2004) which led to a sense of loss of social control and disorder. The police at the time were being developed through taxes and political influences whose greatest concern was more economic than crime control (Potter, 2013). During this time, workers that felt exploited by the political and economic elites were “rioting”, which would later be described as a “primitive form of what would become union strikes against employers,” (Silver, 1967 via Potter, 2013, p. 4). These workers along with those who engaged in public drunkenness, political protests, and crime were said to be part of an “underclass that was easily identifiable” as “poor, foreign immigrants, and free Blacks,” (Lundman, 1980; p. 29). Protecting the political and economic interests disguised as crime control was a central theme even in state police agencies. For instance, the Pennsylvania State Police was modeled after the Phillipine Constabulary which was the occupying force in the Phillipines following the Spanish-American War. Similarly, the Texas Rangers were originally “a quasi-official group of vigilantes and guerillas” used to drive Mexican communities and Comanche off of their lands (Potter, 2013).

Starting in the nineteenth-century, policing was hallmarked by large scale corruption. Police departments in large cities like New York City, Philadelphia, and San Francisco were filled with political appointees who followed the interests of their political parties (Uchida, 2004). There are many documented cases where law enforcement officers from police chiefs down to patrolmen engaged in systematic lawlessness, corruption, bribery, and brutality, and this continued all the way up to and through Prohibition (e.g., Fogelson, 1977; Potter and Jenkins, 1985; Walker, 1996; Uchida, 2004). In 1929 President Hoover created the Wickersham Commission which exposed the extent of the corruption and also became the first governmental body to investigate organized crime (Czaplicki, 2010). This marked the beginning of an era of attempted reform in policing through commissions and also among internal actors as well which led to “police professionalism”. O.W. Wilson set this standard when he published his book *Police Administration* which argued for a centralized, military-style policing (Wilson, 1951). This seemed to have the opposite effect of reform and instead exacerbated tensions between the police and the communities they worked in. “Police professionalism and the military model of policing became synonymous with police repression,” (Potter, 2013, p. 11).

The 1960s were fraught with social and political tensions between anti-war sentiments, the Civil Rights movement, riots/protests, and rising crime. A lot of this unrest was handled with brute force by law enforcement, and between 1964 and 1968, almost every major city saw riots initiated by an incident with the police. The first riot was sparked on July 16, 1964 when a white New York City police officer shot and killed a Black teenager. At the end of the two days of looting and burning in Harlem, one person was dead, almost 150 people were injured, and over 500 were arrested. In the following years there were major “race riots” in Los Angeles, CA (Watts riot, 1965), Chicago, IL (1966), and in 1967 Newark, NJ, Atlanta, GA, Cincinnati, OH

and Detroit, MI all saw violence erupt. On April 4, 1968, 110 U.S. cities exploded into chaos after Martin Luther King Jr. was assassinated. One scholar noted that during this time, "...the police became the symbol of society that denied Blacks equal justice under the law," (Uchida, 2004, p. 22).

As a result of these incidents, in the late 1960s, two presidential commissions reported that the precipice for many of that decade's urban riots and protests could be traced back to police shootings (National Commission on Civil Disorders 1968: 17-53) and the lack of guidance received by officers in the training of use of deadly force (President's Commission 1967: 188-89). In 1968, as part of the Omnibus Crime Control and Safe Streets Act, funds were released to try and repair the police-community relations, in what some have described as "cosmetic" attempts (Potter, 2013), and by the 1980s a new strategy called "community policing" was being employed across the country. This new philosophy was theoretically one that bridged the gap and brought the community into conversations with the police and focused on problem-oriented and pro-active policing. It could look physically like fixing 'broken windows', or cleaning up neighborhoods (Wilson and Kelling, 1982), implementing community programs like Drug Abuse Resistance Education (DARE), Neighborhood Watches, and instituting foot and bike patrols versus patrol cars (Uchida, 2004). Some of these policies and programs, like the War on Drugs, had detrimental effects on community-police relations, as they seemed to target communities of color specifically.

This has led us to the state of policing in today's America. As we discuss the history of policing through the 21<sup>st</sup> century, it seems as though this new era is one defined by technology through the use of body-worn cameras, citizen surveillance, and even community surveillance of police through the emergence of smart phones. Certain enduring themes in history include the

militarization of law enforcement, the application of force, and the complex relationship between political and economic influence.

### *2.1.2 Dangers in Policing & Community-Police Relations*

At the core of the Danger Perception Theory is the belief (real or perceived) that an officer is in imminent life-threatening danger. Although violence against police has been declining over the last half century (White, Dario, and Shjarback, 2019), several researchers have suggested that the focus on officer fatalities involving criminal activity has influenced the socialization and cultural norms within law enforcement (Ingram, Terrill, and Paoline III, 2018; Sierra-Arévalo, 2019), damaged police legitimacy, and caused harm to the public (Stoughton, 2014). This is not to say that policing is not a dangerous job. As previously mentioned, law enforcement officers face an occupational homicide rate three times that of the national average. It is the second leading cause of occupational mortality behind vehicle collisions for law enforcement (Tiesman, Hendricks, Bell, and Amandus, 2010). Of those homicides, more than 90% are committed with a firearm (Swedler, Kercher, Simmons, and Pollack, 2014). Swedler et. al (2015) found that states with high firearm ownership compared to states with low ownership, saw three times more homicidal violence against the police (Swedler et. al, 2015). I would be remiss in any discussion of violence against police to not also mention high-profile attacks on police in the recent years like the two officers killed in Brooklyn in 2014, the ambush on Dallas Police Department officers in 2016, which left five officers dead, and the three officers killed in Baton Rouge in 2016 (White et. al, 2019). Through both formal and informal mechanisms, there is an emphasis placed on the dangers of the job and of patrol (Sierra-Arévalo, 2021). Although devastating, both killings *of* police officers and *by* police officers are relatively rare events (e.g.,

Zimring and Arsiniega, 2015; Marenin, 2016; White et. al, 2019), however the repercussions of both on community-police relations is widely felt and seen.

When communities experience police violence, there can be a loss of faith and trust in the criminal justice system which undermines law enforcement's ability to reduce and prevent violence. Members of the community might be less likely to call the police or become witnesses on one end of the spectrum, and on the other, may take retaliatory justice into their own hands, continuing the cycle of violence (Educational Fund to Stop Gun Violence, 2020). Some of the lesser known, yet equally important impacts of police violence on communities, is that on school age children and teenagers. Researchers have found that those communities that have been exposed to such violence are associated with poor school performance, and lower rates of high school completion; on average, each additional police shooting within a county correlated with three additional high school students dropping out (Ang, 2021). The President's Task Force on 21<sup>st</sup> Century Policing (2015, p. 12) states that "law enforcement agencies should acknowledge the role of policing in past and present injustice and discrimination and how it is a hurdle to the promotion of community trust." All of these outcomes may sustain a cycle of escalating violence, potentially leading law enforcement officers to experience heightened levels of apprehension, thereby increasing their readiness to resort to lethal force, thus perpetuating the cycle.

## *2.2 The History of Firearms in the United States*

### *2.2.1 Gun Culture in America*

The statistical data and prevailing sentiments regarding both firearm possession and gun-related violence in the United States serve as significant indicators of cultural norms and the widespread prevalence of firearms. Gun ownership and gun culture has evolved from the primary

purpose being one of necessity to one of sport and hobby, to now one of personal protection. The gun culture that is so uniquely American, has been described as “a strong cultural association of guns with personal identity and national values” (Yamane, 2017, p. 2; Cook and Goss, 2014; Wright, Rossi, and Daly, 1983). The number of concealed carry permit holders has grown throughout the years as concealed carry laws have broadened. At the end of 2011, the Government Accountability Office estimated that there were around 8 million active concealed carry permits in the United States (Government Accountability Office, 2012). More recent figures from the Crime Prevention Research Center in late 2022 put the number at 22.01 million, a 2.3% increase from 2021 (Crime Prevention Research Center, 2022). Yamane (2017) claimed that one out of every 10 adult citizens in shall-issue states<sup>1</sup> like Georgia, Iowa, and South Dakota, is potentially armed in public, and three to four out of every 100 Americans overall, at the time of publication (Yamane, 2017). According to the Small Arms Survey of 2017, there were about 393 million firearms in the United States with a population of about 326 million people meaning that there were more guns than there were people (Small Arms Survey, 2017), and in 2020, gun-related injuries became the leading cause of death among children and teens (Centers for Disease Control, 2020).

In 1970, Richard Hofstadter coined the term “gun culture” and described how the United States has always emphasized firearms. He claimed that “The American answer to civic and military decadence, real or imagined, was the armed yeoman,” and played a central role in the Revolution and in their liberty from the English. As time went on, the gun became a necessity

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<sup>1</sup> Shall-issue states require that as long as an applicant passes the basic requirements set out by the state law, the state must issue a permit. This is different than a may-issue state, wherein the state has the discretion as to whether or not to issue the permit. There are currently 41 shall-issue states. (<https://www.usconcealedcarry.com/resources/terminology/types-of-concealed-carry-licensure-permitting-policies/shall-issue/#:~:text=There%20are%20currently%2041%20shall,other%20states%20with%20favorable%20reciprocity>).

within the Southern culture, particularly insofar as it related to the work of slave patrols; it became an important symbol of white male status. Through the years, what started out as a tool for agriculture and frontier expansion then transformed into a sport and “an ingredient in the American imagination” (Hofstadter, 1970). In the wake of World War II, the participating countries were left with a huge surplus of weapons and the United States was both large enough and wealthy enough, to become the best market for them. There was another flood of available weapons again in the 1950’s when NATO forces discarded a stock of rifles as they switched to a uniform cartridge (Hofstadter, 1970).

During the late nineteenth century and into the twentieth century, hunting, which previously had been an activity to hunt for food, became a recreational pastime and target shooting and fraternal shooting clubs were becoming more common (Gilmore, 1999). In 1871, the National Rifle Association (NRA) was founded and has since played an integral role in the proliferation of America’s gun culture. Today seen as a politically influential lobbying organization, in the earlier days, the NRA promoted rifle marksmanship through long-range shooting competitions known as “The National Matches” at Camp Perry, Ohio (Hummel, 1985). Throughout most of the twentieth century, the culture of guns was primarily focused on recreational use; in 1978 a survey of gun owners found that 71 percent owned firearms for activities such as collecting, hunting, or target shooting (Wright et al., 1983, p. 60). Over the last fifty years, the focus has shifted from recreational shooting, what Yamane (2017) coined “Gun Culture 1.0”, to armed self-defense, or “Gun Culture 2.0”.

A National Firearms Survey from 2015 showed that 63 percent of gun owners reported that the main reason they owned a gun was for protection against people (Azrael, Hepburn, Hemenway, and Miller, 2017). More recently, a poll conducted by the Washington Post asked

399 AR-15 style rifle owners why they owned one of these high-powered rifles. The most popular reason was for “Self-Defense/ Protect home/ self/ family” with 33 percent of surveyed owners citing that as the main reason. “Target shooting/ Take to range/ Competition” and “Recreation/ Fun/ Sport” came in as the next most popular reasons, both at 15 percent. These results came from open-ended responses to the survey that were then coded into categories (Guskin, Tambe, and Gerberg, 2023)<sup>2</sup>. Yamane refers to these changing ideals as the “culture of armed citizenship”, (Yamane, 2017, p. 5).

There are many subcultures within the broader umbrella of gun ownership like gun collectors, cowboy action shooting, target shooters, and daily concealed gun carriers, however the one similarity is the fundamental belief in owning a physical firearm for whatever purpose they so wish (Stover, 2022). The prevalence of guns in the hands of civilians increases the probability that police officers will encounter an individual in the possession of a firearm (Swedler et. al, 2015) compared to an unarmed individual, and this may explain why some officers end up using fatal force.

