A STUDY OF MASS SHOOTINGS IN THE UNITED STATES: THE EFFECTS OF MENTAL

HEALTH AND HIGH CAPACITY WEAPONS ON FATALITIES AND INJURIES

by

Carly Betzler

Submitted in partial fulfillment of the

requirements for Departmental Honors

in the Department of Criminal Justice

Texas Christian University

Fort Worth, Texas

May 6, 2019

A STUDY OF MASS SHOOTINGS IN THE UNITED STATES: THE EFFECTS OF MENTAL

HEALTH AND HIGH CAPACITY WEAPONS ON FATALITIES AND INJURIES

Project Approved:

Supervising Professor: Brie Diamond, Ph.D.

Department of Criminal Justice

Kendra Bowen, Ph.D.

Department of Criminal Justice

Wendy Williams, Ph.D.

Department of Professional Practice in Honors

Abstract

A public mass shooting is defined by federal agencies as a shooting that kills four or more people in a single public location and at a single point in time. This study examined ninety-two cases of public mass shooting in the United States between 1982 and 2018. The study looked to identify common characteristics among mass shootings, specifically looking at the role of assault weapons in public mass shootings, the mental health of the offender, and the connection between state gun laws and public mass shootings. This study found that almost 70% of mass shooters used an assault weapon to carry out their killings, and the use of assault weapons resulted in significantly more fatalities and injuries compared to the use of low-capacity weapons. More than half of mass shooters exhibited signs of mental illness before committing a public mass shooting, and the majority of offenders had a formal record of their mental illness. In addition, this study found that public mass shooting crime rates decreased in states with more lenient gun laws.

Introduction

Public mass shootings have become highly publicized and overly common events in the United States. A mass shooting occurs, and it is followed by heartache and anger. Politicians then use the event as leverage to further their agendas. Some studies have shown that mass shooting events are not equally distributed over time, and there is evidence that the frequency of mass shootings has increased since the turn of the century (Lemieux, 2014). An FBI study of "active shooter incidents" examined 160 active shooter cases that occurred between 2000 and 2013. During the first seven years of the study, an average of 6.4 incidents occurred annually. In the second half of the study, an average of 16.4 incidents occurred annually, resulting in more injuries and casualties (Federal Bureau of Investigation, 2013).

Mass shootings are increasing in the United States, but there has been little research about why there are more shootings and casualties related to mass shootings. Many blame the increase on the availability of firearms in the United States, stating that lax gun laws make weapons excessively available. With the increase in mass shootings in the United States, gun laws have become a highly debated topic. Both sides of the debate support their arguments with thoughts on mental health, weapon capacity, and current gun laws. However, there is little scholarly research and empirical evidence to support either sides' claims.

Literature Review

In order to understand mass shootings in the United States, it is important to understand the definitions that are recognized by federal agencies. The Federal Bureau of Investigation defines mass murder as the act of "killing four or more people in close succession in a single location or in closely related locations" (Dillon, 2013, p.23). The criteria of this definition involve the location of the murder, as well as the time between murders. This definition is in

contrast to spree or serial murder. A murderer who kills multiple people in separate locations is referred to as a spree killer, and a murderer who kills multiple people between cooling off periods is defined as a serial murderer. If a mass shooting occurs in a public location, it is referred to as a public mass shooting.

Public Mass Shootings and High Capacity Weapons

Mass murderers can use a variety of weapons, including bombs, firearms, knives, or poison. When a mass murderer uses a firearm as their choice of weapon to carry out their killings, the mass murderer is referred to as a public mass shooter, and the event is referred to as a public mass shooting. The Department of Homeland Security defines an active shooter as "an individual actively engaging in killing or attempting to kill people in a confined or populated area" (US Department of Homeland Security, 2008). Firearms are the most popular weapon choice of mass murderers, which may be attributed to various reasons. Firearms can generate greater lethality compared to weapons like knives, a murderer is able to be selective with specific targets compared to bombs or fire, and a firearm places distance between the shooter and the victim (Fox & Levin, 2012).

Firearms, specifically assault weapons, may also be the favored weapon by mass shooters because of their ability to kill a large number of people in a small amount of time, specifically assault weapons. Assault weapons, or high-capacity weapons, are defined by federal laws relating to their features. According to the Assault Weapons Ban of 2018, an assault weapon is defined by the following conditions: any semi-automatic firearm which "utilizes a portion of the energy of a firing cartridge to extract the fired cartridge case and chamber the next round," a magazine with a capacity of more than 10 rounds of ammunition, or "any part or combination of parts that function of accelerate the rate of fire, as well as all AK and AR type rifles (Congress,

2018). Individuals in support of stricter gun laws have argued that high capacity weapons result in greater destruction because they allow the shooter to fire more rounds before reloading, and the bullets are fired in faster succession (McGinty, Webster, & Barry, 2013). For example, Stephen Paddock altered his weapons with bump stocks in the 2017 Las Vegas Massacre, which would classify the weapons as high-capacity assault weapons. He was then able to fire more than eleven hundred bullets over a period of ten minutes, killing fifty-eight people and injuring close to nine-hundred people. On the other hand, Dimitrios Pagourtzis opened fire in Santa Fe High School with a revolver. He killed ten people and wounded ten people with a low-capacity weapon (Hanna, Andone, Allen, & Almasy, 2018). This instance supports the argument that weapon capacity is not a crucial factor in a shooter's ability to carry out their killings, but the use of high capacity weapons has the potential to increase the death and injury toll.

