

Public Mass Shootings Impact on the Public's Firearm Carrying Habits:
Evidence of a Moral Panic

by

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ABSTRACT

Public mass shootings occur at a rate in the U.S. that is higher than any other developed country. These events initiate wide spread media attention. The media attention these events achieve have shown to impact the public behavior (e.g., increased firearm sales). However, the impact public mass shootings have on firearm storage and carry habits of the public is not well understood. Using data collected from the Transportation Security Administration, this study examines how mass shootings have led to moral panics occurring within the U.S. through the examination of the firearm carrying habits among the population immediately following mass shootings. The results indicate that loaded firearms with rounds in the chamber detected by the TSA have significantly increased since 2012. Further, firearms detected immediately following a public mass shooting had a higher proportion of firearms loaded with a round in the chamber relative to 7 days prior to the shooting. Moreover, the increase in proportions of firearms found loaded with a round in the chamber exponentially decays as days past the initial shooting, these events occur at a higher rate than the decay rate can normalize these occurrences. I conclude that in the wake of these shootings a moral panic ensues that is partially responsible for the change in the general public's arming configuration habits. Further research is needed in to determine the impact on crime, and public health related issues due to this change in the public's firearm carrying habits.

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Chapter 1

INTRODUCTION

On the morning of October 1, 2017, 22,000 country music fans prepared for an evening of enjoyment and relaxation at one of the largest annual concerts in Las Vegas, NV. On this morning Stephan Paddock was also preparing for this event, but not in the same manner as the concertgoers. Instead, Paddock meticulously planned out the largest mass shooting in the history of the United States. By the end of this night, 58 people were killed (not including the perpetrator) and 527 were injured (Alsup, 2018). This is one example of a largescale mass shooting, but these type of events have shown an increase in victims in the past decade (Duwe, 2017). Mass shooting events are occurring at a rate consistent with 1980's and 1990's numbers, but these events have become more deadly. The number of victims have increased substantially since 2000. Even though the number of victims per event has increased, the people killed during these events are few when compared to other firearm deaths. Mass shootings are an atypical form of crime, occurring at a lesser rate than other forms of firearm crime (CDC, 2017). The fact that these events are extremely rare seems contrary to public opinion, which is largely formed via the media coverage public mass shootings receive.

The level of violence that occurs in a very short period of time and in a confined location prompts large amounts of public attention on mass shootings that is fed through media outlets. Concern with how and why these events occur is widely discussed. The public mass shooting scenario is a prime example of how an extremely rare event can cause a moral panic (MP) to ensue across a population. A MP occurs when an event stirs large amounts of public attention and is sensationalized through media coverage (Goode

& Ben-Yehuda, 1994). The event is factually rare, but the public becomes hypersensitive to these events and public opinion becomes based on the perception created through media outlets that promote the idea these events occur at a much higher rate than they actually do (Duwe, 2000; Fox & Levin, 2015). The heightened level of concern prompts political discourse and policy change, and/or procedural change regarding how to handle or prevent future events. This level of concern also impacts some form of the population's habits, resulting in behavioral change. When a public mass shooting event emerges, the life course of the event follows a strict MP path, indicating the country is in a deep MP concerning public mass shootings.

The purpose of this study is to determine whether public mass shootings impact firearm carrying and storage habits of a cross-section of firearm owners, thus indicating a behavioral change due in part to an atypical event. This study generates, for the first time, a national metric that indicates how the population carry firearms and in what type of configuration these firearms are carried. This metric is formulated with data from the Transportation Security Agency (TSA) that record the amount of weapons found in carry-on baggage across the nation's airports, and in what type of arming configuration they are found. This metric was used to measure the public's response to public mass shootings, it determined what arming configuration firearms were found in prior to and post public mass shootings nationwide. The expected outcome is to find more firearms across the nation are being carried fully loaded and with a round in the chamber after a public mass shooting has occurred and then this increase will decay exponentially the longer the time period after the initial shooting. This carrying configuration indicates the public's anticipation of being involved in some sort of violent episode where quick access to a

loaded and chambered weapon would be vital to their personal safety, and the decay would indicate a lessened sense of imminent danger the longer the time span is from the initial shooting date. With these findings the conception of being in the middle of a national MP will rest on stronger foundational evidence.

In the following sections, previous research will be explored, the statistical modeling strategy will be explained, and the results from the analysis will be presented. Then the discussion/conclusion section considers weaknesses of the study and directions for future research, among other things.

Chapter 2

PRIOR RESEARCH

MASS SHOOTINGS

When conducting research on mass shootings, one major issue researchers, practitioners, and government agencies immediately come to understand is that there is no universal definition for mass shootings. Even the term “mass shooting” has many synonyms such as active shooter, mass killing, and mass murder, and each of these substitutes has slightly different definitions (Berkowitz et al, 2017; Collof, 2006; Fox & DeLateur, 2014; Rubin, 2017). The shooting at University of Texas, Austin, in 1966 has been noted by multiple news agencies and law enforcement agencies as the introduction to mass shootings in the United States (Collof, 2006). Like many mass shootings that followed (e.g., Columbine, CO, Newtown, CT, San Benardino, CA, and Las Vegas, NV), the Texas shooting evoked large amounts of public concern and debate. The discourse surrounding mass shooting events has continued to this day and has resulted in policy and law enforcement procedural change surrounding mass shooting events.

Mass shooting events achieve large amounts of public attention, but these events are extremely rare when compared to other forms of homicide that do not receive the same levels of concern (Fox & DeLateur, 2014). The rarity of these events do not seem to thwart the level of concern created when they occur, even though the frequency of events has not risen substantially and still hovers around the frequency of mass shootings seen in previous decades. What has changed with time is the number of people being killed during mass shootings, this number has substantially increased. In 2000, the victimization rate for mass shootings was 6 per 100 million, increasing to 40 per 100

million in 2016. When the numbers of victims are compared to the number of events each year it is clear that a rise in victims is occurring at each mass shooting event. In 2000, the rate for mass shooting events was 1 per 100 million which rose to 1.5 per 100 million in 2016 (Duwe, 2000, 2017). Even though both the number of people killed during these shootings and the frequency of these shootings have risen since 2000, the killings that occur are still a very small proportion of people killed by firearms each year. According to the Center for Disease Control (2017), more than 31,000 people have been killed by firearms per year in the United States since 2000. Of these deaths, about 15,000 were from homicide and less than 100 occurred from mass murder, which accounts for less than 1% of all homicides by firearms (Krouse & Richardson, 2015). Mass shootings are arguably the worst manifestation of violent crime within society, but as stated above, these events are extremely uncommon. These comparisons demonstrate just how unlikely the chances are that a person would be a victim of a mass shooting event, but these occurrences are the most visible form of firearm crime to the average citizen.