### *2.2.2 Gun Control/Legislation*

Legislation around firearms is as old as the United States itself. On July 30, 1619, twelve years after the establishment of the Virginia colony, the first General Assembly of Virginia met in Jamestown where, among the first thirty enactments to govern the new colony, was a gun control law. It stated, “[t]hat no man do not sell or give any Indians any piece, shot, or powder, or any other arms offensive or defensive, upon pain of being held a traitor to the colony and being hanged as soon as the fact is proved, without all redemption,” (Spitzer, 2017, p. 57). From the country’s founding to 1934, which is when the first federal gun law was enacted, there were

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<sup>2</sup> The totality of these responses does not equal 100 percent because up to two answers were accepted. Error margin of +/- 5.5 percentage points.

hundreds of laws enacted that put restrictions on carrying, brandishing weapons, semi-automatic guns, and outright bans. Some of the earliest carry restriction laws were put in place as early as 1686, when New Jersey prohibited wearing weapons because they induced “great Fear and Quarrels” (Act of February 14, 1750, Ch. 17, § 1, 1750 Mass. Acts 544, 545). By the 1800s, forty other states had passed similar restrictions and five more were added to the list by the 1900s (Spitzer, 2017). In the Post-Civil War era, there were seven state bans that criminalized the sale or exchange of firearms. Six of them were strictly for pistols (Texas, Kansas, Arkansas, and three in Tennessee), and one (Wyoming) banning all firearms—handguns and long gun. Arkansas also banned the sale and transfer of pistols unless they were for military use (Spitzer, 2017).

The first state to pass a law criminalizing the carrying of concealed weapons (knives included) was Kentucky in 1813, with Louisiana closely following and passing a similar law that same year (Act of Mar. 25<sup>th</sup>, 1813, 1812 La. Acts 172). This trend spread throughout the union and the rest of the country in the nineteenth century. Behind laws regulating hunting and militias, laws prohibiting concealed carrying were among the most common (Spitzer, 2017). In the early 1900s, there were many laws that aimed at prohibiting guns from non-citizens, young people, inebriated individuals, and felons. Another group of individuals who were targeted with gun laws were enslaved persons. Early in American history, it was considered essential to arm enslaved persons because of the conflicts with the Native Americans, however this practice was abandoned as time went on because guns became a way to control the enslaved population and the fear of revolts increased (Brown, 2006). There were also the beginnings of modern laws banning dangerous or unusual weapons, with New Jersey passing the first of its kind in 1771 banning “gun traps” or rigging a firearm to be fired with a string or other mechanism beyond an

actual finger (Act of December 21, 1771, Ch. DXL, § 10, 1771 N.J. Laws 343, 346). The majority of legislation of this type, however, was seen in the early 1900s. West Virginia became the first state to enact anti-machine gun laws in 1925 (Act of June 5, 1925, Ch. 3, 1925 W. Va. Acts 24), and at least twenty-eight other states followed in this time period (Spitzer, 2017).

The National Firearms Act (NFA) of 1934, thought to be the first significant national gun law (Spitzer, 2017), was a direct response to the violence that characterized the Prohibition Era. This Act imposed criminal, regulatory, and tax requirements on weapons that were mainly favored by the main actors perpetuating gang violence, namely fully automatic firearms, short-barreled shotguns and rifles, and firearm sound suppressors, or “silencers” (Office of the Inspector General, 2007). The NFA was expanded through the Gun Control Act of 1968 when it was expanded to include destructive devices (e.g., explosive and incendiary bombs, flash bang grenades, and weapons with a bore of greater than one-half inch in diameter), machine gun frames or receivers, and conversion kits for machine guns. In 1986, Congress passed the Firearms Owners’ Protection Act that prohibited anyone from owning a machine gun that was not purchased legally prior to its enactment; this meant that the only newly manufactured machine guns would be available to the U.S. government and law enforcement (Office of the Inspector General, 2007). The Brady Handgun Violence Protection Act was enacted in 1993 and imposed a waiting period of five days before a “licensed importer, manufacturer, or dealer may sell, deliver, or transfer a handgun to an unlicensed individual”. This became effective in February of 1994 and ceased to apply at the end of November 1998 (Bureau of Alcohol, Tobacco, and Firearms, 2021). The Federal Assault Weapons Ban, a subsection of the Violent Crime Control and Law Enforcement Act of 1994, was a ten-year ban on the manufacture for civilian use of certain assault weapons and ammunition magazines that were defined as large

capacity (Violent Crime Control and Law Enforcement Act of 1994). There have been multiple attempts to re-instate this ban, however none have been successful.

In recent years, the debate on gun control has heated up as mass shootings, as well as other gun deaths including suicides, homicides, and accidental deaths, have continued to increase (Gramlich, 2023). The decentralized nature of gun laws in the United States makes going into each individual state's legislation beyond the scope of this section, however this brief synopsis gives an overview of the earliest gun laws from the nation's founding to some of the very broad federal gun laws.

### *2.3 Historical Problems in Government Collection of Use of Force Data*

The United States has been historically neglectful of obtaining official data on use-of-force by law enforcement, and thus making the analysis of any patterns or trends difficult for researchers (e.g., Sherman and Langworthy, 1979; Sharara and Wool et. al, 2021). The reason for this is that there is no federally mandated reporting system in place despite calls from the public, researchers, and activists for such a system and to treat these types of killings as a public health crisis (e.g., Lett, Asabor, Corbin, and Boatright, 2021; Edwards, Lee, and Esposito, 2019; Sharara and Wool et. al, 2021; Finch, Beck, Burhart, Johnson, Klinger, and Thomas, 2019). The government data collection efforts that have been made, have been shown by many scholars to have consistently underreported the number of deaths at the hands of law enforcement agents (e.g., Fyfe, 2002; Loftin, Wiersema, McDowall, and Dobrin, 2003; Klinger, 2012; Finch et. al, 2019; Sharara and Wool et. al, 2021; Diaz, 2023). The three main governmental databases that have aimed to record some aspects of deaths arising from encounters with the police are: 1) the National Vital Statistics System (NVSS), 2) the Federal Bureau of Investigation's Supplementary

Homicide Reports, and more recently 3) the Bureau of Justice Statistics Death in Custody Report Act (DCRA) Data Collection.

The National Vital Statistics System (NVSS) of the National Center for Health Statistics collects all death certificates issued in the United States and includes information on the decedent's age, sex and race as well as the place, date, and cause of death. In the case of homicides, the death requires a medical examiner or coroner (who may or may not be a licensed physician) to complete the medical part of the death certificate, including in the case of police violence (Bureau of Justice Statistics, 2014). The death certificate is then filed with the designated registrar in the district wherein the death occurred (Sharara and Wool et. al, 2021; Loftin et. al, 2003). In the first academic analysis of the accuracy of the NVSS, Sherman and Langworthy (1979) found that police homicides were underreported possibly by as much as 50 percent. Loftin et. al (2003) found that, in the case of the NVSS, one of the main reasons for the underreporting of deaths at the hands of the police is that the certifiers made no mention of police involvement in the death report which caused the case to be misclassified as a homicide (Loftin et. al, 2003). More recently, Sharara and Wool et. al (2021) compared data from the NVSS to three non-governmental, open-sourced databases (Fatal Encounters, Mapping Police Violence, and The Counted) to quantify the rate of underreporting from the agency. Sharara and Wool et. al (2021) used a network meta-regression to provide adjusted estimates of deaths due to police violence from 1980 to 2019 (Sharara and Wool et. al, 2021). Similar to the results shown by Loftin and colleagues (2003), the revised estimates showed that more than half of all deaths due to police violence had been underreported by the NVSS (Sharara and Wool et. al, 2021). One reason for this could be that the medical examiner or coroner was pressured to rule a death accidental. In a 2011 web-based survey of the National Association of Medical Examiners, 22%

of respondents reported that they had been pressured to change the cause or manner of death on a death certificate (Melinek, Thomas, Oliver, Schmunk, Weedn, and the National Association of Medical Examiners Ad Hoc Committee on Medical Examiner Independence, 2013).

The Federal Bureau of Investigation's Supplementary Homicide Reports (SHR) collected as part of the Uniform Crime Reporting (UCR) System<sup>3</sup> collected monthly information voluntarily submitted by local and state law enforcement agencies. The information collected was included in two sections: one for all murders and nonnegligent manslaughters (including justifiable homicides) and negligent manslaughter homicides. The former refers to cases that were "suspected to be murders, violence-related manslaughters, law enforcement-related killings, and homicides committed in self-defense", and the latter referred to incidents wherein the death of the person was unintentionally caused by another (Bureau of Justice Statistics, 2014). Each incident collected victim and offender characteristics, relationship between the two, weapon, and a short description from the agency about the circumstances of the death. The incident was coded as a justifiable homicide committed by police if the description of the incident mentioned that the individual was killed by an officer of the law or other "peace officer" acting in the line of duty by staff of the state agency or by the FBI (Loftin et. al, 2003).

Multiple scholars have found that the UCR's SHR reported more justifiable homicides by law enforcement than did the NVSS, with one study finding that the SHR estimates was 29% larger than the NVSS estimate (Loftin et. al, 2003; Klinger, 2012), however, this does not automatically imply that such information should be relied upon or utilized for precise analyses of police violence. This could be due to the fact that both systems had different subcategories of

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<sup>3</sup> As of January 1, 2021, the National Incident-Based Reporting System (NIBRS) became the only mechanism for reporting crime data to the UCR Program, moving it from the legacy of the traditional Summary Reporting System (SRS) to NIBRS (<https://www.fbi.gov/how-we-can-help-you/more-fbi-services-and-information/ucr/nibrs#>).

homicide, for example the NVSS's "legal intervention deaths" corresponded with the FBI definition of "justifiable homicide" (Bureau of Justice Statistics, 2014). However, as mentioned above, if the certifier makes no mention of police involvement, the death could be easily misclassified as a homicide under the NVSS classification system. Studies have found that the numbers that were voluntarily reported were not only inaccurate, but at the time of the studies, only 750 out of approximately 17,985, or 4.2% of law enforcement agencies, voluntarily submitted their police killing data to the FBI's SHR program (Finch et. al, 2019; Fyfe, 2002; Loftin et. al, 2003; Klinger, 2012). The reason for this low number was not because a large number of agencies did not participate in the UCR program, but that a larger number of these agencies did not file the SHR forms monthly, or at all. It has also been speculated that the reason for the low reporting has to do with a belief that only criminal homicides should be reported, or that certain cases fall under the jurisdiction of federal law enforcement (New York State Commission on Criminal Justice and the Use of Force, unpublished data, 1987 via Loftin et. al, 2003).

In 2000, Congress passed the Death in Custody Reporting Act of 2000 (DCRA) (H.R. 1800, Public Law 106-297) which required that states report to the Bureau of Justice Statistics any deaths and the circumstances surrounding the deaths of persons within their custody; the law expired in 2006. In 2014, the U.S. Congress passed into law HR 1447 or the Death in Custody Report Act (DCRA) of 2013 that required that states that receive allocations under specified provisions of the Omnibus Crime Control and Safe Streets Act of 1968 "...report to the Attorney General on a quarterly basis certain information regarding the death of any person who is detained, arrested, en route to incarceration, or incarcerated in state or local facilities or a boot camp prison," (Death in Custody Reporting Act, 2000; 2013). States that do not comply face a

penalty of up to a 10% reduction to their awards under their primary source of federal funding to state and local jurisdictions—the Edward Byrne Memorial Justice Assistance Grant Program. The DCRA data is required to be reported to Congress by the Justice Department to be used to formulate policies and strategies that prevent in-custody death, but despite this federal law, no report has been created. This has led some to describe this area of data collection as a “black hole” (Diaz, 2023). In September 2022, the Government Accountability Office testified that 70% of the records submitted to the Justice Department by states “were missing at least one required element—e.g., a description of the individual’s death,”<sup>4</sup>. In a statement to the media outlet NPR, a spokesman for the DOJ’s Office of Justice Programs “committed in late 2022 to enhancing its existing DCRA efforts and released a public report outlining steps to do so,” (Diaz, 2023).

There have been other governmental efforts to collect data on use of force by law enforcement agents. One such program known as the Death in Custody Report Program (DCRP, different from the DCRA discussed above) started in 2003 by the U.S. BJS sought to count every citizen death—no matter the cause—that occurs at any point in the criminal justice process. Deaths that were caused by the actions of police officers were counted as “Arrest-Related Deaths”. A further comparison of the deaths the DCRP had released from 2003 to 2005 and the number of police related deaths in the FBI’s SHR showed large discrepancies for each state. For example, in California, the SHR figures showed 352 justifiable homicides by police from 2003 to 2005 while the DCRP data showed 160. This has shown that the DCRP is not a reliable indicator of police killings (Mumola, 2007; Klinger, 2008, 2012).