Public Mass Shootings and Mental Health

Mental health is also a topic at the center of many gun law debates. One study found that more than 60% of mass shooters in the United States have displayed symptoms of mental illness, including depression, paranoia, and delusions before committing a public mass shooting (Follman, 2012). James Holmes, for example, was being treated by a psychiatrist for schizophrenia when he opened fire in a movie theater in Aurora, Colorado in 2012. Holmes killed twelve people and injured seventy others (Metzl & MacLeish, 2015). Some psychiatrists have claimed that mass shootings would be preventable if the shooters were being treated for their illnesses, while others have argued that those with severe mental illnesses should not have access to weapons (CBS News, 2013). The United States Supreme Court also agreed by recommending laws that would prevent convicted felons and the mentally ill from obtaining weapons because of the liability for violence. (District of Columbia v. Heller, 2008).

Evidence also suggests that mass shooters are socially marginalized. Eric Harris, a shooter in the 1999 mass shooting at Columbine High School, was harassed by students at the high school because of his looks and behavior. He would later kill thirteen people and wound twenty-four more with an accomplice. Some evidence also suggests that mass shooters lead solitary lives, as they fail to live by society's standards. Elliot Rodger, the actor in the Isla Vista shooting who killed six people, was described as a "smart loner" by those around him, as well as having difficulty making eye contact with others (Metzl & MacLeish, 2015). Prior evidence proposes that mass shooters are most often mentally ill or socially marginalized, so mass shooting events often bring attention to the importance of mental health and inclusivity.

On the other hand, the idea that mental illness is the cause of gun violence stereotypes a large number of people who suffer from psychiatric conditions and do not commit violent acts. One study conducted by the National Center for Health Statistics examined more than one hundred thousand killings in the United States that involved a firearm. The study found that less than 5% of these killings were committed by a person diagnosed with a mental illness (Metzl & MacLeish, 2015). There is debate over whether or not mental illness is a root cause of public mass shootings, but politicians on both sides of the spectrum agree that there is at least some relationship between shootings and mental illness.

The debate over gun laws in the United States is very controversial, as gun control is a polarizing topic across political parties. The United States is one of only two countries in the world that grants the right to bear arms in its constitution, and this creates a very contentious gun control debate (Lemieux, 2014). One side of the debate argues that lenient gun laws are a root cause in the high number of shootings that occur. A study in Canada evaluated the number of homicides before and after gun regulations were placed on an individual's ability to purchase a

weapon in that country. The study found that the number of homicides committed with a gun

dropped as much as 10%, which suggests that the availability of firearms may play a role in the

number of deaths that are the result of a firearm (Blais, Gagne, & Linteau, 2011). However, other

studies have shown that the frequency of mass shootings may not be due to gun laws. For

example, Australia enacted a gun control law in 1996, and the country did not have any mass

shooting events in the ten years following the implementation of the law. New Zealand,

however, did not enact any gun control laws, and the country also saw a decrease in the number

of mass shootings in the same time period. This study suggests that public mass shootings may

be related to other factors outside the legal availability of weapons, such as economic cycles and

employment levels (Lemieux, 2014). It is also worth noting that public mass shootings are an

extremely rare event in both Australia and New Zealand, so the law implemented in Australia

may not have had an impact on potential mass shooters.

Current Study

Public mass shootings are being seen more often in the news media, and they are often at

the center of political campaigns. Research on public mass shootings is referenced to the public,

but the current research fails to identify the modern problems associated with mass shootings.

Assault weapon bans are presented to Congress, while there is very little research about the

lethality of assault weapons compared to other firearms. Research also fails to acknowledge new

technologies that allow mass shooters to modify weapons and increase lethality. Gun law

campaigns also reference how firearms are too easily accessible, but research has yet to identify

where and how public mass shooters obtain their weapons. Mental health is also a topic that is

rarely researched in relation to public mass shootings. While some research has identified

common mental illness symptoms among mass shooters, there is very little research on whether

or not these symptoms are able to be identified before the shooting. This study will only analyze

public mass shooting incidents in the United States. Other research may include mass murders

that involve family members. However, mass shootings that involve family members tend to

have different motivations than public mass shootings, so they are excluded from this research.

Current debates surrounding public mass shootings include the role of assault weapons in the

crime, the mental health of the offender, and whether or not more restrictive gun laws would help

to prevent these events. This study will attempt to address the nature of these cases to identify

trends in the offenders, locations, or general characteristics of these incidents. The data used in

this study is from the Mother Jones Mass Shooting Data Set, which includes ninety-two public

mass shootings between 1982 and 2018. The goal of the current study's results is to identify

common characteristics among public mass shootings, which may be beneficial for preventing

future occurrences of these deadly events. This may help to identify early warning signs of

threatening individuals or events.

Method

The unit of analysis in this study is an individual public mass shooting that has occurred

in the United States between 1982 and 2018. There are various definitions for a public mass

shooting, but this study will use the definition put forth by the FBI's crime classification. The

FBI defines a mass shooting as an individual killing four or more people in a single incident, not

including the suicide of himself or herself (Dillon, 2013). Spree killings, which are killings that

occur in more than one location over a short period of time, are not included in this study. Mass

shootings that involve gang members, family members, or shootings that occur along with the

commission of another felony are also excluded from this study. These incidents may be driven

by motivations that differ from public mass shootings, so they are excluded from the data set.

This study focuses on public mass shootings that have occurred in the United States in order to better understand the characteristics behind these incidents.