For media outlets, the impact of news story to create viewers is a critical part of the typical business model, driving the selection of which stories will lead news casts. Journalist Eric Pooley (1989) once noted, “The thoughtful report is buried because sensational stories must launch the broadcast. If it bleeds, it leads.” Indeed, public mass shootings have been some of the most publicized events in the media (Birkland & Lawrence, 2009; Duwe, 2000). Public mass shooting events have the ability to captivate the average citizen as well as interrupt national leaders’ schedules to address these events. On April 20, 1999, Eric Harris and Dylan Klebold executed a deliberate attack on Columbine High School, killing 13 and injuring 21. According to the Pew Research

Center (2000), the shooting at Columbine was the most followed news story in 1999, and the third most watched news story of the 1990s. The Columbine shootings came third to the 1992 Rodney King verdict and the 1996 crash of TWA flight 800 near East Moriches, NY. During the news cycle of the 1990's, 68% of Americans said they followed the shooting "very closely" (Dimock, 2000). Columbine could arguably be the start of contemporary active shooter response and attention from news agencies and citizens alike. This event did not only shape public opinion, but also changed police procedures.

Prior to the Columbine incident, law enforcement would setup a perimeter around the affected area and wait for the better equipped and trained Special Weapons and Tactics (SWAT) team to respond. This practice was birthed after the shootings at the University of Texas-Austin massacre where Charles Whitman climbed to the top of the clock tower and started indiscriminately shooting people (Collof, 2006). These procedures were followed during the Columbine incident, ultimately leading to more innocent people dying during the shooting. Although police officers were on scene within minutes, they did not enter the school. This allowed the perpetrators to have unlimited access to the school and students. Public backlash from the response resulted in changes in how law enforcement agencies respond to such events. The new procedure called for officers to go direct to threat and focus on placing a "good gun on a bad gun" (Scott & Schwartz, 2014). Public mass shooting events have demonstrated the ability to affect policy and how citizens of the country conceptualize the threat of public mass shootings. Change in behavior did not only occur at the law enforcement agency level but also took place among citizens. Studies have shown that immediately following a mass shooting event, firearm sales sharply increased across the country.

Heightened media attention has framed public mass shootings as a daily possibility for the average citizen; these feelings have led to the change in behavior among members of society. There is limited research on the effects of mass shootings on the population, but recent research by Studdert et al. (2017) examined the relationship between mass shootings and gun sales in California. The study found a strong relationship between the occurrence of a mass shooting and a steep rise in subsequent gun sales. According to a Gallup Crime Poll, the most cited reason for carrying a firearm was for personal safety (Swift, 2013). Public opinion indicates gun ownership is directly associated with concern for personal safety. When a public mass shooting occurs, the media response is overwhelming that increases the concern of the population, thus, increasing the need for personal security that has shown an outcome of increased gun sales (Wallace, 2015).

A common thread with mass shooting research highlights the issues surrounding the lack of a comprehensive definition and a federally-housed database (FBI, 2013; Huff-Corzine et al., 2014; Rocque, 2012; Towers et al., 2015). The definition and database used for a study determines the outcome of the project which at times is at odds with past research. These competing research projects create a situation where media outlets and politicians are able to choose the data they will share with the general public. The intentional and unintentional selection bias that occurs when these stories are framed for the general public's consumption further promotes the idea that these events occur at a higher frequency than reality. Overall, mass shootings are an atypical event, but they receive an enormous amount of attention from media outlets, the public, and politicians.

The attention generated tends to mold public opinion on the frequency of mass shootings, thus creating a demand for institutional change to prevent further shootings.

MORAL PANIC THEORY

MP theory is a framework that can be used to understand public reactions to well-known social problems throughout history. Recent examples of the uses of MPs include the war on drugs, alcohol use during prohibition, AIDS epidemic, religious cults, and school shootings (Burns & Crawford, 1999; Muschert & Carr, 2006). In each of these examples, wide spread public fear and concern was created within society that evildoers were abundant, and their whole goal was to harm or tear apart the moral fabric of society.

The term MP was originally coined by Jock Young (1971) who first framed societal issues in the terms of a MP. Later, Cohen's (2002) provided the following definition:

A condition, episode, person or group of person emerges to become defined as a threat to societal values and interests; its (the public) nature is presented in a stylized and stereotypical fashion by the mass media; the moral barricades are manned by editors, bishops, politicians, and other right-thinking people

Sometimes the subject of panic is quite novel and at other times it is something which has been in existence long enough, but suddenly appears in the limelight.

Sometimes the panic passes over and is forgotten...at other times it has more serious and long-lasting repercussions and might produce such changes as those in legal and social policy or even in the way society conceives itself (p. 1).

This definition identifies a person or a group of people who are looked upon as evildoers or “folk devils”—a key feature of MPs. According to Cohen (2002), the behavior of folk devils represents a threat to social values and interest. Cohen continues:

The threat created by these folk devils is depicted in a recognizable dramatic form by the media. The media framing of the threat by folk devils establishes a rapid build-up of public concern. This public concern stimulates authorities, politicians, and moral entrepreneurs to call for a strong solution to the problem. Finally, the panic receded, resulting in social and institutional changes (p. 16).

These folk devils are then cast in a very negative manner and are defined as enemies of society. From this standpoint, prominent members of society and laypersons recognize that folk devils must be castigated and punished in line with the type of deviance they bestow upon the social order.

Cohen’s (2002) theory of MPs has been advanced by others. For example, Goode and Ben-Yehuda (1994) argue an MP occurs when a large part of society agrees that an evildoer poses a significant threat to the fabric or moral order. When this consensus is reached, the natural order of events dictates that something must be done the result is a change in behavior, policies, or procedures. The belief is that these changes will result in re-establishing moral order or holding it constant at current levels. Burns and Crawford (1999) explain the most relevant issue of a MP is the elusive relationship between public perception and reality. It is difficult to relate an issue to the general public if there is no basis in reality. Mass delusion and MPs are intimately connected due to the extensive gap between reality and public perception that leads to a public response. This gap is

responsible for the public overreacting to events and letting their worst fears play out (Ben-Yehuda, 1986).

EXAMPLE OF A MORAL PANIC

In the late 1990s a new drug became prominent in the news media cycle, and methamphetamine (or “meth”) began to receive a large amount of attention. The typical story found in newspapers and on the nightly news across the nation had to do with the perceived increase in prevalence of meth use, its highly addictive nature, and the affect this drug had on communities through the manufacturing and use. Jenkins (1999) explained that for more than a century “social problems have often been blamed on the devastating effects of some harmful substance or chemical, and at various times, different substances have been seen as the major demon figures threatening the nation” (p. 1). In the late 1980s to the early 1990s, “crack” was the drug that was the perceived cause of many social problems, but as time progressed the attention of society and media changed. Meth was framed as the new crack, but with an emphasis that meth was much more destructive to the social fabric than its predecessors.

McCorkle and Miethe (1998) characterize a MP as “a situation in which public fears and state interventions greatly exceed the objective threat” (p. 45). The focus of a MP that occurs around drugs centers in on the drug itself as the “evil” or as Cohen (2002) would say folk devils for the people who are associated with the drug. The drug itself and the people associated with these “evil” drugs through the process of a MP become highly correlated with concerning social problems, such as unemployment, poverty, urban decay, and crime (Weidner, 2009). Unlike crack, meth was not framed as a drug solely impacting areas associated with racial or ethnic minorities, lower SES, or crime-ridden

neighborhoods (Musto, 1999). Rather, meth became associated with the white community, impacting members from many rungs of the social ladder (Weidner, 2009). Past drug scares were linked to areas that did not seem to directly pose a threat to mainstream America, but meth found its way into the fringes of the middle class, causing an uproar and demand for governmental action.