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<sup>4</sup> <https://www.gao.gov/products/gao-22-106033#:~:text=The%20Death%20in%20Custody%20Reporting,description%20of%20the%20individual's%20death.>

In 2020, the George Floyd Justice in Policing Act of 2020 was introduced to Congress and passed in the House. The bill aims to increase “accountability for law enforcement misconduct, restricts the use of certain policing practices, enhances transparency and data collection, and establishes best practices and training requirements,” (George Floyd Justice in Policing Act of 2020). Among other things it would limit qualified immunity for officers<sup>5</sup>, ban no-knock warrants, chokeholds, carotid holds, and would create a national registry—the National Police Misconduct Registry. This bill did not pass in the Senate and continues to be deadlocked due to failed negotiations (Breslow, 2021). Many scholars have called for a federally mandated database that records officer use of force and deaths (e.g., Sherman and Langworthy, 1979; Finch et. al, 2019; Sharara and Wool et. al, 2021; Edwards et. al, 2019), however even this approach has been met with skepticism. The Office of the Inspector General fears incidents will be undercounted because the government relies on states to self-report (Congressional Research Service, 2020).

## *2.4 Extant Research & Theories on Police Violence*

### *2.4.1 Previous Research on Lethal Police Violence*

The first systematic study of police killings was conducted by Gerald Robin in 1963 who examined all fatal shootings by Philadelphia police using records of the Homicide Unit of the Philadelphia Police Department during the years 1950 through 1960, and also studied nine other cities comparatively, all with populations over 250,000. In all ten cities, Black individuals made up a disproportionate number of decedents, ranging from 6 to 29 times the rate of White

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<sup>5</sup> Qualified immunity is a doctrine that protects both state and local officials, like law enforcement officers, who perform discretionary duties, from individual liability unless the official violated a clearly established constitutional right. (<https://crsreports.congress.gov/product/pdf/LSB/LSB10492#:~:text=Qualified%20immunity%20is%20a%20judicially%20created%20legal%20doctrine%20that%20protects,rights.>)

individuals. There were a total of 32 cases in Philadelphia during this time period and all but two were ruled by the medical examiner to be justified homicides and the officers were exonerated of any wrongdoing. The officers in the other two cases were held, brought before a grand jury, indicted, tried, and acquitted. Robin used the term “justifiable police homicides (JPH)”<sup>6</sup> to describe these cases, and noted how the decedent assumes the dual role of victim and offender (V-O). Robin studied the race, age, and the time that the death occurred. He found that Black individuals made up a disproportionate amount of these deaths among the ten cities for a national annual ratio of 7 to 1 compared to White individuals; that the decedents were relatively young with an average age of 27.6 years; and that there was a tendency to use fatal force in the late evening and early morning hours. Robin was the first scholar to rigorously study the phenomenon of fatal encounters with the police.

In the years since, there has been a substantial body of literature examining different characteristics of both the decedents and the officers involved in police killings (for the purposes of this thesis, “police killings” refer to killings *by* law enforcement officers). Much of this research has analyzed the racial disparities among people killed by police and found similar results to those of the first study by Robin (1963). The research shows that Black individuals comprise a disproportionate number of police homicide victims relative to the general population and that a Black individual faces a higher risk than a White individual of being a victim to police violence (e.g., Sharara and Wool et. al, 2021; Schwartz and Jahn, 2020; Edwards, Lee, and Esposito, 2019; Lett et. al, 2021; Hemenway, Berrigan, Azrael, Barber, and Miller, 2020).

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<sup>6</sup> It is important to note that the conclusion of “justified” was reached through testimony given from the police combined with official police interviews and reports. The field has now come to recognize the biases that can make their way into these reports, so it is a difficult conclusion to accept at face value that these cases were in fact, “justified”. The biases can come from the police officers themselves, for example in their reporting of intimate partner violence situations (Twis, Nguyen, and Nordberg, 2018), and even from witness statements (e.g. Quijano-Sánchez, Liberatore, Camacho-Collados and Comacho-Collados, 2018), leading researchers to rely on outside sources as well as police reports (Guss, Tuason, and Devine, 2020).

Hemenway et. al (2020) found that Black victimization rates were more than twice those for Whites when using the *Washington Post* dataset (The Fatal Force database), and Sharara and Wool et. al (2021) concluded that, after making statistical adjustments for control variables, police killed Black people at a lifetime rate of 3.5 times more than White people. Furthermore, these studies have shown that Black men in particular, are among the most at-risk group for these kinds of killings (Sharara and Wool et. al, 2021; Lett et. al, 2021; Hemenway et. al, 2020; Schwartz and Jahn, 2020), with one study showing that Black men face a 1 in 1,000 lifetime chance of being killed by the police, and that they are about 2.5 times more likely to be killed by police than White men (Edwards et. al, 2019).

The research that has examined characteristics of the officers who are involved in these kinds of killings have come to a broader range of conclusions than those reached about individuals killed by the police. It seems consistent in this research that male officers are more likely to be involved in fatal shootings than women officers, with one study finding that men were three times more likely than women to be involved in these kinds of incidents (McElvain and Kposowa, 2008). There are also several studies that show that as officers' years of experience and rank increase, as well as their level of education, the chances that they will use force is less likely (Paoline and Terrill, 2007; Aamodt, 2004; McElvain and Kposowa, 2008). Research looking into the race/ethnicity of the law enforcement officers have come to differing conclusions, however. Some scholars have found that Black officers and officers of color are more likely to be involved in fatal police incidents (Geller and Karales, 1981; Geller and Scott, 1992), and others have found that White officers are more likely to be involved in a shooting incident (McElvain and Kposowa, 2008). The differences here could be due to the sample size of these studies and the demographics of both the officers and the population in which those studies

were concentrated. One interesting finding has shown that the officer's history of shootings was a strong predictor of future shootings (McElvain and Kposowa, 2008). One reason for this could be that the officer is conscious of the dangers of the job and might be quicker to react with lethal force than officers who have not been involved in those situations before (McElvain and Kposowa, 2008).

Other research conducted in this area has analyzed different correlates of police violence like unemployment rates, violence (Klinger, Rosenfeld, Isom, and Deckard, 2015), murder rates (Sherman and Langworthy, 1979; Liska and Yu, 1992; Sorensen et. al, 1993; Jacobs and O'Brien, 1998), percentage of nonwhite population (Liska and Yu, 1992), economic inequality (Sorensen et. al, 1993; Smith, 2004; Klinger et. al, 2015), and population size (Jacobs and O'Brien, 1998). This research has shown that police killings are higher on average in areas with high levels of violent gun crime (e.g., Hemenway, Azrael, Conner, and Miller, 2019; Klinger et. al, 2015), that economic inequality was highly predictive of these types of killings (Sorensen et. al, 1993, Smith, 2004), although some studies came to the opposite conclusion (Klinger et. al, 2015), and that areas with higher levels of diversity were predictive of police killings (e.g., Liska and Yu, 1992; Jacobs and O'Brien. 1998; Johnson, St. Vil, Gilbert, Goodman, and Arroyo Johnson, 2018; Klinger et. al, 2015). Researchers have found that as the percentage of the nonwhite population increases, so does the rate of police homicides for both the White and nonwhite population (Liska and Yu, 1992), and that police killings tend to occur more often in areas where people of color are concentrated (Jacobs and O'Brien, 1998; Johnson et. al, 2018).

#### *2.4.2 Gun Legislation and Police Killings*

There have been multiple studies that have examined the strength of gun legislation and police killings in recent years using different data sources for both gun legislation strength and

crowd-sourced databases that collect information on these kinds of killings. Sivaraman, Marshall and Ranapurwala (2020) used the National Violent Death Reporting System (NVDRS) and the State Firearm Law Database to examine the racial disparities in sixteen U.S. states and found that increased gun legislation could decrease rates of police killings, but this protective effect was not observed for Black Americans (Sivaraman et. al, 2020). Kivisto, Ray, and Phalen (2017) used The Counted database<sup>7</sup> and legislative scorecards from the Brady Center to measure the relationship between state-level variation in firearm laws on rates of fatal shootings from January 1, 2015, through October 31, 2016. They found that states with stricter gun laws had lower rates of fatal police violence on average, with the states with the strictest firearm legislation having more than 50% lower fatalities by police than states with the weakest laws (Kivisto et. al, 2017).

In a similar study using a legislative scorecard, Rogna and Nguyen (2021) used the Fatal Encounters database<sup>8</sup> and the Giffords scorecard<sup>9</sup> to examine the relationship between the two. They found that a “...an increase of one point in the overall Giffords score causes an approximately 1% reduction in the number of fatal police shootings per million of inhabitants...” (Rogna and Nguyen, 2021, p. 15). Furthermore, they disaggregated the seven component scores used to create the overall score (background checks and access to firearms (*BCAF*), other regulations of sales and transfers (*ORST*), classes of weapons and magazines/ammunitions (*CWAM*), consumers and child safety (*CCS*), gun owner accountability (*GOA*), firearms in public places (*FPP*), and a residual class (*OTH*)), to further refine their results and help with more specific policy recommendations. They found that gun owner accountability was the most

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<sup>7</sup> The Counted is a database and map that was launched by The Guardian that includes information on individuals whose death was caused by an American law enforcement officer in 2015 and 2016.

<sup>8</sup> The Fatal Encounters database is an open-source dataset tracking all deaths through police interactions since January 1, 2000.

<sup>9</sup> The Giffords Law Center has annually assigned a letter grade to states based on the strength of their gun laws since 2010 (<https://giffords.org/lawcenter/resources/scorecard/>).

significant category with a one-point increase in this score leading to an on average decrease of 3.7%-3.8% in the number of individuals killed by law enforcement officers (Rogna and Nguyen, 2021)<sup>10</sup>.

#### *2.4.3 Theories to Explain Fatal Police Force*

Academics, particularly policing scholars, have attempted to explain the use of fatal force on individuals by law enforcement, using different theories over the years. There are quite a few criminological theories that have been used to attempt to do this like General Strain Theory, wherein the officer's stress influences their decisions, including the one to use force (Apaza, 2017; Agnew 1992), the brutality theory, used to explain both deadly force and executions, as a justifiable method to resolve a crime related incident (Bowers and Pierce, 1980) and the conflict theory of law that argues that the police function as a tool to maintain the power dynamics of the privileged (Turk, 1969).

Some early scholars claimed that the racial disparities in the victimology were the result of Black individuals having more involvement in crime and came to this conclusion by looking at arrest rates (Goldkamp, 1976; Sorensen, Marquart, and Brock, 1993). This conclusion however, rests on the assumption that arrests are a valid indicator of criminal involvement. One of the more prominent theories that has attempted to explain the racial disparities is the racial threat theory (or minority threat hypothesis) introduced by Blalock in 1967. This theory claims

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<sup>10</sup> This study published by Marco Rogna and Bich Diep Nguyen (2021) is similar to mine, however there are important differences to note. The difference between their study and mine lies in the databases, the time periods, and the statistical analysis. Rogna and Nguyen (2021) use the Fatal Encounters database to study the number of deaths caused by police shootings between January 1, 2012 and December 31, 2018. My thesis will be using the Mapping Police Violence database to examine the years January 1, 2017 to December 31, 2019. The most important difference, and where this thesis will add a unique contribution to the literature, is in the statistical analysis. Rogna and Nguyen (2021) ran regression models to reach their conclusions whereas this study will be using a matched-pair comparison analysis. The previous study compared all states, so a comparison of Texas and Minnesota gets as much weight as one between Texas and Louisiana. This study will examine multiple states that are similar to each other in certain aspects, like geography and demographic composition, but that have different Gifford's scorecard letter grades, to statistically test the danger-perception theory.

that as the relative population size of racial minorities grow, the majority group grows fearful of the social order being threatened (e.g., Liska and Yu, 1992; Jacobs and O'Brien, 1998; Johnson et. al, 2018). Blalock's theory was originally focused on the different threats—particularly economic or political—that may arise from a growing minority population, since his theory was mainly one of a struggle between power and resources. Regarding the economic threat, Blalock theorized that discriminatory responses from the group in control will increase when the minority population increases, because of the competition for available jobs, and wages (Blalock, 1967; Dollar, 2014; Gabbidon, 2015; Gray and Parker, 2020). Similarly, regarding the political or power threat, as the minority group gains more access to political power and resources, again, the majority group will increase the discriminatory and control practices to deter that from happening (Blalock, 1967; Feldmeyer and Cochran, 2018; Stults and Swagar, 2018; Gray and Parker, 2020). If the minority group can do both of these things, they can then challenge the existing racial order (Dollar, 2014; Gabbidon, 2015; Gray and Parker, 2020). Arguably the most important aspect of Blalock's theory is that of the racial composition threat, or the threat associated with the size of a racial minority group. Discussed briefly in the section previously, there has been substantial research showing support for this (e.g., Liska and Yu, 1992; Jacobs and O'Brien, 1998; Johnson et. al, 2018; Klinger et. al, 2015). Alternately, there have been several studies that found that the size of the Black population was not a predictor of deadly force (e.g., Jacobs and Britt, 1979; Holmes, Painter II, and Smith, 2019).

