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An Evaluation of the Differences Between Perpetrators in Completed and Averted School Shootings

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AN EVALUATION OF THE DIFFERENCES BETWEEN PERPETRATORS IN COMPLETED AND AVERTED SCHOOL SHOOTINGS

by

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ABSTRACT

School shootings have received a substantial amount of media attention and there have been a variety of explanations proposed as to their cause. While completed school shootings have been evaluated extensively, little research has been done into school shootings that have been averted, and even fewer studies have evaluated between group differences between completed and averted school shootings. The purpose of the present study was to assess the differences in completed and averted school shootings primarily with respect to the age of the perpetrators, the number of perpetrators, and participation in leakage warning behaviors. Additional demographic variables were assessed with respect to characteristics of the perpetrators themselves, in addition variables related to the school setting. A completed case was classified as one that involved at least one injury and an averted case was classified as any case prevented prior to any injury. A total of 264 cases were evaluated in this study, 172 of which were classified as completed and 92 of which were averted. Results indicate that age, number of perpetrators, and participation in leakage warning behavior were all predictors of whether a school shooting attempt was completed. In a logistic regression, considering all of these variables relative contributions, only leakage warning behavior served as a significant predictor of group membership. This has been the first study to compare variables related to completed and averted school shootings. Future prevention efforts should focus on increasing knowledge around the signs of leakage warning behavior to increase detection and aversion of future attempts.

For Nancy Suchman and my mother. Two powerful women who taught me that true strength involves always being humble and willing to learn.

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CHAPTER 1: INTRODUCTION

In 1966, a man walked up to the top of the clock tower at the University of Texas. In the next 96 minutes, this man shot and killed 14 people and wounded 30 more. This would become the first of many rampage school shootings in the United States (Montgomery, 2016). As defined by Newman et al. (2004), a rampage school shooting is one that involves multiple victims, chosen either at random or for their symbolic significance, takes place at a school or school-related function in front of an audience, and involves one or more shooters that are current or former students of the school. As of 2013, the United States had more school shootings than all other countries combined (Böckler et al., 2013). The New York Times reported that as of May 11, 2019, there have been 111 school shootings across elementary schools, middle schools, and high schools in the United States since 1970. This number excludes targeted attacks, gang shootings and suicides (Cai & Patel, 2019). While CNN reported that between 2009 and 2018 there have been 180 school shootings, whether rampage, targeted, or gang shooting, that have taken place across grade levels kindergarten through grade twelve, resulting in at least one person being shot (Walker et al., 2019). Internationally, Böckler et al. (2013) found that there was an average of 1.1 cases of school shootings per year during the 1980s, 3.6 during the 1990s, and 5.7 cases from 2001-2010. As of 2011, 76% of all school shootings took place in the United States, and from 2010 to 2014, there was an additional 80 school shootings in the United States alone, averaging 20 school shootings per year (Duplechain & Morris, 2014). In addition to these devastating numbers, in 2018 alone there were 110 incidents in the United States where a gun was brought to a school, fired, or a bullet hit school property (Riedman & O'Neill, 2019). According to analyses completed by Towers et al. (2015), there is a school shooting once every 31.6 days in the United States. Despite increased safety measures, school shootings still occur

every year, and there have already been more school shootings in the 21st century than all of the 20th century combined (Katsiyannis et al., 2018).

The latest data indicates that these trends are only increasing over time; from 2014 to 2020 there was a 78.9% increase in the number of youths injured or killed by gun violence in the United States (Gun Violence Archive, 2021). Similarly, in the same time frame, there was a 126.3% increase in the number of mass shootings that took place in the United States (Gun Violence Archive, 2021). When school shootings in the United States are examined more specifically, there was a 55.1% increase in the number of youths injured or killed in school shootings between 2014 and 2020, and a staggering 232.7% increase between 2014 and 2018 (Riedman & O'Neill, 2021).

Furthermore, it is anticipated that these numbers will continue to increase in the coming years. Of the top 10 highest days in which NICS firearm background checks took place, six took place in 2021 and two took place in 2020. Additionally, of the top 10 highest weeks for NICS Firearm background checks, six took place in 2021 and three took place in 2020 (Federal Bureau of Investigation, 2021). While it cannot be assumed that there is a one-to-one correlation between firearm background checks and the number of firearms purchased, it can be assumed that there has been a substantial increase in the number of guns privately owned in the United States in the last two years. It has been documented in several studies that there is a substantial correlation between rates of gun ownership and homicide rates (Hepburn & Hemenway, 2004; Siegel et al., 2013). An increase in the number of guns owned in the United States results in an increase adolescent access to firearms, a national study found that one-third of adolescents reported that they could access firearms within their home in less that 5 minutes, even though 70% of these adolescents' parents reported that their child could not access these weapons alone

(Salhi et al., 2021). Taken together, it may be assumed that more gun availability poses a threat to student safety.

Previous research and years of misinformation from the media have perpetuated the concept that isolated, singular reasons hold full explanatory weight for school shootings (Böckler et al., 2013). Nevertheless, the evidence does not support a univariate explanation. Instead, it appears that it is a conglomerate of different interacting factors that ultimately result in the completion or attempt of a school shooting (Dumitriu, 2013).