Weidner (2009) examined the coverage of meth from 1997 to 2005 by newspapers in small Midwestern cities. The amount of media coverage given to the prevalence of meth within a community was compared to a created scale of site-specific drug treatment admission data. The treatment admission data were used as an indicator for the level of a meth problem within a community. Weidner found that media coverage was disproportionate to the scale of the meth problem within studied communities. The results of the study indicted news agencies framed meth with previously seen drug-scare rhetoric that promoted a MP within these communities. This scenario plays directly into the idea of a situation or event causing excessive concern and panic within communities that are disproportionate to the actual threat of the situation or event.

MORAL PANICS AND MASS SHOOTINGS

The shootings at Columbine High School initiated nationwide concern and was the start of public mass shootings being seen as a national problem rather than as a regional issue (Muschert, 2007). The interest in mass shootings attracted national attention that fed the constant news feeds on the Columbine shooting and resulted in the largest news ratings of 1999. Within these news feeds, there were stories that tried to identify the root cause of the massacre in an attempt to prevent future occurrences. Columbine High School is a critical turning point in how the media, societal opinion, and

policy turned these rare events into a national crisis. On April 20, 1999, a nationwide MP on public mass shootings started.

Cohen's (2002) model identifies the steps for the creation of a MP. The events occurred in the wake of Columbine. During the Columbine shooting the media coined the term "Trench Coat Mafia" to label a class of students within the school's social network. These students were considered outsiders who became targets for increased scrutiny from school administrations nationwide. Students who fit this label became the folk devil discussed by Cohen. The media exasperated the belief that these folk devils were dispersed throughout the nation's schools. The New York Times published 170 articles on Columbine High School within 30 days of the event, 6 times more than mass shooting events between 1997-2001 (Chyi & McCombs, 2004; Muschert & Carr, 2006). The amount of news coverage and national interest in public mass shooting events created extreme public concern, nationwide fear, and a national demand for future interventions. These demands from the public initiated large policy shifts throughout many organizations (e.g., law enforcement agencies and schools), including a review of how violence is portrayed by the media, the creation of new school bullying policies, an increased scrutiny on school security measures, increased gun regulations, and the adoption of new law enforcement procedures for dealing with such events (Dimock, 2000). The concern for this event was enduring throughout the year but the news cycle eventually shifted and public concern subsided. Some policy changes remained in place, but other changes reverted to pre-Columbine status quo. The longest lasting policy shift was attributed to how law enforcement agencies respond to mass shooting events, which is still in place today (Scott & Schwartz, 2014).

Columbine represented a watershed moment, changing how Middle-class America viewed violent criminal acts. No longer did violence only occur in bad neighborhoods, but rather had moved into more affluent places (e.g., the suburbs). This increased concern and fear was well established through documented ratings on viewership of news stories about the Columbine shooting. As mentioned above, Columbine was one of the largest news stories in the 1990s. Public mass shootings captivate the population and provide high ratings for news outlets. Just as with the drug scare, news agencies hyper sensationalize these types of shootings and over represent their prevalence within society. Past studies have shown that extreme media attention paid to other high profile events, like the meth drug scare of the late 1990s, tends to promote fear-related responses in populations, often disproportionate to the actual threat (Weidner, 2009). NPR (2016) stated that mass shootings caused a large increase in concealed carry permits across the nation, other studies have also shown that mass shootings are correlated to behavioral changes in the public that are indicative of fear. Studdert et al. (2017) found increases in the purchasing of firearms immediately following mass shootings. Levine and McKnight (2017) found similar results, but also found an increase in accidental deaths occurring from firearms in the wake of the Newton, CT shooting. Depew and Swensen (2016) found that concealed carry permit applications increased nearly five times between 1999 and 2015, and responses to mass shootings was implicated as one of the causes for the rise (Turchan, Zeoli, & Kwiatkowski, 2017). The news life cycle of a public mass shooting event has become repetitive; initial shock, condemning the shooter, condolences to families, and finally a demand for change.

Every time a public mass shooting occurs across the nation it follows a similar path as the shooting event at Columbine High School or other MPs, such as the meth epidemic. The demand for change brought about through extensive media coverage of public mass shootings, result in national debate that is disproportionate to the actual threat of mass shootings on society. MPs result in prescribed interventions and attention that deeply outweigh the reality of the threat. Mass shootings are atypical events that occur spuriously throughout temporal and geographic locations, but achieve excessive amounts of media coverage and public attention that is conducive to promoting a MP every time these events occur.

Chapter 3

METHODOLOGY

DATA

In this section the database on public mass shootings is described and the acquired TSA data that quantifies the amount of firearms found throughout the nation's airports are explained. There are currently no comprehensive data sets held by a federal agency that incorporate all public mass shootings, thus the analysis relied on the *USA Today* dataset on mass killings. The term public mass shooting for the purpose of this study combines the FBI's definitions for "active shooter" and "mass murder." According to the FBI (2013), an "active shooter is an individual actively engaged in killing or attempting to kill people in a confined and populated area" and "mass murders are murderous events resulting in at least four deaths and normally taking place at one or more geographical locations relatively near one another" (p. 1). It was critical for the analysis to have an established definition for this type of crime because across legal communities there are different definitions for these events. All events in the *USA Today* data set that fit this criteria were looked at and any event deemed to be associated with any other type of crime was not included in this study.

Table 1

Dataset Descriptive Statistics

Dataset	Mean	95% CI
TSA Dataset (2012-2016)		
Chambered Weapons	0.30	[0.292, 0.309]
Loaded Weapons	0.85	[0.843, 0.857]
Total Firearms Found: 11,258		
USA Today Mass Killing Data (2012-2016)		
Days Between Public Mass Shooting	71	[16, 159]
Number Killed	6.90	[4.583, 9.217]
Number Wounded	1.65	[1.323, 5.957]
Public Mass Shooting Killed	9.17	[6.853, 11.487]
Family Shooting Killed	4.20	[1.883, 6.517]
Family Killings	0.45	[0.304, 0.612]
Public Killings	0.55	[0.388, 0.696]

TSA Firearm Detection Data. The TSA has collected data on firearm detection since October, 2011, and the website provides weekly updates on prohibited items found in the carry-on baggage line. When a person enters an airport in the United States, they are searched by the TSA prior to being allowed past security. At the security line, TSA agents search for prohibited items that are detailed on the TSA website (available at www.tsa.gov). The data include the details of individual incidents of firearms being detected, including the airport, the date, the caliber of the weapon, whether it was loaded, and whether it had a round in the chamber. These data began to be collected in the middle of December, 2011, but this analysis used full data collected between 2012 and 2016, dismissing partial data from previous and post years. From these data a list was compiled containing 11,258 firearms found at TSA security checkpoints nationwide.