Data

This study uses publicly-available data collected from investigations on public mass shootings by Mother Jones Magazine, which is a news organization specializing in investigative reporting on topics like politics and human rights. Mother Jones' investigation worked to compile all available data on every public mass shooting in the United States between the years 1982 and 2018, which resulted in data on ninety-two separate instances of public mass shootings. The Mother Jones data set was selected for this study because of its availability and comprehensive nature. It has been compared to similar data sets, and it has been proven to be accurate and reliable. In contrast to other data sets, the Mother Jones data set only includes events of public mass shootings. Therefore, other data sets may record more instances of mass shootings because of the variation among definitions, such as including a mass shooting that killed four people during a bank robbery (Dillon, 2013). The current study looks to examine public mass shootings, so the data from Mother Jones is the most appropriate to identify trends or warning signs of these crimes.

The data set included details about the shootings, including the firearms used in each case and how each firearm was obtained by the shooter. It also included measures like the incident name, location, date, summary, fatalities, injuries, venue, mental illness, race, and gender of the shooter. The data set provided detailed information about each public mass shooting event, which can be used to better understand what public mass shootings and shooters have in common. The mass shootings included in the study happened during a single occurrence in a

public place and resulted in the deaths of at least four people. Mother Jones used the FBI's

Supplemental Homicide Reports and media sources to provide more details behind each event.

Measures

Offender Characteristics.

The Mother Jones data set provided demographic information about the shooter, which

included age, race, and gender. Shooters were classified as either male or female. The shooter's

race was defined as White, Black, Latino, Asian, Native American, or Other. It also reported

whether or not the shooter showed prior signs of mental illness. The mental health histories of

some shooters were unclear or unknown, meaning that Supplemental Homicide Reports or media

sources were not able to find information about the shooter's mental health history, or the

shooter's mental health history could not be confirmed or disproved. Shooters who showed no

signs of mental illness or had no record of mental illness were classified as "no prior signs of

mental illness", while other shooters did have a history of mental illness. If the shooter had a

history of mental illness, the details of their symptoms or mental health records were described in

a few sentences.

Offense Characteristics.

The data set included the name of each incident, the date that it occurred, and the location

of the shooting. The location included both the city and state of the shooting, as well as the type

of venue that the shooting occurred at. Locations were classified as a workplace, religious venue,

school, military venue, restaurant/bar, office building, home, concert, shopping center, outdoor

venue, or other. A brief summary of the incident described the actions of the offender, as well as

an overview of the shooting's outcome. The data included the total number of victims, which

was also broken down by fatalities and injuries.

Information about the weapons used in the shooting was also detailed in the data set. The legality of the weapons used was included; weapons were classified as legally obtained, illegally obtained, or unknown. If the investigation could not determine where or how the shooter obtained his or her firearms, the legality was classified as unknown. If the source of the firearms was known, the data set specified how the shooter obtained them. The source of the firearms was classified as either unknown, a gun store, family member, pawn shop, internet, third party individual, stolen, sporting goods store, government issued, gift, assembled, or from a gun show. The data also included detailed information about the weapons used. The incidents were divided by types of weapons. Many of the public mass shootings involved more than one firearm, so the incidents may have been placed in more than one weapon category. The weapon categories included semi-automatic rifle, semi-automatic handgun, shotgun, revolver, handgun, rifle, semi-automatic pistol, long gun, pistol, assault rifle, and derringer. If there were more details about the weapons used that fell outside of these categories, the details were given in a separate column. Details may have included information like caliber, magazine capacity, or modifications of the firearm. Using information from the weapon types and weapon details, the incidents were categorized as using a high-capacity weapon or not using a high-capacity weapon (referred to as a low-capacity weapon). Any public mass shooting that involved a high-capacity weapon, even if other low-capacity weapons were involved, was classified as a shooting with a high-capacity weapon. High-capacity weapons were defined by the following characteristics presented to Congress in the Assault Weapons Ban of 2018.

- "Semi-automatic rifles and pistols with a military-style feature that can accept a detachable magazine

- All Semi-automatic rifles with a fixed magazine that can hold more than 10 rounds

- Semi-automatic shotguns with a military-style feature

- Any ammunition feeding device that can hold more than 10 rounds

- 205 specifically-named and listed firearms

- The language of the bill defines the following as "military-style features": pistol grip; forward grip; detachable magazine; folding, telescoping, or detachable stock; grenade launcher or rocket launcher; barrel shroud; and threaded barrel" (Personal Defense World, 2018)

Gun Laws.

States were ranked from one to five based on the strictness of their gun laws; states ranked one are the least gun friendly and states ranked five are the most gun friendly. States were ranked based on Guns to Carry, a website that analyzes gun laws from all fifty states. The gun laws analyzed include gun permits, registration of weapons, open carry laws, and background checks on gun sales. These rankings will then be compared to the number of mass shootings that have occurred in all fifty states over the past thirty-six years in order to determine if strict gun laws are helping to prevent mass shootings.

Analytical Procedure

This study looks to examine trends in mass shootings in the United States over the past thirty-six years. This will be done in three ways. Firsts, the study will examine offender demographics to analyze the actors in these crimes, as well as the frequency of mass shootings over time. This study will also compare high capacity weapon injuries and fatalities to low capacity weapon injuries and fatalities in order to determine if weapon capacity is related to the lethality of a mass shooting. It will also analyze the mental health of the shooter in order to determine if there is a trend of mental illness among actors. It will look at whether these actors

show symptoms of mental illness before the shooting, which may indicate common

characteristics that can be identified in order to prevent mass shootings. This study will also

attempt to evaluate the relationship between the gun-friendliness of a state and public mass

shooting incidents in the state. Also, gun laws will be evaluated in reference to mental health.