One philosophy regarding law enforcement mentality that warrants a brief mention is the Warrior/Guardian mentality, insofar as it relates to the Danger Perception Theory. This framework is largely philosophical and deals with law enforcement's psychological and behavioral orientation towards their work. This philosophy is unique in police culture literature

because rather than academic research, it began in public and legal scholar discourse (McLean, Wolfe, Rojek, Alpert, and Smith, 2019). Stoughton (2016) posits that there are four attributes that are central to the Warrior mentality in law enforcement: honor, duty, resolve, and the “the willingness to engage in righteous violence” (Stoughton, 2016, p. 632). Stoughton claims that when it comes to pursuing justice, the Warrior must adhere to a code of honor that he claims is governed not by law “...which is often seen as frustrating, rather than furthering justice—but by the norms of the Warrior brotherhood itself” (Stoughton, 2016, p. 633). Duty refers to the mentality of committing oneself to the cause, one that will never be fully completed. Resolve is possessing the mental ability to survive not just physical threats, but those from public criticism and when they believe the system has failed. Finally, the “willingness to engage in righteous violence” speaks to the Warrior’s ability to use violence to protect him/herself and others from victimization. This is a tool that they should not be afraid to use, but should be made “deliberately and repeatedly”, as their “gift of aggression” (Grossman and Christensen, 2007 via Stoughton, 2016). Alternately, the Guardian mentality in policing is one that seeks to foster trust in the community by instilling values that builds community relationship and encourages public engagement, one that guards and protects and does not seek confrontation (Stoughton, 2016). Stoughton argues that the Warrior mentality has been fostered and encouraged in police culture in the wake of “race riots” like the Watts riot in Los Angeles, the development of the SWAT team, and the militarization of the police overall. The President’s Task Force on 21<sup>st</sup> Century Policing (2015) suggested a shift from the Warrior mentality to that of the Guardian mentality to improve community relations. As to how this philosophy plays a part into the Danger Perception Theory, the Warrior mentality may lead officers to be quicker to employ lethal violence as the

Us versus Them thinking could make them quicker to believe someone they are involved with in an encounter poses an imminent deadly threat.

### **3. Theoretical Framework**

#### *3.1 Danger Perception Theory*

Researchers have argued that deadly force by police can best be explained by law enforcement's exposure to dangerous situations, places, and persons. This perspective has been called the "community violence" perspective (Sorenson et. al, 1993), the "reactive hypothesis" (Jacobs and O'Brien, 1998), and the "danger-perception" theory which is the name of the theory that will be used going forward (MacDonald, Alpert, and Tennenbaum, 1999). The Danger Perception Theory posits that the use of deadly force by law enforcement can be explained by the level of threat (real or perceived) that the officer encounters during any encounter. MacDonald et. al (1999) further refined this theory to include a "reactive hypothesis" that claims that as the number of dangerous situations increase (or more specific to my thesis, as the number of firearms increase), so will the number of cases where officers will use force, and thus, the number of police killings will also increase. MacDonald et. al (1999) first tested this hypothesis by using criminal homicides as a proxy for the number of (real or perceived) dangerous situations. Their findings supported the "reactive hypothesis" of the Danger Perception Theory showing that there was evidence of a temporal connection between criminal homicides and deadly force by police. These findings were further reinforced in another study (MacDonald, Kaminski, Alpert, and Tennenbaum, 2001) that further refined the "reactive hypothesis" to the "ratio-threat" hypothesis, which is a concept borrowed from political science literature known as the "ratio goal" model (Ostrom and Marra, 1986). This model explains killings by police as a

“fixed ratio or function of the level of violence (real or perceived) in society” (MacDonald et. al, 2001).

It is important to recognize that while “theory” is in the title, the Danger Perception Theory is more of a set of hypotheses. The distinction is that the set of hypotheses can be specifically tested while a theory makes a more generalizable claim about a phenomenon (namely the reasoning behind police killings). I will continue to use the term, Danger Perception Theory, because that is the name that is used in literature but want to acknowledge that the term “theory” is a bit of a misnomer. This thesis will be testing the set of hypotheses that lie within the Danger Perception Theory, that is that as the level of threat increases (strength of gun legislation) the rate of police killings will also increase.

In the aforementioned studies, the researchers used criminal homicides as a proxy for the threat level to the officers. In my thesis, the threat level as it relates to the Danger Perception Theory, is instead going to be the strength of gun legislation, and the threat arising from the high rate of gun ownership across the United States. In a June 2021 Pew Research Center survey, four-in-ten U.S. adults said they lived in a household with a gun, and three-in-ten U.S. adults said they personally owned a gun<sup>11</sup>. Although there has been research that has examined household gun ownership and firearm legislation and found them to be significantly and positively correlated with police killings (e.g., Hemenway et. al, 2019; Kivisto et. al, 2017; Rogna and Nguyen, 2021), they did not explicitly connect it to the Danger Perception Theory. This theory has been examined using levels of criminal homicides (MacDonald et. al, 1999), household gun ownership (Azrael et. al, 2017), and levels of criminal violence (Klinger et. al, 2015). Following this line of reasoning, it would make sense to examine the strength of state gun

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<sup>11</sup> <https://www.pewresearch.org/fact-tank/2021/08/04/wide-differences-on-most-gun-policies-between-gun-owners-and-non-owners-but-also-some-agreement/>

legislation. The strength of a state's gun legislation should have a direct impact on the number of guns on the street, and thus the probability that a law enforcement officer will encounter one while on the job. The increased (or decreased) probability of this would then, theoretically, contribute to that officer's feeling of danger and their subsequent decision to use fatal force. This thesis will attempt to add to the empirical literature testing the hypotheses that lie within the danger-perception theory to explain police killings of individuals.

#### **4. The Current Study: Data, Measures, and Analytic Strategy**

##### *4.1 Data*

##### *4.1.2 Mapping Police Violence*

To fill the void that comes from the lack of a government database to provide information on police use of force and police killings, several organizations began compiling publicly available, web-based accessible databases. The main databases that are typically used for analyses are The Counted, Fatal Encounters, Washington Post, and Mapping Police Violence. Each of these databases relies on information in the public domain.

The Counted is an interactive database that was launched by The Guardian that has data on every death caused by an American law enforcement officer in 2015 and 2016 by filing thousands of records requests with police departments, and other regional authorities, conducting hundreds of interviews with family, attorneys, and others, and from media reports. The weakness of this dataset comes from there only being two years of data to study that is now almost seven years old (The Guardian, 2016).

Starting in 2015 and continuing to the present, The Washington Post began to keep track of every person shot and killed by an on-duty officer in the United States by, as well as other details surrounding the killing. Up to this point, the Post has obtained information from local

news reports, law enforcement websites, social media, and also by using other databases like Fatal Encounters (Washington Post, 2022). Because The Post only tracks shootings, it would not have data on other types of killings like those of George Floyd (Minneapolis) and Eric Garner (New York) who were killed by chokeholds.

Fatal Encounters is an open (meaning the public has access) dataset headed by D. Brian Burghart that tracks all deaths through police interaction since January 1, 2000, mined similarly through media reports, official reports, and social media (Fatal Encounters, 2022). This does not mean that these were all intentional deaths, nor directly at the hands of a law enforcement officer. This could include drownings, smoke inhalation, or a medical emergency. Farman (2016) assessed the completeness of the database by making FOIA requests of eleven states, for a total of 328 law enforcement agencies. Of those agencies, 75% responded (or 246 agencies), and Farman found that the Fatal Encounters dataset was totally complete for nine states, and overall was 99.1% complete (Finch et. al, 2019).

The dataset that will be used for the current study, Mapping Police Violence (MPV), is a database that is published by an advocacy group Campaign Zero. MPV defines police violence as “any incident where a law enforcement officer (off-duty or on-duty) applies, on a civilian, lethal force resulting in the civilian being killed whether it is considered ‘justified’ or ‘unjustified’ by the U.S. Criminal Legal System,” (Mapping Police Violence, 2022). The data is collected through local and state government agencies, and Google News as the primary method for detecting media mentions of police violence. By comparing the numbers to those provided by the Bureau Justice of Statistics, estimates suggest that the MPV database captures 92% of the total numbers of police killings that have occurred since 2013 and seems to be the most comprehensive (Mapping Police Violence, 2022). The dataset I used for this project was

downloaded on December 27, 2022. It includes the name of the decedent, age, gender, race, date, street address, city, state, zip, county, agency responsible, cause of death, circumstances, and allegedly armed, among other characteristics of each instance.

#### *4.1.2 The Gifford's Law Center Scorecard*

Since 2010, The Giffords Law Center<sup>12</sup> has computed a numeric score which was then assigned a letter grade to states based on their gun laws. This score is determined by analyzing state legislation throughout the year and assigning different policies and laws point values based on strengths and weaknesses. For the three years of analysis, the scores were composed of ten categories that encompassed smaller categories under those umbrellas. These categories that corresponded with legislation included: Background Checks and Access to Firearms, Other Regulation of Sales and Transfers, Gun Owner Accountability, Classes of Weapons and Ammunition/Magazines, Firearms in Public Places, Consumer and Child Safety, Investigating Gun Crimes, Local Authority to Regulate, Community Violence Intervention Initiatives, and Other. These categories are disaggregated further and then points are either awarded or taken away, with points awarded indicating stronger gun legislation. These points are then added up to a numeric score that was then curved to ensure all scores were positive numbers. From there, the scores are converted into a letter score from A-F, with F indicating weaker gun legislation and A showing the strongest gun legislation. Over the three years, the methodology has remained relatively stable, with minor changes in the categories. For years 2017 and 2018, a total of 122

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<sup>12</sup> The Gifford's Law Center, originally named Americans for Responsible Solutions (ARS), was founded in the wake of two mass shootings. On July 1, 1993, a gunman killed eight people and wounded six more in the 101 California Street massacre. In the wake of this shooting, a group of local Bay Area attorneys formed Legal Community Against Violence (LGAV), which for years pushed for safer gun laws in California and beyond. Nearly 20 years later on January 8, 2011, Congresswoman Gabrielle Giffords was meeting with her constituents in her hometown of Tucson, Arizona when a gunman opened fire, killing six people and wounding 13 others, including Congresswoman Giffords. Following the Sandy Hook mass shooting, Congresswoman Giffords and her husband Captain Mark Kelly announced the formation of a new organization to fight the gun violence epidemic, and in 2016, the ARS joined with the LGAV to create the Gifford's Law Center (<https://giffords.org/about/history/>).

points were available, while in 2019, two points were taken away for a total of 120. The Giffords scorecard has been used in several studies to examine different characteristics of gun violence. For example, the scores have been used to study the relationship between child access prevention and state level gun legislation and pediatric firearm deaths (Chammas, Byerly, Lynde, Mantero, Saberi, Gilna, Pust, Rattan, Namias, Crandall, and Yeh, 2023), mass shooting events (Duchesne, Taghavi, Toraih, Simpson, and Tatum, 2022), rates of firearm suicides (Chien, Chang, Gakh, and Coughenour, 2022), and firearm-related juvenile death rates (Tomlinson, Paul, Zhang, Liu, and Coakley, 2022).