USA Today Mass Killing Data. These data were collected from January 2012 to December, 2016. USA Today conducted a study to account for all mass killings that occurred between the previously mentioned dates. They initially started with data from the FBI Supplemental Homicide Reports, then supplemented the data with hundreds of media reports and police documents to compile a comprehensive list of incidents that involved four or more people being killed, not to include the assailant (data are available at masskillings.usatoday.com). The USA Today study did not rely solely on the FBI reports due to the fact that the FBI data were based on voluntary reports by local police agencies. According to USA Today, The voluntary aspect of these data made the FBI dataset incomplete on mass murders within the United States, and also the data were found to be only 61% accurate when compared to media reports and data received from nationwide local police agencies. The data consist of 75 events, of which 44 (59%) were mass shootings. Of these 44 events, 20 were classified by USA Today as family mass shootings, and 24 were classified as public mass shootings. Media attention generally differs between the two types of events, with public mass shootings receiving more widespread and intense media attention (Birkland & Lawrence, 2009; Duwe, 2000).

STATISTICAL MODEL

Logistic regression methods are used to assess the temporal trends in the probability of firearms detected by the TSA to be loaded, or to be loaded with a round in the chamber. The logistic regression is expressed as a generalized linear model, with the regression being fit to a linear predictor using a logit link.

To study how a public mass shooting might impact the temporal dynamics, it is assumed that a public mass shooting may “infect” people with the idea to change their carrying configuration habits by carrying their firearm with a round in the chamber in the immediate wake of a public mass shooting. This fraction of people who decided to carry their firearms with a round in the chamber might decline in time as fear of being involved in future attacks decreases, and the perception of the relative risks of accidental injury might become more predominant. The perception that being personally involved in a mass shooting is assumed to persuade the public that this newly emerged threat outweighs the threat of having firearms loaded with a round in the chamber and being involved in a negligent discharge scenario. This perception is assumed to be tied to the MP theory where the issue of mass shootings are sensationalized through extensive media coverage, thus infecting the population with the idea that these events are occurring at a much higher rate than reality.

Assume that there are M mass shootings occurring over a time period. In the contagion model, it is assumed that the i^{th} mass shooting that happens on day t_i causes a temporary rise in the odds, OR , of people carrying and storing a loaded firearm with a round in the chamber, that then decays exponentially:

$$\begin{aligned}
OR(t) &= OR_{baseline}(t_i)Ae^{B*(t-t_i)} && \forall t \ t_i < t < t_{i+1} \\
&= OR_{baseline}(t_i)Ae^{B*\Delta t}
\end{aligned}
\tag{1}$$

where t_{i+1} is the day of the next mass shooting, and Δt is the number of days since the i^{th} shooting.

Taking the logarithm of both sides transforms the model into logistical form:

$$\log(OR)(t) = \log(OR_{baseline})(t_i) + \log A + B\Delta T \quad \forall t \ t_i < t < t_{i+1}
\tag{2}$$

In the current model $\log(OR)(t)$ represent the odds of finding a firearm loaded, or loaded and with a round in the chamber in the day following a public mass shooting.

$OR_{baseline}(t_i)$ represents the odds of finding a firearm loaded or loaded and with a round in the chamber seven days prior to the public mass shooting event. $\log A$ represents the magnitude of the initial impact following a public mass shooting, and $B\Delta T$ represents the exponential decay or increase over time. If $B = 0$ then the odds are equal, if $B < 0$ the odds will decay exponentially, and if $B > 0$ the odds will increase exponentially. In this current study the odds of finding a firearm loaded or loaded with a round in the chamber are being assessed against the odds of finding a firearm loaded or loaded with a round in the chamber seven days prior to the public mass shooting, ΔT allows this study to analyze how the odds change from the initial public mass shooting (t_i) for every day post public mass shooting (t), up until the next public mass shooting (t_{i+1}).

Baseline odds are assessed for each public mass shooting by calculating the odds of detecting a firearm with a round in the chamber the week prior to the public mass shooting. The study assesses one week prior to the public mass shooting as a baseline this

choice was somewhat arbitrary, but one does not want the period to be too short or too long: with too short a period, there is not a sufficient amount of data to reliably assess the average odds before each incident, but with too long of a period, the average runs the risk of being impacted by potential lingering affects due to a recent prior public mass shooting (i.e., potentially driving these baseline odds higher). One week allowed for the analysis to capture all days of the week prior to the event, which allowed the study to not be impacted by missing days of the week people fly. The robustness of the conclusions of this study based on the choice of length of time prior to a public mass shooting is assessed by also assessing $OR_{baseline}$ using the data from four and ten days prior to the event, respectively.

Using logistic regression the values of A and B are estimated. The analysis is also repeated to examine temporal changes in the odds ratio of finding firearms to be just loaded after a public mass shooting.

This analysis used the number of people killed at each shooting as a proxy for the amount of media attention each event received. To assess this potential dependence of the odd ratio on the number killed (N^{kill}), Equation 1 is modified as

$$OR(t) = OR_{baseline}(t_i)(A + CN^{kill})e^{B*\Delta t}, \quad (3)$$

then the fits are repeated.

The analysis also takes into account family mass shootings by fitting A and B to the family mass shootings data; these shootings tend to receive less amounts of media attention than public mass shootings.

This study used R as the main statistical package through the RStudio software, version 1.0.153. All statistical computations and graphical diagrams were executed through R. R was created to implement the S programming language combined with lexical scoping semantics inspired by Scheme (Morandat, Hill, Osvald, & Vitek, 2012). R and its libraries provide an extensive amount of statistical techniques for both linear and non-linear modeling, classical statistical tests, time series analysis, classification, clustering, and others (Morandat et al., 2012).

Chapter 4

RESULTS

Everyday firearms are found at airports across the nation. The average number of loaded firearms found at TSA checkpoints was 5.2 per day and the average number of firearms found loaded with a round in the chamber was 1.8 per day. Public mass shootings occur at a lesser rate than firearms being found across the nation with the average public mass shooting occurring every 71 days (range = 16 to 159 days).

TSA airport firearm detection data (2012 to 2016)