This study will compare the legality of weapon sales to the mental health of offenders to

determine if gun laws are successfully screening for mental health issues. Finally, this study will

compare the legality of gun sales to the lethality of a mass shooting in order to determine if

restrictive gun laws are preventing offenders from committing mass shootings. The ultimate goal

of this study is to understand the nature of mass shootings in order to help prevent these acts in

the future. The goal of this study's results is to provide a better indication of the trends and

characteristics of these deadly incidents in order to help shape formal prevention efforts that may

provide warning or early detection of troublesome individuals and events.

Results

Offender Characteristics

The data showed a wide variety of offenders who committed mass shootings over the past

thirty-six years (see Figure 1). Offenders' ages ranged from eleven years old to sixty-six years

old, and both the median and mean age of offenders was thirty-four years old. The majority of

shooters were between the ages of twenty and forty-nine. These findings support previous

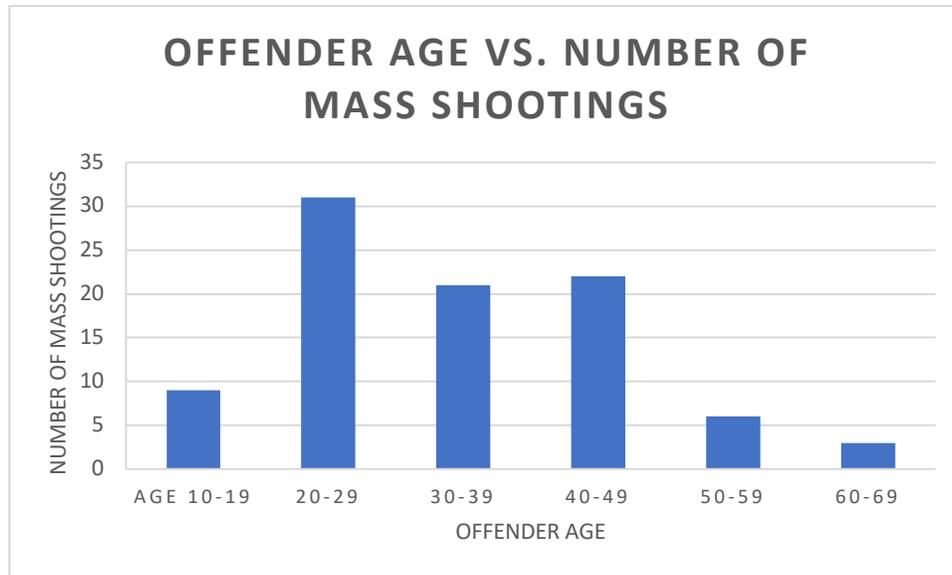research that mass shooters do not have a specific age typology.

Figure 1: Offender Age vs. Number of Mass Shootings

As shown in Table 1, the majority of offenders were male (97%), while only 3% of shooters were females. The majority of offenders were also white (61%), while Black (15%), Latino (9%), Asian (7%), Native American (2%), and shooters of other races (7%) were less common (see Table 1). These findings support previous research that the most common shooter is a white male.

Table 1: Offender Demographics		
Variables	N	%
Age		
10-19	9	9.8
20-29	31	33.7
30-39	21	22.8
40-49	22	23.9
50-59	6	6.5
60-69	3	3.3
Race		
White	56	60.9
Latino	8	8.7
Black	14	15.2
Asian	6	6.5
Native American	2	2.2
Other	6	6.5

Table 1: Offender Demographics (cont.)		
Gender		
Male	90	97.8
Female	3	3.3

Offense Characteristics

The data showed that mass shootings have been increasing over the past thirty-six years (see Figure 2). In the years between 1982 and 1995, an average of 1.1 mass shootings occurred each year. In the years between 1996 and 2010, an average of 1.8 mass shootings occurred each year. However, since 2011, 8.9 mass shootings have occurred each year. This data supports research that mass shooting events are increasing in the United States, which reiterates the importance of research on mass shootings.
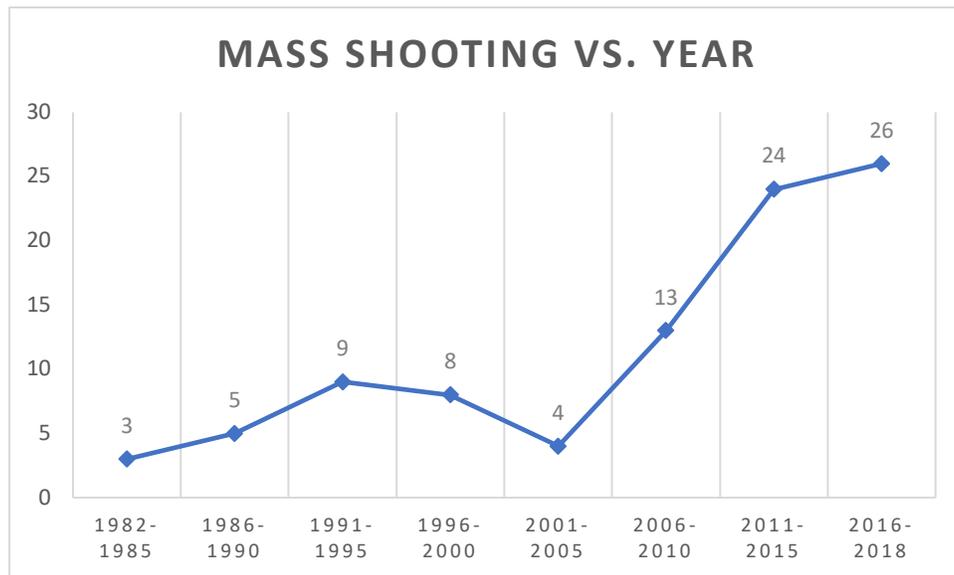

Figure 2: Mass Shooting by Year

Venue.