Some skepticism has arisen regarding the use of this scoring system. Critics argue that The Gifford's Law Center, being inherently a gun violence prevention organization, exists to advocate for a political agenda. This has called objectivity into question. Several pro-gun media sources have written articles criticizing the Giffords Scorecard like "Latest Gun Death Scorecard from Giffords Is Grossly Misleading" published in *The New American* (Adelmann, 2019; Reeping, Morrison, Rudolph, Goyal, and Branias, 2021) and "Debunking Anti-Gun Giffords Law Center's 'Gun Law Scorecard'" published with *Omaha Outdoor* (Touhy, 2018; Reeping et. al, 2021). The main complaint arising from these criticisms is that including suicide numbers heavily skewed the numbers on deaths from firearms and create sensational statistics. To be clear, within the Gifford's Law Center Scoring system, the numbers of suicides or deaths by firearms are not included, however they do use the scores they assigned to look at gun deaths to rank the states and calculate gun deaths per 100k. For example, California has a Gifford's grade of A, they rank 44 in "Gun Death Rate Rank" and have 8.7 "Gun Deaths Per 100K", and these are the numbers that are shown on the website<sup>13</sup>. The critics claim that when Gifford's Law

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<sup>13</sup> <https://giffords.org/lawcenter/resources/scorecard/>

Center makes the claim that “strong gun laws save lives”, by including suicide numbers, which one article claimed was not a gun issue (Adelmann, 2019), they are making a huge causal claim because most suicides are committed with a legally acquired handgun<sup>14</sup>, so laws would not be saving lives (Adelmann, 2019). The criticisms, though, are not directed solely at the scoring system itself. Instead, they focus on the broader message conveyed by Gifford’s Law Center through the supplementary analyses that rely on their scores.

One study analyzed several of these scoring/ ranking systems by both gun-safety oriented organizations (Giffords Law Center, Everytown for Gun Research, and the Siegel count of provisions) and gun-rights oriented organizations (The Cato Institute, Guns and Ammo Magazine, and the Traveler’s Guide to the Firearms Laws of the Fifty States). Across the seven scales, they found them all to be highly similar with an average correlation coefficient between the scales being  $r = 0.77$ . The strongest correlation scores were between Everytown Count and the Siegel count, and the Siegel count and the Giffords Scorecard (both at  $r = 0.89$ ,  $p < 0.001$ ). The Cato Score and the Everytown County were the least correlated ( $r = 0.65$ ,  $p < 0.001$ ), however they are still moderately to strongly correlated. The gun-safety oriented organizations have an average correlation coefficient of  $r = 0.86$  with one another; the gun-rights oriented organizations had an average correlation coefficient of  $r = 0.74$  with each other; and the average correlation coefficient of scores from opposite organizations was  $r = 0.74$  (Reeping et. al, 2021).

#### *4.1.3 Household Gun Ownership Proxy (FSS)*

Another factor that is important to consider is gun ownership by state. A problem is that there are no direct measures on gun ownership in the United States (e.g., Kleck, 2004; Hemenway and Miller, 2000). Researchers have attempted to navigate this issue by using a proxy for household

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<sup>14</sup> It has been shown that handgun ownership is associated with a much higher suicide risk (Duff-Brown, 2020).

gun ownership based on the number of suicides committed by firearm (e.g., Killias, 1993; Hemenway and Miller, 2000; Reeping, Cerda, Kalesan, Wiebe, Galea, and Branas, 2019). One study assessed 25 macro-level indicators of gun levels including percentage households with gun, percentage suicides with gun (PSG), fatal gun accident rate, hunting license rate, and others, and found that the best indicator was the percentage of suicides committed with a gun (Kleck, 2004). A dataset published in late 2023 (Kang and Rasich, 2023) captures the rate of state-level firearm suicides divided by all suicides (FSS) (firearm suicides / total suicides) for the years 1949-2020. For this study, I will examine this variable for the years 2017-2019. The later numbers on which this thesis relies, are pulled from the CDC's WONDER and WISQARS systems (Kang and Rasich, 2023).

## 4.2 Measures

### 4.2.1 Dependent and Independent Variables

The primary dependent variable for this study is the rate of annual police killings, defined as the number of police killings per state per year divided by the state population multiplied by one million, to obtain the rate of police killings per million. When conducting the final analyses, the state Gifford's score was the independent variable of interest.

### 4.2.2. Matching Variables

This study employs a broad range of individual predictors to compare the states. The following characteristics were compiled from several sources for each of the fifty states. The following predictor variables were pulled from the US Census Bureau Data Profiles<sup>15</sup> which covers the most frequently requested social, economic, housing, and demographic data for each year: *young* (persons under 18, percent), *elderly* (persons 65 years and older, percent), *white*

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<sup>15</sup> <https://www.census.gov/acs/www/data/data-tables-and-tools/data-profiles/2017/>

(white, percent), *black* (black, percent), *hispanic* (Hispanic or Latino, percent), *pphousehold* (people per household or average household size), *hsgrad* (high school graduate or higher, percent of persons age 25 years+), *oohousing* (owner-occupied housing unit rate), *med\_income* (median household income), and *povper* (persons in poverty, percent). The '*fss\_year*', which is the number of suicides committed with a gun divided by total number of suicides as a proxy for gun ownership, was pulled from the 'State-level household gun ownership proxy dataset, 1949-2020' (Kang and Rasich, 2023). The predictor '*vcr\_year*' was a predictor pulled for the violent crime rate for each year from the FBI's UCR Program. The UCR Program defines violent crime as being composed of four offenses: murder and nonnegligent manslaughter, rape, robbery, and aggravated assault (FBI: Uniform Crime Report, 2018)<sup>16</sup>. Finally, the 'urban' characteristic was pulled from the United States Census Bureau<sup>17</sup> who defines an urban area as one that "...will comprise a densely settled core of census blocks that meet minimum housing unit density and/or population density requirements. This includes adjacent territory containing non-residential urban land uses. To qualify as an urban area, the territory identified according to criteria must encompass at least 2,000 housing units or have a population of at least 5,000," (U.S. Census Bureau, 2020). These predictors are commonly used in research (e.g., Rogna and Nguyen, 2021; Kivisto et. al, 2017; Reeping et. al, 2019), and thus made sense to use to match states.

#### 4.3 Analytic Strategy<sup>18</sup>

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<sup>16</sup> <https://ucr.fbi.gov/crime-in-the-u.s/2018/crime-in-the-u.s.-2018/topic-pages/violent-crime>

<sup>17</sup> <https://www.census.gov/programs-surveys/geography/guidance/geo-areas/urban-rural.html>

<sup>18</sup> This research design is based on a 1961 study conducted on the deterrent theory used by capital punishment retentionists for murderers. Sellin (1961) followed the reasoning that if the fear of being executed for murder deterred a would-be murderer from committing the crime, those states in which that fear is not present (abolitionist states) would show higher murder rates. Sellin compared states to each other that were "similar in the character of their population, their urban and industrial development, and their mores," (Sellin, 1961, p. 6), on the assumption that those states would have similar homicide rates, regardless of the presence or absence of the death penalty. Following Sellin's logic, I would expect to see similar police killing rates for states that are comparable on the variables other than gun legislation strength.

The method that was used for the analysis was to match the states using z-scores<sup>19</sup>. Z-scores were calculated for each of the predictor variables using the standard z-score formula:

$$Z = \frac{x - \bar{x}}{\sigma}$$

Where  $x$  = observed value (individual state predictor),  $\bar{x}$  = mean of the sample (mean of all states), and  $\sigma$  = standard deviation of the sample (SD of all states). To overcome the issue of states being geographically distant from each other, as well as differing culturally, demographically, and politically, states were only compared to contiguous states, and they were only included in the final comparison if they fell *within one standard deviation* (above or below) on *each* of the predictor variables. This process involved state by state assessments to determine which states could be compared (e.g., California and Oregon, Nevada, and Arizona; Mississippi and Tennessee, Alabama, Louisiana, and Arkansas). To find the final state comparisons, they were matched using matching without replacement or using each state only once for each year.

Predicting the timing of when legislation will produce noticeable effects is challenging. As a result, six comparisons were analyzed and included up to a two-year lag: 2017 and 2017 (instantaneous comparison); 2017 and 2018 (one-year lag); 2017 and 2019 (two-year lag); 2018 and 2018 (instantaneous comparison); 2018 and 2019 (one-year lag); and 2019 and 2019 (instantaneous comparison). The pairs that were successful matches are presented below:

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<sup>19</sup> I explored the possibility of using propensity score matching, but due to the small sample size and desire for regional comparisons, this method was abandoned. Propensity scores showed some concerning issues, one of the biggest being that two states could have the same (or similar) propensity scores for different reasons. For example, when doing this exercise one possible comparison that came up for 2018 was between Virginia and Washington. They had identical propensity scores (rounded scores: VA: 40.427; WA: 40.427) despite being in very different places in the US, and on certain predictors like percent black (VA: 19.2; WA: 3.7). Another example would be comparing Arizona and Vermont in 2019, which again had similar propensity scores (AZ: 19.4; VT: 20.17) but varied widely on geography and other predictors like poverty percent (AZ: 15.1; VT: 10.9).

2017 PAIRS	2018 PAIRS	2019 PAIRS
AR/TN	AR/TN	AR/TN
CT/MA	CT/MA	CT/MA
IA/SD	IA/SD	IA/SD
IN/OH	IN/OH	IN/OH
KS/NE	MO/OK	KS/NE
MO/OK	NC/SC	MO/OK
NC/SC		NC/SC

*Table 1: Final State Pairs*

\*Final pairs with matching variables, and their corresponding z-scores, are included in Tables A – C in the Appendix.

To align with the Danger Perception Theory, a state would have to have a higher Gifford’s score (gs) and a lower rate of police killings per year (pk[year]) out of the pair. The way this was analyzed was after finding the pairs, highlighting the state that had a higher Gifford’s score and looking at the rate of police killings. Under the “dpt” column (Danger Perception Theory), a ‘+’ sign was put next to the state out of the pair with the higher rate of police killings and a ‘-’ sign was put for the lower rate. The final count for the DPT was counted as “DPT yes” if the highlighted state in the pair also corresponded with the ‘-’ sign for lower rates of police killing. Alternately, it was counted as “DPT no” if the opposite was true.

To illustrate this, I will walk through an example of each. Using a two-year lag comparing 2017 GS with 2019 police killings, Arkansas and Tennessee were compared. Tennessee had the higher Gifford’s score<sup>20</sup>, and in 2019 had a lower rate of police killings per million (TN: 4.92; AR: 7.001). Because Tennessee was highlighted as having the higher Gifford’s score, and had a ‘-’ to indicate it had lower police killings, this was counted as “DPT yes” and counted towards a pair that supported the DPT. Alternately for the same two-year lag (2017 GS & 2019 PK), Kansas and Nebraska were compared. Nebraska had the higher Gifford’s

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<sup>20</sup> The raw Gifford’s scores will not be published as I am bound by a Non-Disclosure Agreement; to anonymize those raw scores, I will publish which state has the higher GS, noted by “High” and a lower GS, noted by “Low”, and these tables can be found in the appendix, Tables A-C.

score, but also had the higher police killing rate per million (NE: 3.13; KS: 3.09). Therefore the ‘+’ sign was placed next to the highlighted state and was counted as “DPT no” to show that this comparison did not support the DPT. The final step was to count the number of state comparisons where the DPT is supported divided by the total number of state comparisons. This proportion was called  $p$ .

My statistical analysis examines both the estimated value of  $p$  for each year along with the uncertainty pertaining to  $p$  in each set of comparisons. A Bayesian credibility interval is similar to a confidence interval but requires the specification of a “prior” distribution for  $p$ . A prior distribution of  $p$  that has good relative frequency properties for small  $n$  situations, such as the one explored here, is the Jeffreys’ prior (Brown, Cai, and DasGupta, 2001). Thus, a 95% credibility interval for  $p$  can be interpreted as a posterior probability interval (i.e., the probability that  $p$  lies between the endpoints of the interval is 0.95) or as a traditional 95% confidence interval. The relative frequency interpretation is based on the idea of repeated sampling which leads to many confidence intervals for  $p$ . Based on that interpretation, we would infer that out of those many thousands of intervals, that about 95% of them would contain the true population parameter value. The Bayesian interpretation would be that there is a 95% chance that the true value of  $p$  lies within this interval, wherein  $p$  = the probability of support for the DPT. In other words, what is the probability that when compared side-by-side, a state with a higher Gifford’s score (stronger gun legislation) would have lower rates of police killings. For my analyses, I am showing graphs for both a 95% interval, and an 80% interval. I wanted to see if I would draw a different conclusion looking at both intervals. The 2.5<sup>th</sup> and 97.5<sup>th</sup> percentiles, and the 10<sup>th</sup> and 90<sup>th</sup> percentiles, of the posterior distribution were numerically computed using R, and the

question for this analysis is whether  $p = 0.5$ , represented by the vertical dashed line in the graph, is included in the interval.