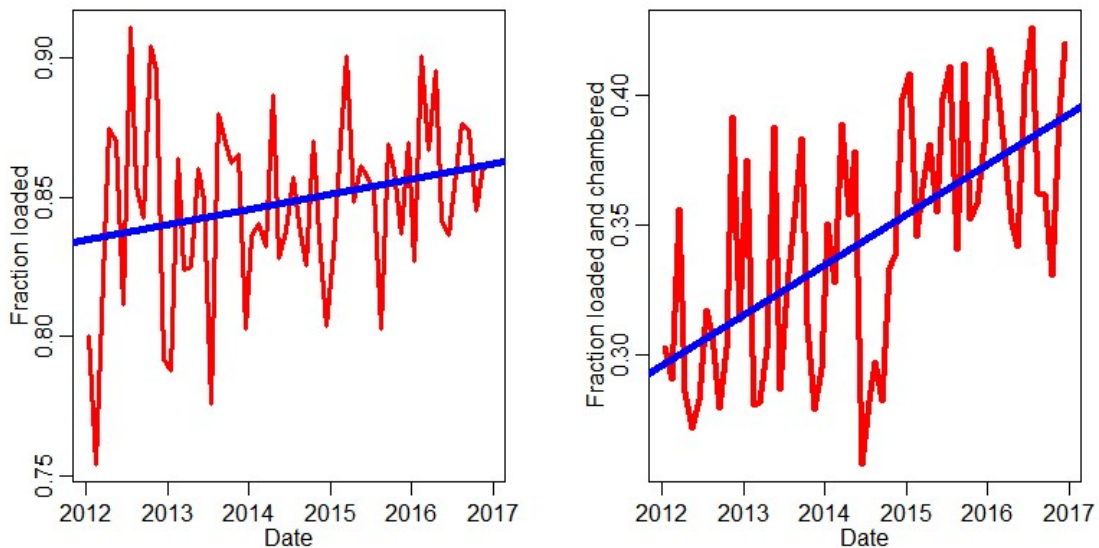


Figure 1. The Plot on the Left Depicts the Probability of the TSA Finding That a Detected Firearm Is Loaded, Averaged Within the Month. Overlaid in Blue Is the Results of a Linear Logistic Regression Fit. The Plot on the Right Depicts the Probability of the TSA Finding That a Detected Firearm Is Loaded with a round in the Chamber, Averaged Within the Month. Overlaid in Blue Is the Results of a Linear Logistic Regression Fit, in Both Cases, the Rise Is Significant, to $P < .05$.

In Figure 1, the probability of the TSA finding a firearm loaded is demonstrated by the average number of firearms found loaded on a monthly basis from 2012 to 2016.

A generalized linear model with a logit link was used to fit the attributed data to the

figure, displayed as an overlaid blue line. The logit of the odds increased significantly over the aforementioned time period, with a slope of 0.042 days⁻¹, with a 95% CI [0.005, 0.078] days⁻¹ (logistic linear regression $p = 0.025$).

In Figure 1 the probability of the TSA discovering a firearm loaded with a round chambered is displayed by the average amount of findings monthly between the years 2012 and 2016. The figure depicts an overlaid line that represents a generalized linear model with a logit link regression fit. The logit of the odds were also statistically significant over the same time period, with a slope of 0.086 days⁻¹, with 95% CI [0.05, 0.123] days⁻¹ (logistic linear regression $p < 0.001$).

Table 2

TSA airport firearm detection data (2012 to 2016), Logistic Regression

Models	Coefficient	Std Error	Pr< z	95% CR
Model 1: Firearm Loaded				
Firearm Loaded	0.042	0.018	0.025	[0.005, 0.078]
Model 2: Firearm Loaded and Chambered				
Firearm Loaded and Chambered	0.086	0.015	<0.001	[0.051, 0.123]

Total Firearms: 11,258

Note: Model 1: Firearm Loaded Indicates the Probability of the TSA Detecting Firearms in the Loaded Arming Configuration at Airport Baggage Security Checkpoints Nationwide Regressed Against Time. Model 2: Firearm Loaded and Chambered Indicates the Probability of the TSA Detecting Firearms in the Loaded and Chambered Arming Configuration at Airport Baggage Security Checkpoints Nationwide Regressed Against Time. Both Models Represent Findings Between 2012 to 2016.

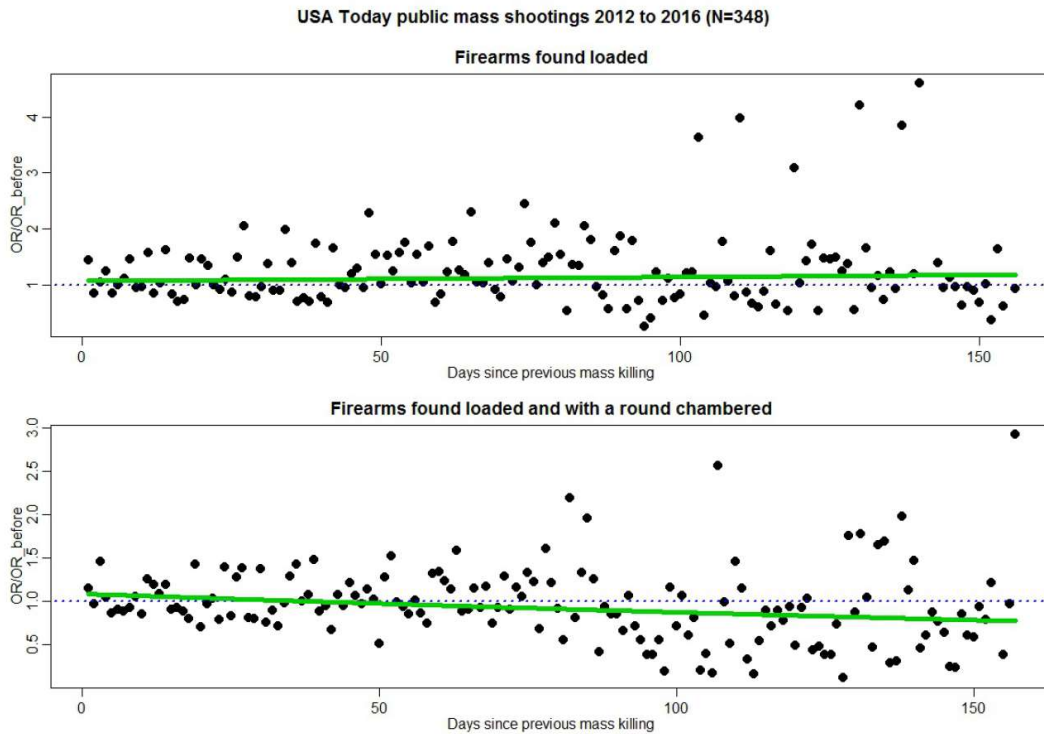


Figure 2. The Top Plot Shows the Odds of a Firearm Being Found Loaded by the TSA, Relative to Finding a Firearm Loaded the Week Prior, Averaged Within Days from the Most Recent Public Mass Shooting. The Green Line Overlaid Represents the Results of the Linear Regression from Equation 1 (the Slope Is Not Statistically Significantly Different than Zero). The Bottom Plot Shows the Odds of a Firearm Being Found Loaded with a round in the Chamber by the TSA, Relative to Finding a Firearm Loaded with a round in the Chamber the Week Prior, Averaged Within Days from the Most Recent Public Mass Shooting. The Green Line Overlaid Represents the Results of the Linear Regression from Equation 1 (the Slope Is Statistically Significant ($P < .001$)). The Blue Horizontal Line Depicted in Both Plots Indicate When the Odds Are Equal after the Shooting to the Odds the Week Prior to the Shooting.

The odds of a firearm being detected that is loaded is defined as OR_L . Displayed in Figure 2 is the average OR_L in the days post mass shooting, divided by OR_L one week prior to the mass shooting. The results of the fit to Equation 1 of the data are overlaid on Figure 2. The increase in OR_L immediately after a public mass shooting is $A = 1.069$, with a 95% CI [.0970, 1.169], and the slope subsequently is $B = 0.0006$, with a 95% CI [-0.0009, 0.0022]. The fit estimate of A is not significantly different than one (two sided t -test 0.17), and B is not significantly different than zero (two sided t -test 0.42).