Table 2 reports descriptive information concerning the offense date and location. The most common location for a public mass shooting in the United States was the workplace (31%), followed by schools (17%) and restaurants/bars (12%). Other venues, such as religious centers

(6%), military bases (6%), office buildings (7%), homes (4%), concert venues (2%), shopping

centers (5%), and outdoors (5%) were less common targets among mass shooters. This data can

help identify popular targets of mass shooters to identify venues that need to be better protected

from shooters.

Table 2: Offense Characteristics		
Variables	N	%
Year		
1982-1985	3	3.3
1986-1990	5	5.4
1991-1995	9	9.8
1996-2000	8	8.7
2001-2005	4	4.3
2006-2010	13	14.1
2011-2015	24	26.1
2016-2018	26	28.3
Venue		
Workplace	28	30.4
Religious Venue	5	5.4
School	16	17.4
Military Base	5	5.4
Restaurant/Bar	11	12.0
Office Building	6	6.5
Home	4	4.3
Concert	2	2.2
Shopping Center	5	5.4
Outdoors	5	5.4
Other	5	5.4

Weapons.

Legally obtained weapons (74%) were overwhelmingly used by mass shooters, while

only 16% of mass shooters used weapons that were illegally obtained (see Figure 3). This

supports the research that gun laws are not properly screening out potential mass shooters or

violent criminals in general. Also, the origins of 12% of weapons could not be identified,

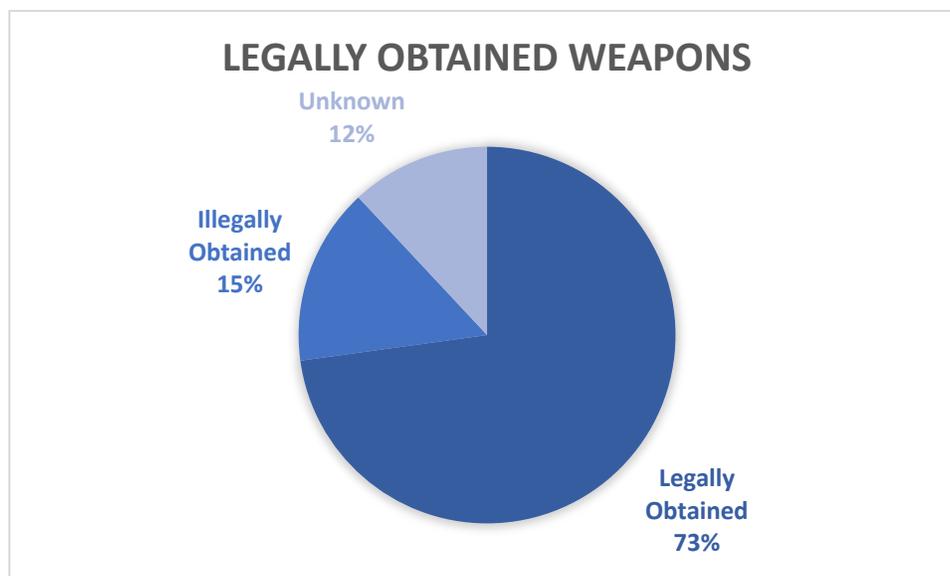suggesting that many gun sales and exchanges are inadequately recorded.

Figure 3: Legally Obtained Weapons

Semi-automatic handguns were the most popular weapons among mass shooters, followed by shotguns and rifles, respectively (see Table 3). However, the majority of mass shooters in the United States used high capacity assault weapons (70%). Only 30% of mass shooters used a weapon that was not high capacity. On average, high capacity weapons resulted in 16.63 injuries and 9.77 fatalities per incident, while non-high capacity weapons resulted in 4.15 injuries and 5.48 fatalities per incident (see Figure 4). There was a significant difference in the number of injuries between high-capacity and low-capacity weapons (t=2.83, $p < 0.05$, one-tailed), and there was also a significant difference in the number of fatalities between high-capacity and low-capacity weapons (t=3.15, $p < 0.05$, one-tailed).