## 5. Results

### 5.1 *Descriptive Statistics*

There were a total of 1,096 police killings in 2017, 1,146 in 2018, and 1,099 in 2019 for a total of 3,341 total killings by law enforcement during the three-year period of analysis (Mapping Police Violence, 2023). The median ages for the three years were between 36 and 38 (2017: 36.47, SD: 13.13, Range: 6-91; 2018: 37.12, SD: 13.39, Range 1-89; 2019: 37.91, SD:12.97, Range: 15-84). The demographics along with information on whether or not the individual was armed<sup>21</sup> is included in the table below (also see Tables D-O for more details):

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<sup>21</sup> Using two measures included in the Mapping Police Violence dataset, the “allegedly\_armed” and “wapo\_armed” variables, I created another variable for “firearm”. The “allegedly\_armed” variable was coded into “Allegedly Armed”, “Unarmed/Did Not Have Actual Weapon”, “Unclear”, and “Vehicle”. The next variable “wapo\_armed” was created by *The Washington Post* in their dataset which indicated that the decedent was “armed” with some sort of instrument that an officer believed could be harmful. Some of those instruments include baseball bats, crowbars, garden tools, and vehicles (for a full list, see Appendix). There were seven categories that I combined that indicated the presence of a firearm; this included “Gun”, “Gun and Car”, “Gun and Hatchet”, “Gun and Knife”, “Gun and Sword”, “Gun and Vehicle”, and “Vehicle and Gun”. There are two variables “Undetermined”, and “Unknown Weapon” that I did not include in the new “firearm” variable which could cause issues with missingness. By creating this variable, I was able to pull this data for each of the three years of analysis.

Descriptive Statistics of PK Decedents							
		2017		2018		2019	
		<i>n</i>	Percent	<i>n</i>	Percent	<i>n</i>	Percent
Gender	Male	1039	94.8	1075	93.8	1043	94.9
	Female	54	4.93	70	6.11	50	4.55
	Transgender	3	0.27	1	0.09	1	0.09
	Unknown	-	-	-	-	5	0.45
Race	Asian	13	1.19	15	1.31	17	1.55
	Black	278	25.36	266	23.21	285	25.93
	Hispanic	226	20.62	213	18.59	206	18.74
	Native American	28	2.55	30	1.75	13	1.18
	Native Hawaiian and Pacific Islander	6	0.55	11	0.96	10	0.91
	Unknown race	34	3.1	108	9.42	119	10.83
	White	511	46.62	513	44.76	449	40.86
Allegedly Armed	Allegedly Armed	795	72.54	811	70.77	815	74.16
	Unarmed/Not Armed	147	13.41	122	10.65	123	11.19
	Weapon	54	4.93	133	11.61	95	8.64
	Unclear	100	9.12	80	6.98	66	6.01
Armed w/ Firearm	Firearm	611	55.75	598	52.81	611	55.6
	No Firearm	485	44.26	548	47.82	488	44.4
Total		1096		1146		1099	

Table 2: Descriptive Statistics of Police Killing Decedents

5.2 Findings and Analysis

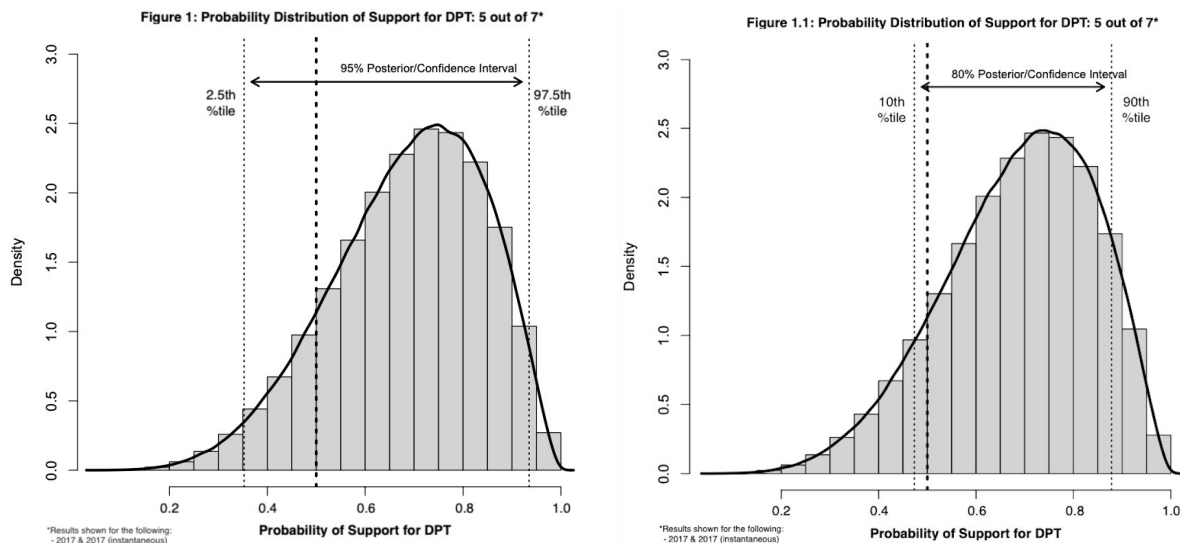


Figure 1 shows the 95% posterior probability distribution, and Figure 1.1 shows the 80% posterior probability distribution for comparing the 2017 Gifford’s Score (GS) with the 2017 rate

of police killings for an instantaneous effect. For these, there were seven total pairs of states compared, and of those, five of them showed support for the DPT. This distribution shows that a clear majority of the tests support the DPT by falling above 0.5 (mode: 0.75; median of  $p$ : 0.704), however, when measuring the uncertainty around  $p$ , for both the 95% and 80% posterior probability distributions, they do include 0.5 in the confidence interval. Thus, we do not have enough evidence to reject the hypothesis that comparisons supporting and opposing the DPT are equally likely.

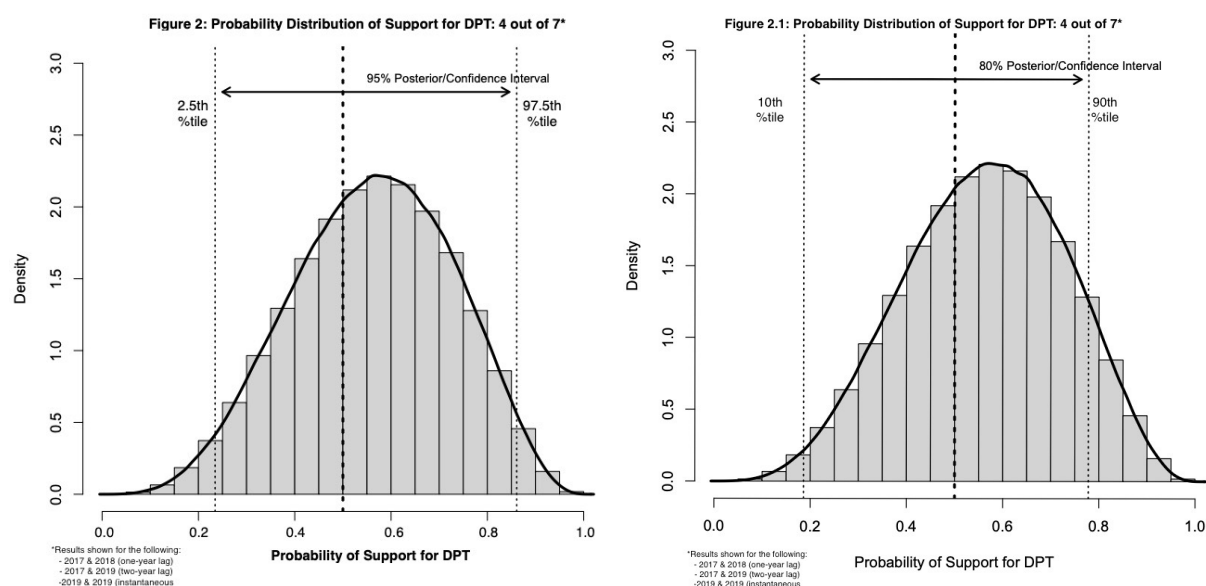
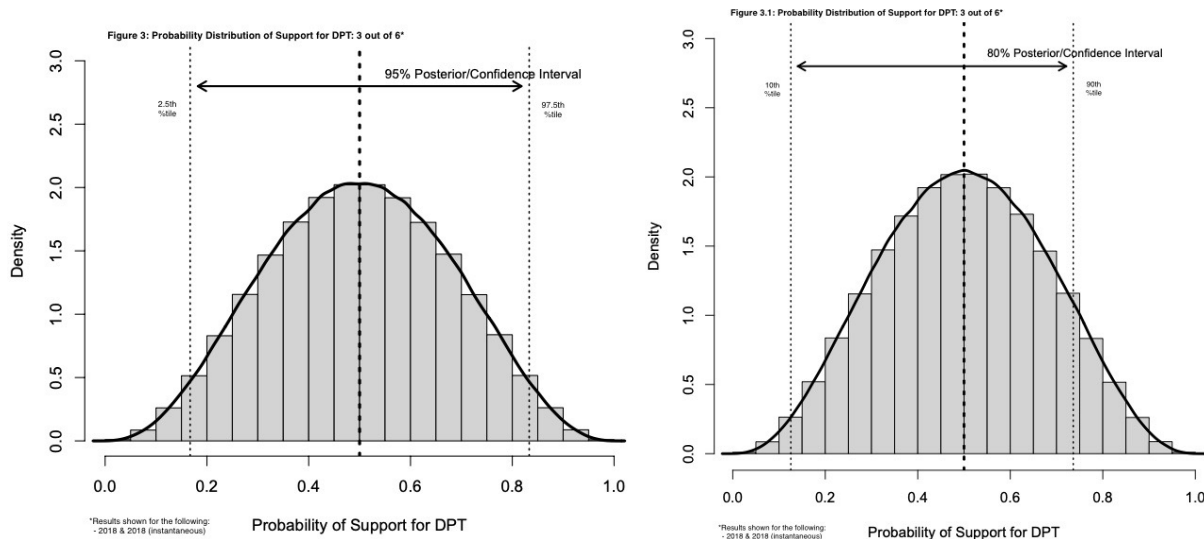
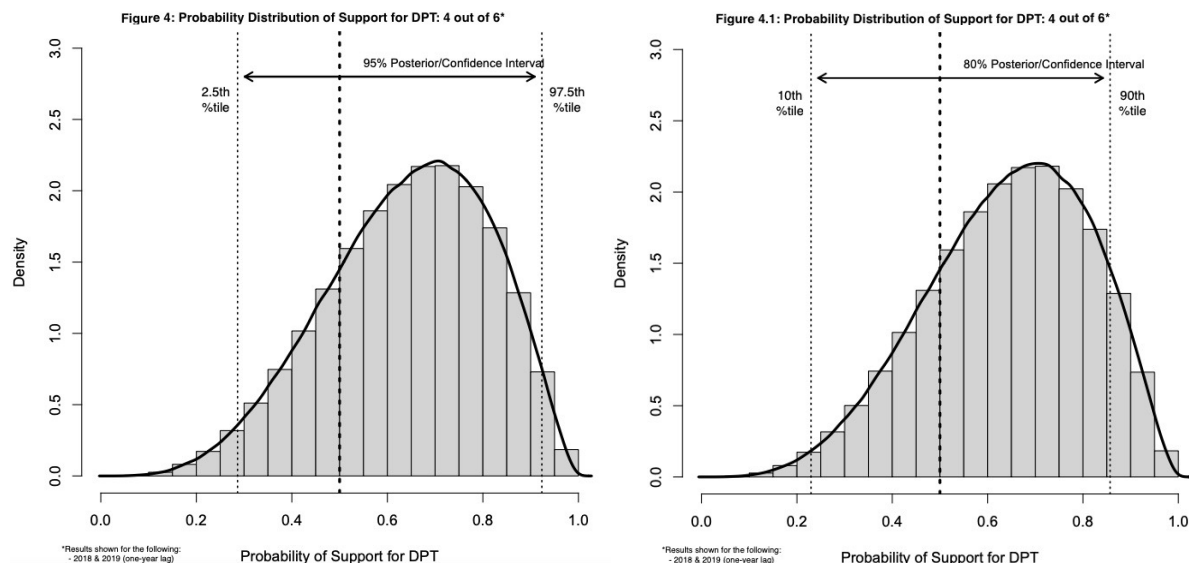


Figure 2 shows the 95% posterior probability distribution, and Figure 2.1 shows the 80% posterior probability distribution, for three of the analyses comparing the 2017 GS with both the 2018 and 2019 rates of police killings for a one-year lag, and a two-year lag, respectively, as well as an instantaneous comparison of 2019 GS with 2019 rates of police killings. There was a total of seven state pairs, and four of those pairs showed support for the DPT. The mode is 0.58 and the median of  $p$  is reported at 0.57; when measuring for uncertainty around  $p$ , the confidence interval for both the 95% and 80% posterior probability distribution includes 0.5 which shows,

again, that there is not enough evidence to reject the hypothesis that both support and opposition for the DPT are equally likely.