The odds of a firearm being detected that is loaded and has a round in the chamber is defined as OR_{LC} . Displayed in Figure 2 is the average OR_{LC} in the days post

mass shooting, divided by OR_{LC} one week prior to the mass shooting. The results of the fit to Equation 1 of the data are overlaid on Figure 2. The increase in OR_{LC} immediately following a public mass shooting is $A = 1.087$ with a 95% CI [1.009, 1.165] and it subsequently decreases at a rate of $B = -0.0022$ with a 95% CI [-0.0034, -0.001]. The fit estimate of A is significantly different than one (two sided t -test 0.028), and B is significantly different than zero (two sided t -test < 0.001).

A robustness check was conducted on the analysis by cross checking the baseline odds four and ten days prior to each public mass shooting used in this analysis. In both instances the value of linear slope, B , stays significantly negative ($p < 0.05$ in both cases, two sided t -test). The value of intercept, A , is significantly different than one when four days prior to a public mass shooting is checked ($p = 0.028$, two sided t -test), but became statistically consistent with one when ten days prior to a public mass shooting is checked ($p = 0.45$, two sided t -test).

Table 3

TSA Data and USA Today Data Fit, Using Generalized Linear Model with Logit Link

Model	Coefficient	Std Error	Pr <z	95% CR
Equation 1 OR _L				
<i>A</i>	1.069	0.866	0.17	[0.970, 1.169]
<i>B</i>	0.0006	0.0001	0.42	[-0.0009, 0.0022]
Equation 1 OR _{LC}				
<i>A</i>	1.087	0.036	0.028	[1.009, 1.165]
<i>B</i>	-0.0022	0.001	<0.001	[-0.0034, -0.0011]

Note. The ORL Model Defines the Odds of a Detected Firearm to Be Loaded in the Days Preceding a Public Mass Shooting Divided by the Odds the 7 Days Prior to the Public Mass Shooting. The ORL&C Model Defines the Odds of a Detected Firearm to Be Loaded and Chambered in the Days Preceding a Public Mass Shooting Divided by the Odds the 7 Days Prior to the Public Mass Shooting. For Both the ORL and ORL&C Models They Are Binned by Day and Are Both the Fits From Equation 1.

Using Equation 3 as a proxy for the amount of media attention attributed to each public mass shooting by including the number of people killed was found to not be statistically significant, and *C* is statistically consistent with zero (two sided *t*-test $p = 0.27$).

Another robustness check was conducted by cross checking the analysis with lower-profile family mass shootings. The check returned non-significant results where *A* is statistically consistent with one (two sided *t*-test $p = 0.12$), and *B* is statistically consistent with zero (two sided *t*-test $p = 0.24$).

The analysis examined temporal patterns in the odds of finding a firearm to be loaded (with or without a round in the chamber) and found a non-significant dependence on the timing of public mass killings; $A = 1.069$, with a 95% CI[0.970, 1.169], and $B = 0.0006$, with a 95% CI[-0.0009, 0.0022].

Chapter 5

DISCUSSION AND CONCLUSION

This study used data related to firearms found by the TSA at airport security check points nationwide and analyzed how these firearms were being carried. It identified that the prevalence of unsafe storage and carrying practices had significantly increased from 2012 to 2016, while also indicating that temporal trends were impacted by high profile public mass shootings. Immediately following a public mass shooting the probability of finding a firearm loaded with a round in the chamber significantly increased, potentially indicating a fear response generated by the event and driven through media outlets, thus causing gun owners to change their carrying and storage habits. In the following days after a public mass shooting the probability of finding a firearm loaded with a round in the chamber exponentially decreases, potentially due to the initial fear response diminishing and the assessment of these unsafe storage and carrying habits being reconsidered. These results are consistent with Cohen's (2002) and Goode and Ben-Yehuda's (1994) explanation of events that evolve into MPs.

The data used in this analysis were derived from firearms found in carry-on baggage across the nation's airports, the TSA states that most passengers claimed that they forgot their firearms were stored in their luggage. The behavior of leaving a firearm in luggage and forgetting it is stored there is an irresponsible practice (especially if children are in the home), but the fact that 85% of these firearms were loaded and 35% of the firearms loaded had a round in the chamber indicates an extreme sense of carelessness on the part of the firearm owner. The observed data in this study represents a cross-

section of firearm owners who were careless enough to forget their firearms were stored in their luggage, responsible firearm owners do not enter the sample.

Goode and Ben-Yehuda (1994) explain that a MP occurs when a large part of society agree that an evildoer poses a significant threat to the social fabric or moral order. The collective consensus within society establishes a demand for policy makers to produce changes in policy and/or procedures to prevent these type of events from occurring in the future. The most relevant issue surrounding MPs is the elusive relationship between public perception and reality (Burns & Crawford, 1999). This large gap between reality and public perception establishes the intimate relationship between mass delusion and MPs, thus indicating a possible explanation for the public overreacting to events and allowing their worst fears to cloud their judgement (Ben-Yehuda, 1986). Past studies have found that during this stage of a mass shooting MP the public also display changes in their behavior, such as purchasing of more firearms or an increase in applications for concealed weapons permits (Studdert et al., 2017; Turchan, Zeoli, & Kwiatkowski, 2017).

This study found evidence that public mass shootings impact the decisions of a cross-section of firearms owners to change their firearm carrying habits. The decision of this population to carry and store their firearms with a round in the chamber is based on an increased perceived risk of an imminent threat versus the actual risk of injury due to a negligent discharge. The threat of a negligent discharge is increased when members of society carry their firearms in the aforementioned configuration, placing themselves and their family at a greater risk for firearm injury. The cross-section of firearm owners who employ unsafe storage and carrying habits are also the people who would feasibly

underestimate the risk of such practices, and potentially overestimate the risk of imminent threat when exposed to the extreme media coverage about violent public mass shootings.

This study strengthens the foundation that the nation is in a perpetual MP following public mass shootings. Currently, as this thesis is being written all national news outlets, political figures, and the public are engrossed with the shooting at Stoneman Douglas High School, Parkland, FL. This shooting has generated a large amount of demand for change, such as extensive measures for gun control, security procedures for schools, and mental healthcare. Different cross-sections of society are identifying various folk devils classification tend to follow partisan politics. One side is arguing that the firearm, or more specifically the AR-15 is the cause of these events, whereas the other side is arguing that mental health and security is the issue at hand. This is another example of how captivated the entire population becomes with these events. The danger is that the second and third order effects generated by a MP cause further injury and death due to the overestimation of being involved in an imminent threat. Levine and McKnight (2017) found strong evidence that in the wake of the shooting at Sandy Hook Elementary accidental deaths from firearms increased by 60 with 20 of those being children in the immediate aftermath of this event. This study has identified a change in behavior with arming configurations whereas the above study indicated an increase in accidental deaths due to firearms following a large scale public mass shooting. The underestimation of the threat from carrying a firearm with a round in the chamber and the overestimation of being involved in a follow on mass shooting creates the perfect storm for injury or death from a negligent discharge.