| Table 3: Weapon Characteristics		
Variables	N	%
Legality of Weapon		
Legally Obtained	67	74.4
Illegally Obtained	14	15.6
Unknown	11	12.2
Origin of Weapon		
Unknown	34	37.0
Gun Store	21	22.8
Family Member	8	8.7
Pawn Shop	5	5.4
Internet	3	3.3
Third Party Individual	4	4.3
Stolen	2	2.2
Sporting Goods Store	9	9.8
Government Issued	2	2.2
Gift	1	1.1
Assembled	1	1.1
Gun Show	2	2.2
Weapon Type		
Semi-auto Rifle	9	9.8
Semi-auto Handgun	57	62.0
Shotgun	24	26.1
Revolver	11	12.0
Handgun	9	9.8
Rifle	15	16.3
Semi-auto Pistol	1	1.1
Long gun	1	1.1
Pistol	1	1.1
Assault Rifle	13	14.1
Derringer	2	2.2
Weapon Capacity		
High-Capacity	64	69.6
Low-Capacity	28	30.4
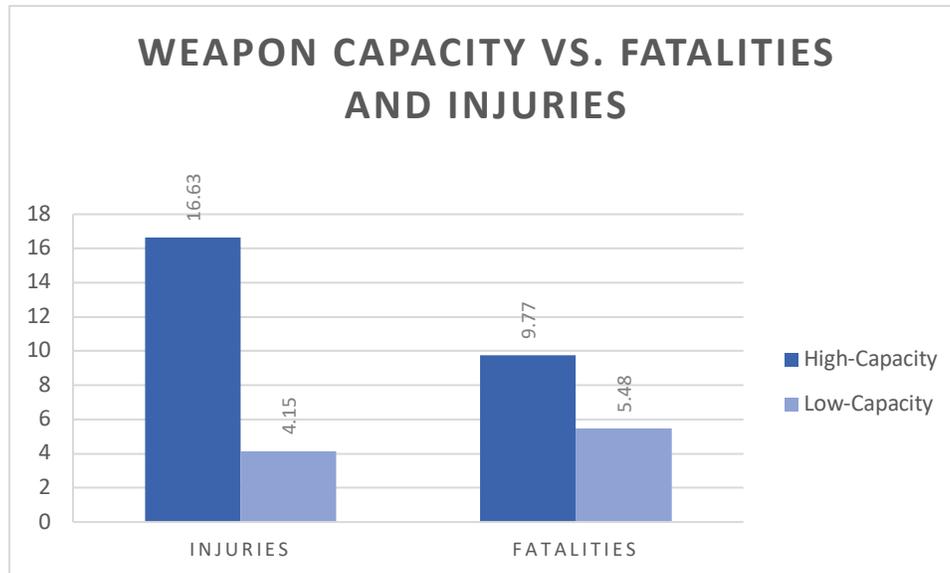
Figure 4: Weapon Capacity vs. Fatalities and Injuries

Mental Illness:

More than half (51%) of mass shooters showed signs of mental illness prior to the

shooting, while only 16% of mass shooters did not show any signs of mental illness (see Figure

5). It should be noted that 16% of mass shooters who did not show any signs of mental illness

may have experienced symptoms of mental illness without showing signs, or people may have

failed to recognize the symptoms. The remaining 33% of mass shooters were either undiagnosed

or their mental health history was unknown. These numbers indicate that mental health records

are not adequate, as well as the need for a reporting system for mental health professionals and
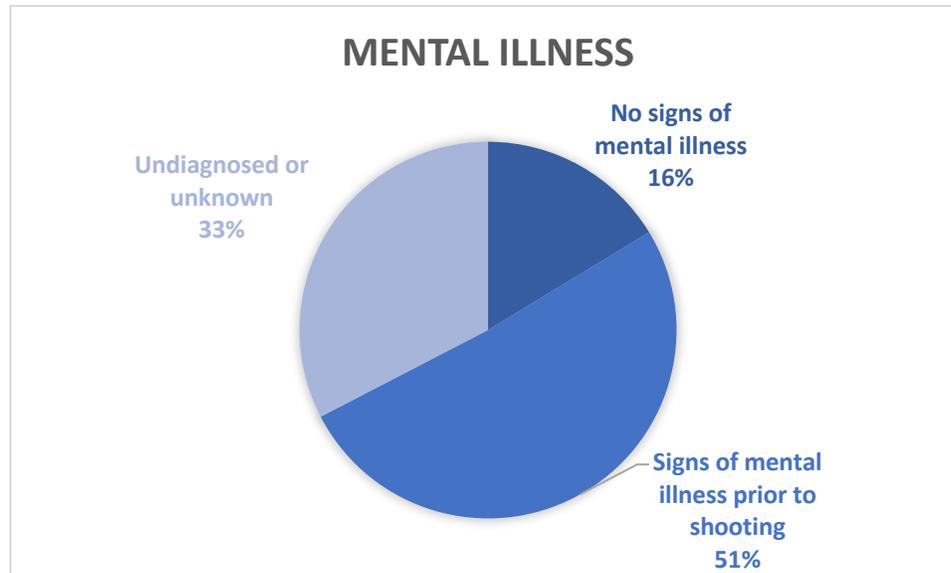
law enforcement.

Figure 5: Mental Illness

For incidents in which the offender showed signs of mental illness prior to the shooting, 60% of offenders had a formal record of mental illness, and 40% of offenders had shown symptoms of mental illness to friends or family members (see Figure 6). This indicates that current gun laws are not screening for mental illnesses. Also, the people closest to the shooter are not reporting when they identify signs of mental illness that may lead to violence. In addition, 66% of weapons that were obtained legally were given to offenders who had shown prior signs of mental illness. This further supports the idea that background checks for firearms are not adequately considering mental health. See Table 4 for more details on mental illness in relation to public mass shootings.
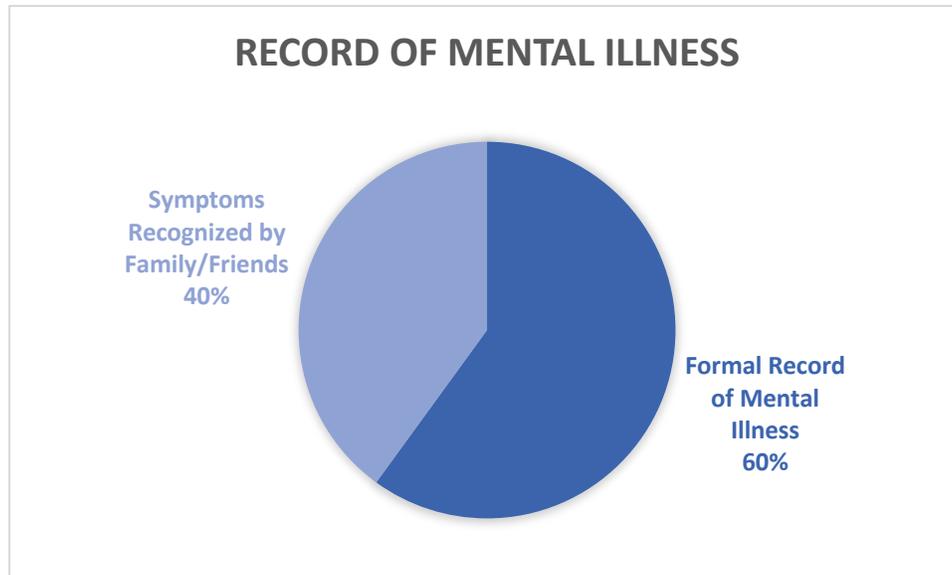
Figure 6: Record of Mental Illness