Figures 3 and 3.1 show the 95% probability distribution, and 80% probability distribution respectively, comparing 2018 GS with 2018 PK for an instantaneous comparison. In this case, it was a split right down the middle with three pairs of states showing support for the DPT, and three pairs that did not, for a total number of six state pair comparisons. The measures of central tendency for both the 95% and 80% probability distribution are around 0.5, so once again there is not enough evidence to reject the hypothesis.



The final set of comparisons shown in Figure 4 is looking at the 95%, and Figure 4.1 looking at the 80% posterior probability distribution for the 2018 GS with the 2019 rates of police killings (one-year lag). This shows that of the six pairs of states compared, four of them show support for the DPT. The mode is 0.7, and the median of  $p$  is 0.66, which both indicate that the majority of the tests are in support of the DPT, however because the Jeffrey's interval includes 0.5 for both the 95% and 80% posterior probability distributions, we once again cannot reject the hypothesis because the evidence is not strong enough. None of the tests conducted were statistically significant.

## 5. Discussion and Conclusions

### 5.1 Discussion

This current study shows mixed results for the Danger Perception Theory which would show states that had stricter gun legislation (higher Gifford's scores) would see lower rates of police killings. In all of the tests conducted, the median was consistently above 0.5, which showed that there were enough contradictory cases that there was ambiguity. While these tests

lacked statistical significance, the results do show a pattern of states tending to follow the reasoning of the DPT, and following the conclusions drawn in previous literature on the topic.

When comparing these results with similar preceding studies, we find differing results. Kivisto et. al (2017) remarkably found that states in the top quartile of gun legislation had a police killing incident rate of more than 50% lower than states in the lowest quartile. That study, however, is not necessarily comparable as they used a different scoring system and police fatality database (namely, the Brady Campaign scoring system and The Counted database for police killings). Several studies have found that firearm prevalence (gun diffusion/ownership) was positively and significantly associated with fatal police shooting rates per population (Nagin, 2020; Hemenway et. al, 2019), however Rogna and Nguyen found no statistical significance in the diffusion of firearms (2021). Instead, they found that the strength of gun owner accountability led to a decrease in the number of killings by police (Rogna and Nguyen, 2021). Yet another study found that states with stricter gun legislation led to a lower number of police killings, however they found that this “protective” effect was not present for Black Americans (Sivaraman, Marshall, and Ranapurwala, 2020).

These studies differed from my study by disaggregating the legislation scores (Kivisto et. al, 2017; Rogna and Nguyen, 2021), using only gun diffusion instead of score cards (Hemenway et. al, 2019), or looking specifically at racial groups (Sivaraman et. al, 2020) to run Poisson regressions to come to their conclusions. The present study adds to this literature by looking at states compared to contiguous states with similar demographics and predictor variables. In the regressions, each state was given the equal weight, and as one scholar commented, “Gun prevalence across states is not random...” (Nagin, 2020, p. 56). Nagin (2020) examined the state rates of fatal police shootings and firearm prevalence, and while he did find a positive correlation

between the variables, he was unable to say why that is so. This is referred to as the “omitted variable bias”, or the lack of another variable that may actually cause the outcome. My research attempts to explore this bias by introducing the state gun legislation scorecard as an explanation. Another point Nagin (2020) raises in his study is the lack of a strong regional control by using dummy variables, which may not account for large regional differences. By comparing states with each other, this research considers regional and state similarities with the only difference within the fixed set of variables, being the strength of gun legislation. If the Danger Perception Theory is correct, we would expect to see that reflected in the rates of police killings.

There are several reasons why I am finding different results from previous research. One of the most important reasons to discuss is the small number of comparisons. In a small sample, there is going to be low power,  $p$  is going to be a little bit bigger than 0.5. A bigger sample might have more power, but that might come at the cost of comparability, or being less meticulous on how to match the states. The small number of comparisons is both a strength and a weakness. It ensures that the comparisons that are being made are reasonable, but again, the small number has low power.

## *5.2 Limitations and Future Research*

Despite the empirical and theoretical contributions to this area of research, there are a few limitations to this study that are worth discussing. One issue that is deserving of recognition is the stringent matching criteria that led to a small number of state comparisons. Fatal encounters with the police are already a relatively rare event (Adams, Alpert, Dunham, Garner, Greenfeld, Henriquez, Langan, Maxell, and Smith, 1999; Whit, Ready, Riggs, Dawes, Hinz, and Ho, 2013) and matching the states on thirteen variables within one standard deviation of each other led to an even smaller number to analyze. This research would benefit greatly from analyzing more

years and thus having more state comparisons<sup>22</sup> and this could be done using the same criteria or matching on less predictors. Having more state comparisons, that are reasonable comparisons, would make for a stronger case either for or against the Danger Perception Theory. Future research could also use designs that increase the statistical power.

Second, there was some arbitrariness in the both the Gifford's scorecards and some of the researcher decisions made in this analysis. The Gifford's rubric system for the scorecards assigned different points for different laws, or categories. For example, a state would be given five points for a discretionary ("May issue") permitting system and assigned one point for prohibiting the open carry of all firearms. Some researchers (using other grading systems) have attempted to overcome this issue by dropping the weighting system in favor of a 1 law = 1 point scoring system (Kivisto et. al, 2017), however others find that doing so is "analogously arbitrary" and have left the weighting system in place (Rogna and Nguyen, 2021, p. 6) which is what was done for this research. For this thesis, I used a one standard deviation rule for matching the states, but future research could explore if the conclusions would change if they were to use more stringent or lenient matching rules.

Third, as discussed earlier in this paper, reliable data on killings by police has proven to be a historically difficult task to do. To overcome this obstacle, I discussed four crowd-sourced databases that have proven to be the most comprehensive places to get data on these kinds of killings, however they do not come without their obstacles. For instance, Klinger and Slocum (2017) discuss one possible issue in how it pertains to the category of "Armed" versus "Unarmed" using the *Washington Post* database. They found that an individual could be categorized as "Unarmed", but when diving into this label further, found that the individual could be armed

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<sup>22</sup> This paper could have expanded to use more years of data, however I am bound by a Non-Disclosure Agreement with Gifford's Law Center to only use the three years described (2017-2019). See Appendix P. for this agreement.

with a metal pole or branch for example, that could be potentially used as a weapon (Mentch, 2020). Likewise, during the creation of my “firearm” variable for analysis, I encountered comparable issues with the Mapping Police Violence dataset<sup>23</sup>. This is by no means the only possible issue using these datasets, but a helpful example of some of the problems that could arise.

Fourth, it is difficult to know what to attribute to legislation. Previous literature has found a relationship between gun legislation strength and rates of police killings, but my research does not show that it holds at the state level which might be an indication that there are other factors. The changes in police killings found by other researchers could be attributed to any number of factors that have nothing to do with legislation. For example, it is possible that states that already have high Gifford’s score have better police training, or that states with lower gun scores have more rural departments which leads to less officers being on shift and therefore more likely to use deadly force. It is also difficult to know when to see the impact of the laws enacted on rates of police killings, which I attempted to account for by exploring a two-year lag in the analyses. These limitations lead to many avenues for future research.

Other research of this issue disaggregated the scores into gun legislation to find out which areas of legislation have a greater impact on the rate of police killing (Rogna and Nguyen, 2021; Kivisto et. al, 2017), so this could be adapted to do something similar. Looking more into the armed/unarmed variable might make for a stronger case for or against the Danger Perception Theory. Although there is no way to measure what an officer perceives that decedent to have in their hand without interviewing each individual officer, it would be beneficial to study how many were actually armed with a firearm along with the state gun legislation. It is also important

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<sup>23</sup> See Tables G, K, and O in the Appendix to see examples of some of the objects used by the decedents.

to discuss that while I was examining the states with each other across time, time was not the issue. This leads to yet another avenue for future research to look at these issues over time.

Nagin (2020) and Sivaraman et. al (2020) looked into the racial composition of the geographical regions and of police killing victims in their research, and doing so with this model would be a possible avenue for further research. Race has long played a role in both the development of policing, and of the gun culture in America. I think studying the Danger Perception Theory in conjunction with the Racial Threat Theory would be a very interesting next area to explore. According to the U.S. Census Bureau, in 2017 the Black population made up 12.3% of the population. Looking at the descriptive statistics for the same year, Black individuals made up 25.36% of the individuals killed by police which is a disproportionate amount compared to the amount of the general population they comprise (U.S. Census Bureau, 2017). There has been a plethora of research that has shown that Black people make up a inordinate number of people killed by the police (e.g., Sharara and Wool et. al, 2021; Schwartz and Jahn, 2020; Edwards, Lee, and Esposito, 2019; Lett et. al, 2021; Hemenway, Berrigan, Azrael, Barber, and Miller, 2020). Future research would benefit from looking deeper into how and why these inequalities in police killing victims persist, particularly insofar as they relate to the Danger Perception Theory.

### *5.3 Concluding Remarks*

The ability of law enforcement to use fatal force comes with much scrutiny. Bittner (1970) claims that one of the core functions of police is to control and use force, however there are many nations (e.g., Denmark, Iceland, and Switzerland to name a few) that have zero police killings. Although the analysis conducted in this research did not produce any statistically

significant results, it has added to the growing body of literature that shows that looking into gun legislation could be a potential direction to reduce police killings.

Killings at the hands of law enforcement officers are complex events. Researchers, lawmakers, and advocates have been looking into ways to reduce these killings since at least the 1970s. It is important to note that this research does not speak to whether any particular death was preventable or justified, nor does it speak to how the officer felt in the moment, specifically if they felt fear which is the backbone of the Danger Perception Theory. There has been a plethora of time and resources devoted to searching for ways to do this through community outreach, de-escalation, non-lethal use of force, and body-worn cameras to name a few. This area is ripe for further research and for policy implications for gun legislation in the United States.