The policy implications of this study point toward increasing education on firearm safety among gun owners, including appropriate storage habits. Also, the media should review their process for framing these events to the public because news coverage of these events play a role in the hypersensationalism of public mass shootings, thus fueling a national MP. Members of our society who are deemed guardians, such as law enforcement and military members, undergo extensive and regular training on firearm safety to mitigate the risk associated with carrying a firearm loaded with a round in the chamber (Pink & Ornelas, 2012; Sullivan & Hamilton, 1993). This is vastly different when compared to laws across the country associated with firearm training for members of society who want to carry their weapons (currently 40% of handgun owners have no training) (Rowhani-Rahbar et al., 2017a). There has been a successful push by gun owners and gun lobby organizations in recent years to further minimize state carry permitting laws and the deregulation of firearms, in part to partisan fears surrounding the 2008 and 2012 elections (Reich & Barth, 2017), but also likely in response to fears associated with high profile public mass shootings that occurred, including the 2012 shooting at Sandy Hook (Turchan et al., 2017).

Many states have moved to permit-less carry or “constitutional carry” where neither a permit nor training is required for concealed carry of a firearm, and in the majority of the states neither is needed for open carry of a firearm. Without training, there is a danger that a member of the general public might underestimate the risk of a negligent discharge of a firearm with a round in the chamber. A policy for potential implementation that could thwart the impact of an increase proportion of our society carrying firearms loaded with a round in the chamber after a public mass shooting should

focus on the educational aspect of being a responsible firearm owner. Instead of allowing a large portion of the population to carry firearms with no apparent training or safety standards; policy makers could establish a baseline education for current and future firearm owners.

According to the MP theory, media attention is a critical element. The manner in which these stories are framed should be reviewed so that the coverage does not focus on the shooter, but rather on the victims. After the shooting at Columbine, personal journals were found where Eric Harris and Dylan Klebold expressed the desire to become infamous; this desire for attention needs to be thwarted by responsible coverage of the event throughout the news cycle (Langman, 2009). Towers et al. (2015) found that there is a contagion effect that occurs from these events which lasts up to 13 days after a mass shooting event. There are many factors which play in to this, but according to the MP theory, media attention is a large factor in the perpetuation of atypical events. A policy directed at responsible coverage of public mass shootings could lessen the immortalization of the shooter and the belief that the occurrences of these events are rampant within our society.

The process of assessing how members of society purchase, carry, or store their firearms has been troublesome in the past due to a multitude of reasons. The main reason as of 1996 can be attributed to the “Dickey” amendment which placed restrictions on grant money towards firearm violence research (Ruben, 2016). Since 1996, there has been documented and measured decreases in the amount of research conducted on firearm violence due to the refrainment of government grants (Ruben, 2016). The passing of the “Dicky” amendment has been a substantial roadblock for the furtherance of firearm

violence research and has impacted the understanding of why people carry, how they carry, and how they store their firearms.

Future researchers interested in conducting studies on how the population stores and carries their firearms have multiple ways to gauge this behavior within a population such as surveys, observations within communities, and establishing a proxy as this current study has. There are surveys that encompass firearm habits that are conducted by federal entities and surveys that are conducted by private organizations. The issue with surveys on such a politically polarizing subject is the validity of the answers from the respondents (Single, Kandel, & Johnson, 1975). Another issue with survey data in the research towards public reactions to public mass killings would be the memory of the respondents when asking them to recall how they reacted immediately following past public mass shootings (Single, Kandel, & Johnson, 1975). In the current study the proxy allowed for the immediate assessment of the reaction to how a cross section of nationwide firearm owners carry their firearms in the wake of a public mass shooting.

Public mass shootings are quite rare, and further research is needed to assess whether the temporal relationship between firearm carrying habits and public mass shootings remains consistent through the test of time. This analysis also did not take into account other events that may have a significant impact on firearm carry habits, such as partisan political concerns surrounding elections, which led to a documented rise in firearm sales (Depetris-Chauvin, 2015; Reich & Barth, 2017). However, unlike mass shootings that occur on a specific date, the lead-up to elections occurs over several months, and thus the impact of such an event is gradual compared to the large spike seen following a public mass shooting. The impact of public mass shootings is easily seen

within the data due to the point process of these events and sharp increases in firearms being found loaded with a round in the chamber.

This analysis assumed a linear logistic model for the temporal dynamics of arming configuration habits in the wake of public mass shootings. In reality, the dynamics are likely more complex, with delays between when people stored the firearm in luggage in its last used arming configuration, and when they passed through an airport security checkpoint with the luggage at a later date. This depends on how often people handle their firearms, and studies on this matter are generally lacking, although one recent study found that 24% of handgun owners carried at least once monthly, 35% of whom carried daily (Rowhani-Rahbar et al., 2017b). However, the last use of the firearm includes the time when it was last used for target practice (which does not necessarily involve personal carry), and/or the time it was last carried (whichever happened most recently). The frequency of the former among handgun owners is currently unknown.

This study created a metric that indicates firearm carrying and storage habits of members of society and how these habits are altered immediately following a public mass shooting. This is the first such metric to be created that indirectly assesses trends in the firearm carrying and storage habits among Americans. This study provided robust evidence that public mass shootings are partially responsible for the change in behavior of a cross-section of firearm owners altering their firearm carrying configurations. These events have the ability to captivate the nation and garner extreme amount of media attention, and this media attention fuels a national MP following public mass shootings. The danger of these MPs are that they perpetuate the idea that these events are occurring at a much higher rate than in reality, which then infects members of the population with

the idea that they are in an imminent threat scenario, thus causing them to take action and change how they carry their firearms. Further research is needed to assess the implications that this study has on temporal and geospatial trends in crime and rates of firearm injury, including pediatric firearm injury and mortality. Such a study must of course not only take into account the arming configuration of the firearms, but also the prevalence of household firearm ownership.