Table 4: Mental Illness		
Variables	N	%
Signs of Mental Illness		
No signs of mental illness	15	16.3
Mental illness prior to shooting	47	51.1
Undiagnosed or unknown	30	32.6
Record of Mental Illness		
Formal record	36	60.0
Symptoms recognized by family/friends	24	40.0

Gun Laws

State gun laws were evaluated by comparing the mass shooting crime rate to the

friendliness of the state's gun laws. States given one star were the least gun friendly states, such

as California and New York. States given five stars were the most gun friendly states, such as

Alaska, Arizona, and Missouri. States like Colorado and Nevada have moderate gun laws, so

they were given three stars. Overall, 2-star states had the highest mass shooting crime rate

(0.0436), and 5-star states had the lowest mass shooting crime rate (0.0089). Interestingly, crime

rates decreased with more lenient gun laws. Due to the rarity of public mass shootings and the

small sample size of events in the United States, the small difference in crime rates must be

interpreted with caution.

Table 5: Gun Laws		
Variables	Crime Rate	Number of Public Mass Shootings
State Gun Laws		
1 Star	0.0205	21
2 Star	0.0436	7
3 Star	0.0396	24
4 Star	0.0186	36
5 Star	0.0089	4

Discussion

The purpose of this study was to research the impact of mental health and weapon

capacity in ninety-two cases of public mass shootings in the United States. The findings of this

study support those of previous research, including the ideas that public mass shooting events

have been increasing and high-capacity weapons are responsible for increased injuries and

fatalities in public mass shootings. Most mass shooters use legally-obtained weapons to carry out

their acts, meaning that these shooters are passing state and federal background checks to gain

access to firearms. The current study also found that mental illness is a common characteristic

among mass shooters, and there is most likely a record of the shooter's mental illness before the

commission of the mass shooting. When comparing state gun laws to public mass shooting

events, this study found that public mass shootings decrease in states with more lenient gun laws.

This study reinforced the typology of public mass shooters. The majority of mass shooters are white males, and most shooters are between the ages of twenty and forty-nine. However, a very small portion of the United States' population commits a public mass shooting, so these demographics may not help in profiling potential mass shooters. This study also confirmed that public mass shooting events are increasing. On average, eight more mass shootings occur per year in recent years compared to the 1980's and 1990's. This information brings to light the importance of researching these events in order to understand why they continue to occur. It is important to understand the factors involved in a public mass shooting in order to save lives in the future. More than half of all public mass shootings occurred at either a workplace, school, or restaurant/bar. These public spaces are popular targets among mass shooters, which may indicate that these targets need to be hardened in order to prevent future public mass shootings.

High-capacity weapons were used in the majority of mass shootings, and the majority of the high-capacity weapons were classified as semi-automatic. These firearms have the ability to fire more rounds of ammunition in a shorter amount of time, which allows the shooter more opportunities to make contact with a victim. The firing rate and ammo capacity of these assault weapons result in significantly higher numbers of fatalities and injuries in mass shootings. However, mass shootings continue to occur with low-capacity weapons as well, and a bullet from a low-capacity has the same potential lethality as a bullet from a high-capacity weapon.

While limiting access to high-capacity weapons may help decrease injuries and fatalities in a public mass shooting, eliminating high-capacity weapons will not prevent all future public mass shootings or shootings in general. Limiting access to firearms from certain populations of people may help to prevent public mass shootings. The majority of mass shooters exhibited some signs

or symptoms of mental illness before committing a mass shooting. This suggests that background checks are not properly screening out individuals who are more inclined to commit violent acts due to a mental illness. The failure of background checks may be due to the fact that there is a lack of communication between background checks and police reports or psychiatric histories. Some mass shooters showed symptoms of mental illness that were informally recognized by friends and family. A system in which these individuals are able to report suspicious or frightening behavior may help identify individuals who are exhibiting precursors to a public mass shooting, which may prevent these individuals from gaining access to weapons or carrying out their plans.

The large majority of public mass shooters obtained their weapons through legal channels. While 73% of weapons were legally obtained, the origin of these weapons could not be traced. Gun laws or registries may help to maintain records of weapons in the United States, which may help identify where mass shooters are legally obtaining weapons. Gun stores were the second most popular location for obtaining a weapon, which suggests that gun stores are not properly running background checks or investigating potential buyers. Family members were also a popular source of weapons. This may indicate that family members need to practice better gun safety by securing weapons, or they may need to learn to identify the behaviors that may indicate violence in order to prevent them from obtaining a weapon.