## 6. Appendix

Table 3: 2017 Pairs Analysis

2017 PAIRS ANALYSIS							
State	GS/RANK	PK17	DPT	PK18	DPT	PK19	DPT
AR	Low	5.03703226	+	7.02183557	+	7.00147031	+
TN	High	4.24410838	-	4.0594856	-	4.91850485	-
CT	High	1.66922708	+	0.27921231	-	1.11885796	+
MA	Low	0.73645089	-	0.58563499	+	0.72986809	-
IA	High	1.60353959	-	3.19233941	-	1.59260623	-
SD	Low	3.50695078	+	4.62808158	+	4.59433197	+
IN	Low	3.02369763	+	2.56123383	-	2.85041203	+
OH	High	2.92857145	-	3.00638754	+	2.05913192	-
KS	Low	4.82123548	+	3.09408493	+	3.09209071	-
NE	High	0.52800513	-	0.52500053	-	3.13386132	+
MO	Low	5.761033238	-	4.26925046	-	5.73309025	-
OK	High	7.69970928	+	8.67759346	+	9.40788788	+
NC	High	2.18849639	-	2.95402823	+	3.40968561	-
SC	Low	2.45226062	+	2.82490151	-	3.98342418	+
DPT yes			5		4		4
DPT no			2		3		3

Table 4: 2018 Pairs Analysis

2018 PAIRS ANALYSIS					
State	GS/RANK	PK18	DPT	PK19	DPT
AR	Low	7.02183557	+	7.00147031	+
TN	High	4.0594856	-	4.91850485	-
CT	High	0.27921231	-	1.11885796	+
MA	Low	0.58563499	+	0.72986809	-
IA	High	3.19233941	-	1.59260623	-
SD	Low	4.62808158	+	4.59433197	+
IN	Low	2.56123383	-	2.85041203	+
OH	High	3.00638754	+	2.05913192	-
MO	Low	4.26925046	-	5.73309025	-
OK	High	8.67759346	+	9.40788788	+
NC	High	2.95402823	+	3.40968561	-
SC	Low	2.82490151	-	3.98342418	+
DPT yes			3		4
DPT no			3		2

Table 5: 2019 Pairs Analysis

2019 PAIRS ANALYSIS			
State	GS/RANK	PK19	DPT
AR	Low	7.00147031	+
TN	High	4.91850485	-
CT	High	1.11885796	+
MA	Low	0.72986809	-
IA	High	1.59260623	-
SD	Low	4.59433197	+
IN	Low	2.85041203	+
OH	High	2.05913192	-
KS	Low	3.09209071	-
NE	High	3.13386132	+
MO	Low	5.73309025	-
OK	High	9.40788788	+
NC	High	3.40968561	-
SC	Low	3.98342418	+
DPT yes			4
DPT no			3

Table 6: 2017 Race

Race	Freq.	Percent	Cum.
Asian	13.00	1.19	1.19
Black	278.00	25.36	26.55
Hispanic	226.00	20.62	47.17
Native American	28.00	2.55	49.73
Native Hawaiian and Pacific Islander	6.00	0.55	50.27
Unknown Race	34.00	3.10	53.38
White	511.00	46.62	100.00
Total	1096.00	100.00	

Table 7: 2017 Gender

Gender	Freq.	Percent	Cum.
Female	54.00	4.93	4.93
Male	1039.00	94.80	99.73
Transgender	3.00	0.27	100.00
Total	1096.00	100.00	

Table 8: 2017 Allegedly Armed

Allegedly Armed	Freq.	Percent	Cum.
Allegedly Armed	795.00	72.54	72.54
Unarmed/Did Not Have Actual Weapon	147.00	13.41	85.85
Unclear	54.00	4.93	90.88
Vehicle	100.00	9.12	100.00
Total	1096.00	100.00	

Table 9: 2017 Weapon

WaPo Armed	Freq.	Percent	Cum.
Air Conditioner and Glass Bottle	1.00	0.09	0.09
Ax	4.00	0.37	0.46
Baseball Bat	2.00	0.18	0.64
Baseball Bat and Bottle	1.00	0.09	0.73
Baton	1.00	0.09	0.82
Beer Bottle	1.00	0.09	0.91
Blunt Object	2.00	0.18	1.10
Chainsaw	1.00	0.09	1.19
Chair	1.00	0.09	1.28
Crossbow	2.00	0.18	1.46
Crowbar	1.00	0.09	1.56
Electric Razor on Cord	1.00	0.09	1.65
Fireworks	1.00	0.09	1.74
Golf Club	1.00	0.09	1.83
Gun	602.00	55.08	56.91
Gun and Car	3.00	0.27	57.18
Gun and Hatchet	1.00	0.09	57.27
Gun and Knife	4.00	0.37	57.64
Gun and Sword	1.00	0.09	57.73
Hammer	1.00	0.09	57.82
Hatchet	2.00	0.18	58.01
Knife	142.00	12.99	71.00
Lighter Fluid	1.00	0.09	71.09
Machete	10.00	0.91	72.00
Metal Object	1.00	0.09	72.10
Metal Pipe	3.00	0.27	72.37
Metal Stick	1.00	0.09	72.46
No Object	113.00	10.34	82.20
Pen	2.00	0.18	82.98

Piece of Wood	1.00	0.09	83.07
Pipe	3.00	0.27	83.35
Pitchfork	1.00	0.09	83.44
Pole and Knife	1.00	0.09	83.53
Rock	1.00	0.09	83.62
Screwdriver	4.00	0.37	83.99
Shovel	1.00	0.09	84.08
Sword	2.00	0.18	84.26
Taser	6.00	0.55	84.81
Toy Weapon	30.00	2.74	87.56
Undetermined	28.00	2.56	90.12
Unknown Weapon	7.00	0.64	90.76
Vehicle	100.00	9.15	99.91
Wooden Doorjamb	1.00	0.09	100.00
Total	1093.00	100.00	

Table 10: 2018 Race

Race	Freq.	Percent	Cum.
Asian	15.00	1.31	1.31
Black	266.00	23.21	24.52
Hispanic	213.00	18.59	43.11
Native American	30.00	1.75	44.85
Native Hawaiian and Pacific Islander	11.00	0.96	45.81
Unknown Race	108.00	9.42	55.24
White	513.00	44.76	100.00
Total	1146.00	100.00	

Table 11: 2018 Gender

Gender	Freq.	Percent	Cum.
Female	70.00	6.11	6.11
Male	1075.00	93.80	99.91
Transgender	1.00	0.09	100.00
Total	1146.00	100.00	

Table 12: 2018 Allegedly Armed

Allegedly Armed	Freq.	Percent	Cum.
Allegedly Armed	811.00	70.77	70.77
Unarmed/Did Not Have Actual Weapon	122.00	10.65	81.41
Unclear	133.00	11.61	93.02
Vehicle	80.00	6.98	100.00
Total	1146.00	100.00	

Table 13: 2018 Weapon

WaPo Armed	Freq.	Percent	Cum.
Ax	6.00	0.52	0.52
Baseball Bat	3.00	0.26	0.79
Baton	1.00	0.09	0.87
Bow and Arrow	1.00	0.09	0.96
Box Cutter	3.00	0.26	1.22
Chain	1.00	0.09	1.31
Crossbow	3.00	0.26	1.57
Flag Pole	1.00	0.09	1.66
Glass Shard	1.00	0.09	1.75
Gun	586.00	51.27	53.02
Gun and Car	2.00	0.17	53.19
Gun and Knife	8.00	0.70	53.89
Gun and Vehicle	1.00	0.09	53.98
Hatchet	1.00	0.09	54.07
Incendiary Device	1.00	0.09	54.16
Knife	159.00	13.91	68.07
Lamp	1.00	0.09	68.15
Lawn Mower Blade	1	0.09	68.24
Machete	11.00	0.96	69.20
Meat Cleaver	1.00	0.09	69.29
Metal Object	1.00	0.09	69.38
Metal Pipe	4.00	0.35	69.73
No Object	88.00	7.70	77.43
Pick-Axe	2.00	0.17	77.60
Piece of Wood	1.00	0.09	77.69
Pipe	1.00	0.09	77.78
Pole and Knife	1.00	0.09	77.87
Rock	1.00	0.09	77.95

Screwdriver	2.00	0.17	78.13
Sharp Object	1.00	0.09	78.22
Straight Edge Razor	2.00	0.17	78.39
Sword	5.00	0.44	78.83
Taser	4.00	0.35	79.18
Toy Weapon	32.00	2.80	81.98
Undetermined	104.00	9.10	91.08
Unknown Weapon	21.00	1.84	92.91
Vehicle	80.00	7.00	99.91
Vehicle and Gun	1.00	0.09	100.00
Total	1143.00	100.00	

Table 14: 2019 Race

Race	Freq.	Percent	Cum.
Asian	17.00	1.55	1.55
Black	285.00	25.93	27.48
Hispanic	206.00	18.74	46.22
Native American	13.00	1.18	47.41
Native Hawaiian and Pacific Islander	10.00	0.91	48.32
Unknown Race	119.00	10.83	59.14
White	449.00	40.86	100.00
Total	1099.00	100.00	

Table 15: 2019 Gender

Gender	Freq.	Percent	Cum.
Female	50.00	4.55	4.55
Male	1043.00	94.90	99.45
Transgender	1.00	0.09	99.55
Unknown	5	0.45	100.00
Total	1099.00	100.00	

Table 16: 2019 Allegedly Armed

Allegedly Armed	Freq.	Percent	Cum.
Allegedly Armed	815.00	74.16	74.16
Unarmed/Did Not Have Actual Weapon	123.00	11.19	85.35
Unclear	95.00	8.64	93.99
Vehicle	66.00	6.01	100.00
Total	1099.00	100.00	

Table 17: 2019 Weapon

WaPo Armed	Freq.	Percent	Cum.
Ax	6.00	0.55	0.55
Barstool	1.00	0.09	0.64
Baseball Bat	5.00	0.46	1.09
Baseball Bat and Knife	1.00	0.09	1.19
Baton	1.00	0.09	1.28
Beer Bottle	1.00	0.09	1.37
Box Cutter	2.00	0.18	1.55
Car, Knife, and Mace	1.00	0.09	1.64
Chain	1.00	0.09	1.73
Chair	1.00	0.09	1.82
Crowbar	1.00	0.09	1.92
Garden Tool	2.00	0.18	2.10
Gun	598.00	54.56	56.66
Gun and Car	4.00	0.36	57.03
Gun and Knife	1.00	0.09	57.12
Gun and Vehicle	5.00	0.46	57.57
Hammer	6.00	0.55	58.12
Hatchet	3.00	0.27	58.39
Knife	149.00	13.59	71.99
Machete	4.00	0.36	72.35
No Object	87.00	7.94	80.29
Piece of Wood	2.00	0.18	80.47
Scissors	2.00	0.18	80.66
Screwdriver	2.00	0.18	80.84
Sharp Object	7.00	0.64	81.48
Shovel	2.00	0.18	81.66
Straight Edge Razor	1.00	0.09	81.75
Sword	7.00	0.64	82.39
Taser	5.00	0.46	82.85
Toy Weapon	32.00	2.92	85.77
Undetermined	66.00	6.02	91.79
Unknown Weapon	17.00	1.55	93.34
Vehicle	66.00	6.02	99.36
Vehicle and Gun	3.00	0.27	99.64
Vehicle and Machete	1.00	0.09	99.73
Walking Stick	1.00	0.09	99.82
Wasp Spray	1.00	0.09	99.91
Wrench, Hammer	1.00	0.09	100.00
Total	1096.00	100.00	

Figure 5: Gifford’s Law Center Data Use and Nondisclosure Agreement



## DATA USE & NONDISCLOSURE AGREEMENT

It is understood and agreed to that Giffords Law Center to Prevent Gun Violence (“Giffords Law Center”) will share original, confidential gun law scores and rankings with Kristen Millsap at the University of Maryland, advised by Dr. Robert W. Brame at the University of Maryland. To ensure the protection of such information and in consideration of the agreement to exchange said information, the parties agree as follows:

1. The confidential information to be disclosed is original gun law scores, gun law rankings, and point allocation documents created by Giffords Law Center in preparation for the state gun law scorecard publication produced in 2017, 2018, and 2019. These scores are based on Giffords Law Center’s analysis of the then-current state of firearms laws in all fifty states.
2. Ms. Millsap shall use the confidential information only for the purpose of aiding her in her thesis research regarding how rates of police killings correlate with state gun legislation. No data or point allocation documents shall be published in raw form.
3. Ms. Millsap shall limit disclosure of Giffords Law Center’s data to use in her own research and will not disclose the data to any third party (whether an individual, corporation, or other entity), except that she may describe the data to journal editors for the purpose of publication.
4. This agreement shall not be construed as creating, conveying, transferring, granting or conferring upon the recipient any rights, license or authority in or to the information exchanged, except the limited right to use the confidential information as specified in paragraph 2. Furthermore and specifically, no license or conveyance of any intellectual property rights is granted or implied by this agreement.
5. This agreement shall become effective on the last date of signature by the parties below (“Effective Date”) and shall expire after three (3) years, unless terminated in writing by either party prior to such time. Notwithstanding the expiration of this agreement, the data confidentiality and non-disclosure obligations agreed to herein will continue beyond the agreement’s expiration.

**WHEREFORE**, the parties acknowledge that they have read and understand this agreement and voluntarily accept the duties and obligations set forth herein.

**Recipient of Confidential Information:**

Name (Print or Type): Kristen Millsap  
Company: University of Maryland, College Park  
Title: Graduate Student  
Address: 4209 Oglethorpe St. Apt. 202  
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Signature: 

Date: 05/08/2023

Name (Print or Type): Cory M. Whitman  
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Date: 7/6/2023

**Provider of Confidential Information:**

Name (Print or Type): Kelly Drane  
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Signature: 

Date: 7/10/23

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