REFERENCES

- Alsup, T. (2018). *LVMPD Preliminary Investigative Report*. Las Vegas, NV: Las Vegas Metropolitan Police Department.
- Ben-Yehuda, N. (1986). The Sociology of Moral Panics: Toward a New Synthesis. *The Sociological Quarterly*, 27(4), 495–513.
- Berkowitz, B., Gamio, L., Lu, D., Uhrmacher, K., & Lindeman, T. (2017, January 8). The math of mass shootings. *The Washington Post*. Retrieved from <https://www.washingtonpost.com/graphics/national/mass-shootings-in-america/>
- Birkland, T. A., & Lawrence, R. G. (2009). Media Framing and Policy Change After Columbine. *American Behavioral Scientist*, 52(10), 1405–1425.
- Burnett, J. (2016). Concerns over mass shootings spark rise in concealed carry permits. *NPR*. Retrieved from <https://www.npr.org/2016/04/12/473992268/concerns-over-mass-shootings-spark-rise-in-concealed-carry-permits>
- Burns, R., & Crawford, C. (1999). School Shootings, the Media, and Public Fear: Ingredients for a Moral Panic. *Crime, Law & Social Change*, 32(2), 147–168.
- CDC. (2017). *Firearm Homicides*. Retrieved from <https://www.cdc.gov/nchs/fastats/homicide.htm>
- Chyi, H. I., & McCombs, M. (2004). Media Salience and the Process of Framing Coverage of the Columbine School Shootings. *Journalism and Mass Communication Quarterly*, 81(1), 22–35.
- Cohen, S. (2002). *Folk devils and moral panics: The creation of the mods and rockers*. London and New York: Routledge.
- Collof, P. (2006, August). 96 Minutes. *Texas Monthly*, pp. 1–25.
- Depetris-Chauvin, E. (2015). Fear of Obama: An Empirical Study of the Demand for Guns and the US 2008 Presidential Election. *Journal of Public Economics*, 130, 66–79.
- Depew, B., & Swensen, I. D. (2016). *The Decision to Carry : The Effect of Crime on Concealed-Carry Applications*. Retrieved from <http://hdl.handle.net/10419/147922%0AStandard-Nutzungsbedingungen>:
- Dimock, M. (2000). *Columbine shooting biggest news draw of 1999*. Washington D.C.: Pew Research Center.
- Duwe, G. (2000). Body Count Journalism. *Homicide Studies*, 4(4), 364–399.
- Duwe, G. (2017, October 4). Mass shootings are getting more deadlier, not more frequent. *Politico Magazine*. Retrieved from <https://www.politico.com/magazine/story/2017/10/04/mass-shootings-more-deadly-frequent-research-215678>

- FBI. (2013). *A Study of Active Shooter Incidents in the United States Between 2000 and 2013*. Washington D.C.: United States Department of Justice.
- Fox, J. A., & DeLateur, M. J. (2014). Mass Shootings in America. *Homicide Studies*, 18(1), 125–145.
- Fox, J. A., & Levin, J. (2015). *Extreme Killing*, 3rd edition. Thousand Oaks, CA: Sage.
- Goode, E., & Ben-Yehuda, N. (1994). *Moral Panics*. Oxford: Blackwell.
- Goode, E., & Ben-Yehuda, N. (1994). Moral Panics: Culture, Politics, and Social Construction. *Annual Review of Sociology*, 20(1), 149–171.
- Huff-Corzine, L., McCutcheon, J. C., Corzine, J., Jarvis, J. P., Tetzlaff-Bemiller, M. J., Weller, M., & Landon, M. (2014). Shooting for Accuracy: Comparing Data Sources on Mass Murder. *Homicide Studies*, 18(1), 105–124.
- Jenkins, P. (1999). *Synthetic panics: The symbolic politics of designer drugs*. New York: New York University Press.
- Krouse, W. J., & Richardson, D. J. (2015). *Mass Murder with Firearms: Incidents and Victims, 1999-2013*. Washington, D.C.: Congressional Research Service.
- Langman, P. (2009). *Why kids kill: Inside the minds of school shooters*. New York: St. Martin's Press.
- Levine, P. B., & McKnight, R. (2017). Firearms and Accidental Deaths: Evidence from the Aftermath of the Sandy Hook School Shooting. *Science*, 358(6368), 1324–1328.
- McCorkle, R., & Miethe, T. D. (1998). The Political and Organizational Response to Gangs: An Examination of a “Moral Panic” in Nevada. *Justice Quarterly*, 15(1), 41–64.
- Morandat, F., Hill, B., Osvald, L., & Vitek, J. (2012). Evaluating the Design of the R Language. *ECOOP 2012 – Object-Oriented Programming*, 7313, 104–131.
- Muschert, B. G. W., & Carr, D. (2006). Media Salience and Frame Changing Across Events: Coverage of Nine School Shootings, 1997-2001. *Journalism & Mass Communication Quarterly*, 83(4), 747–766.
- Muschert, G. W. (2007). Research in School Shootings. *Sociology Compass*, 1, 60–80.
- Musto, D. (1999). *The American Disease: Origins of Narcotic Control*. New York: Oxford University Press.
- Pooley, E. (1989). Grins, gore, and videotape: The trouble with local TV news. *New York Magazine*, 36–44.
- Reich, G., & Barth, J. (2017). Planting in Fertile Soil: The National Rifle Association and State Firearms Legislation. *Social Science Quarterly*, 98(2), 485–499.
- Rocque, M. (2012). Exploring School Rampage Shootings: Research, Theory, and Policy. *Social Science Journal*, 49(3), 304–313.

- Rowhani-Rahbar, A., Lyons, V., Simonetti, J., & Miller, M. (2017a). Formal Firearm Training among Adults in the USA: Results of a National Survey. *Injury Prevention*. Published Online First on 11 July 2017.
- Rowhani-Rahbar, A., Azrael, D., Lyons, V., Simonetti, J., & Miller, M. (2017b). Loaded Handgun Carrying among US Adults, 2015. *American Journal of Public Health, 107*(12), 1930-1936.
- Rubin, M. (2017, October 2). The history of mass shootings begins with a gunman in a tower in Texas in 1966. *Quartz*. Retrieved from <https://qz.com/1091859/las-vegas-shooting-the-history-of-us-mass-shootings-begins-with-this-one-in-1966/>
- Rubin, R. (2016). Tale of 2 Agencies: CDC Avoids Gun Violence Research But NIH Funds It. *JAMA : The Journal of the American Medical Association.*, 315(16), 1689.
- Scott, M. D., & Schwartz, J. (2014). *Police and Fire Departments in Arlington County, VA Create Rescue Task Forces to Speed Medical Care. The police response to active shooter incidents*. Washington D.C.: Police Executive Research Forum.
- Single, E., Kandel, D., & Johnson, B. D. (1975). The reliability and validity of drug use responses in a large scale longitudinal survey. *Journal of Drug Issues, 5*(4), 426-443.
- Studdert, D. M., Zhang, Y., Rodden, J. A., Hyndman, R. J., & Wintemute, G. J. (2017). Handgun Acquisitions in California after two Mass Shootings. *Annals of Internal Medicine, 166*(10), 698–706.
- Swift, A. (2013). Personal Safety Top Reason Americans Own Guns Today. *Gallup*, 1–6.
- Towers, S., Gomez-Lievano, A., Khan, M., Mubayi, A., & Castillo-Chavez, C. (2015). Contagion in Mass Killings and School Shootings. *PLoS ONE, 10*(7), 1–12.
- Turchan, B., Zeoli, A. M., & Kwiatkowski, C. (2017). Reacting to the Improbable: Handgun Carrying Permit Application Rates in the Wake of High-Profile Mass Shootings. *Homicide Studies, 21*(4), 267–286.
- Wallace, L. N. (2015). Responding to Violence with Guns: Mass Shootings and Gun Acquisition. *Social Science Journal, 52*(2), 156–167.
- Weidner, R. R. (2009). Methamphetamine in Three Small Midwestern Cities: Evidence of a Moral Panic. *Journal of Psychoactive Drugs, 41*(3), 227–239.
- Young, J. (1971). The Role of the Police as Amplifiers of Deviancy, Negotiators of Reality and Translators of Fantasy. *Images of Deviance, 37*, 27–61.