Another finding in this study is the notion that public mass shooting events are least common in states with the most gun leniency, and the overall rate of public mass shootings in the United States decreases with less restrictive gun laws. States that were rated with two stars, meaning that they had more restrictive gun laws, had the highest rates of mass shootings. While public mass shootings are extremely rare events and differences in crime rates may be due to the rarity of the

event, this finding may indicate that mass shootings are not the result of lenient gun laws or citizens carrying firearms. This may also show that stricter gun laws will not prevent public mass shooting events, so the blame for public mass shooting events with legal firearms may need to be placed on background checks rather than state gun laws.

Limitations

These findings must be interpreted with consideration of several limitations. The sample of mass shootings in the United States is rather small, which limits both the accuracy and extent of data analysis (especially with regard to crime rates). The Mother Jones data set was compiled mostly from media sources, which leads to the potential for error. Information from media sources may contain bias either for or against gun ownership, which may skew the data that the media source chooses to present. Media sources also have a tendency to report information before it can be verified, so some of the facts offered in the articles may be inaccurate or unverified. Also, the threshold of mental illness is poorly defined here, and perhaps some instances of mental health included here would not have risen to the level of official intervention, even if agencies were made aware of them. Finally, media reports about mental illness and types of weapons may have varied slightly across media networks. However, this data set was checked for accuracy and completeness, and it has been used in several studies in the past. Based on this information, the Mother Jones data set was proven to be the best option for the current study.

Conclusions

Further research should evaluate reasons as to why mass shootings have increased drastically in the past ten years. The increase in public mass shootings may be due to a variety of reasons. One reason may be that there has been an increase in the number of firearms that are available to the public, while another reason may be the fact that shooters are receiving more

attention from media sources than in prior decades. Mass shootings are often followed by weeks of news stories and interviews, and the news stories are circulated very quickly. Also, the increase in mass shootings around 2006 may be due to the invention of modern-day social media. Social media site like Facebook, Twitter, and YouTube gained popularity in the early 2000's, which may play a role in the increase of public mass shootings. Research must work to understand why there is an increase in public mass shootings in order to prevent these events from occurring.

Future research can also work to understand the mental health of mass shooters. There is an opportunity to understand how the age of the shooter relates to mental health, which can help mental health professionals and law enforcement identify age-appropriate signs of mental illness. The ages of public mass shooters were distributed over a wide range, so shooters at different ages may exhibit different signs and symptoms of mental illness. If we are able to identify age-appropriate signs of mental illness, we may be able to diagnose and treat these individuals before they commit a mass shooting. Also, many of the public mass shooters were undergoing major life transitions. Some shooters had recently lost a job before committing a mass shooting while others had lost a spouse or large sum of money. Resources that help individuals experiencing life changes may offer them coping skills, which may prevent mental illness and further prevent mass shootings.

Overall, mass shootings are increasing in our society, but we have failed to identify why they continue to occur. Thousands of people have become the victims of these heinous crimes, and we must work to prevent any future victimizations. Future research on public mass shootings is necessary in order to understand and prevent these events.

References

Blais, E., Gagne, M. P., & Linteau, I. (2011). The Effect of Gun Control Laws on Homicides in

    Canada. *Canadian Journal of Criminology and Criminal Justice, 53*(1), 27-61.

CBS News. (2013). Retrieved from Imminent Danger: https://www.cbsnews.com/video/preview-

    imminent-danger/

Congress, 1. (2018, February 26). H.R. 5087. *Assault Weapons Ban of 2018*.

Dillon, L. (2013). Mass shootings in the United States: An exploratory study of the trends from

    1982-2012. Fairfax, VA: George Mason University.

District of Columbia v. Heller, 07-290 (Supreme Court of the United States 2008).

Federal Bureau of Investigation. (2013, September 16). US Department of Justice. *A Study of

    Active Shooter Incidents in the United States Between 2000 and 2013*. Washington D.C.

Follman, M. (2012, November 9). *Mother Jones* . Retrieved from Mass Shootings: Maybe What

    We Need Is a Better Mental-Health Policy:

    https://www.motherjones.com/politics/2012/11/jared-loughner-mass-shootings-mental-

    illness/

Fox, J. A., & Levin, J. (2012). *Extreme Killing: Understanding Serial and Mass Murder*. Los

    Angeles, CA : Sage Publications .

Hanna, J., Andone, D., Allen, K., & Almasy, S. (2018, May 19). *CNN*. Retrieved from Alleged

    shooter at Texas high school spared people he liked, court document says:

    https://www.cnn.com/2018/05/18/us/texas-school-shooting/index.html

Lemieux, F. (2014). Effect of Gun Culture and Firearm Laws on Gun Violence and Mass

    Shootings in the United States: A Multi-Level Quantitative Analysis. *International

    Journal of Criminal Justice Sciences, 9*(1), 74-93.

McGinty, E. E., Webster, D. W., & Barry, C. L. (2013). Effects of News Media Messages about

      Mass Shootings on Attitueds Toward Persons with Serious Menal Illness and Public

      Support for Gun Control Policies. *Am J Psychiarty, 170*(5), 494-501.

Metzl, J. M., & MacLeish, K. T. (2015). Mental Illness, Mass Shootings, and the Politics of

      American Firearms. *American Journal of Public Health, 105*(2), 240-249.

Personal Defense World. (2018, February 28). Retrieved from House Democrats Introduce

      Assault Weapons Ban of 2018 Bill:

      https://www.personaldefenseworld.com/2018/02/democrats-assault-weapons-ban-bill/

US Department of Homeland Security. (2008, October). *Active Shooter - How to Respond*.

      Retrieved from https://www.dhs.gov/xlibrary/assets/active_shooter_booklet.pdf