In order to better evaluate the interplay of factors, we must first understand what is known with respect to not only completed shootings, but averted shootings, as well. For the purposes of this study, an averted school shooting is defined as, "a violent attack planned, with […] the use of a firearm, that was prevented either before or after the potential perpetrator arrived on school grounds but before any injury or loss of life occurred" (Langman & Straub, 2019, p. 9). In contrast, a completed attack is considered, "a violent attack completed, with […] the use of a firearm, that took place on school grounds and resulted in injury or loss of life" (Langman & Straub, 2019, p. 1). By examining the differences and similarities between completed and averted attacks, we may be able to better understand where prevention efforts need to be targeted, in order to, prevent future school shootings. Prior to this analysis, however, it is essential to examine the previously proposed theories that have been made in terms of cultural factors (Brown et al., 2009; Kimmel & Mahler, 2003), individual characteristics and psychopathology (Langman, 2009, 2013; O'Toole, 2000), and social dynamics (Newman et al., 2004), and how these factors interact.

CHAPTER 2: CULTURE

The cultural environment of the community has been suggested multiple times as a factor impacting school shooting perpetration, with the most emphasis placed on communities that have a "culture of honor." Culture of honor refers to community norms that view violence as an appropriate response to insults or threats to one's reputation, self, home, or family (Cohen, 1998; Nisbett, 2018). Schools in "culture of honor" states are deemed to be the most at risk. Culture of honor states are those located in the southern and western portions of the United States (Brown et al., 2009). In an examination of 108 school shootings, it was found that 75% of the shootings occurred in culture of honor states. When considering rampage school shootings alone, this percentage increased to 80% (Brown et al., 2009).

Population density also appears to contribute to increased rates of both completed and averted school shootings. Rural communities have been disproportionally affected by school shootings (Agnich, 2015; Baird et al., 2017; Langman, 2013; Rocque, 2012). Between 1982 and 2001, 27 out of 28 completed school shootings in the United States occurred in rural or suburban areas (Kimmel & Mahler, 2003). Similarly, Baird et al. (2017) found that in the United States all but 2 of 22 school shootings evaluated between January of 1995 and June of 2014, took place at schools in suburban or rural communities. Between 2013 and 2015, Kalesan et al. (2017) found that those states with a higher percentage of urban populations had lower rates of school shootings. In three iterations of a study evaluating averted school shootings in the United States, the National Police Foundation found a consistent trend, most planned attacks took place in suburban communities (Daniels, 2019; Langman & Straub, 2019; National Police Foundation, 2021).

Internationally, a similar relationship between population density and school shootings has been found. In the works of Agnich (2015), schools in rural and suburban areas were the most frequently targeted schools. When considering both the educational stage and population density of the community, Agnich (2015), found that high schools in rural areas were most frequently chosen. Additionally, middle schools in rural areas were targeted more frequently than those in urban and suburban areas. Interestingly, averted school shootings have occurred more frequently in elementary schools in rural areas compared to other areas. These findings were not consistent when evaluating the location of targeted universities and colleges, which were instead most targeted in urban communities (Agnich, 2015).

Newman et al. (2004) and Wilkinson and Fagan (2001), postulate that rural and suburban community schools are most commonly the target of mass shootings because it is the largest stage that the perpetrator has within that community, as opposed to urban communities where there are numerous potential large targets for mass violence. Furthermore, people living in rural communities appear to engage in behaviors that increase the risk of school shootings at higher rates than people who live in urban areas. Specifically, Brown et al. (2009) found that the proportion of a state's population that lived in rural areas was predictive of weapon carrying behavior. Rural communities may be targeted frequently because they have the largest density of guns and therefore the easiest access for a potential perpetrator of a school shooting. As demonstrated in the works of Lacombe et al. (2019), residents of rural areas exceeded small towns by 32% with respect to gun ownership, and had even larger discrepancies when compared to urban and suburban residential communities.

It is important to consider in combination with the previously mentioned findings, that schools may simply offer a stage that the perpetrator has an intimate knowledge of either because they are currently attending the school or have attended the school in the past.

CHAPTER 3: SCHOOL FEATURES

School features have also been implicated as risk factors for school shootings (Baird et al., 2017; Flores de Apodaca et al., 2012; Fridel, 2019; Kaiser, 2006; Wike & Fraser, 2009). It has been speculated that the characteristics of the school itself may facilitate an environment of isolation and detachment. In turn, the fostering of these feelings may contribute to the eventual perpetration of a school shooting (Flores de Apodaca et al., 2012). Grade level and school size are also variables that may impact school shootings.

Grade Level

There are several differences regarding school shootings across grade levels. Across several samples high schools were the targeted most frequently whether the attacks were completed (Langman & Straub, 2019) or averted (Althari et al., 2021; Langman & Straub, 2019; National Police Foundation, 2021). Although shootings in middle and elementary schools were less common, completed attacks occurred with the same frequency as averted attacks in these settings (Langman & Straub, 2019). Colleges and universities experienced the largest number of rampage attacks (Flores de Apodaca et al., 2012), and had the greatest disproportion of completed attacks versus averted attacks, with the overwhelming majority of attacks at colleges being completed (Langman & Straub, 2019).

Large-scale attacks are those than involved 10 or more victims. In an international sample evaluated by Agnich (2015), 60% of large scale attacks occurred at elementary schools, followed by 25% at colleges and universities, and only 14% of large scale attacks occurring at high schools.

These findings are consistent with current information about the age of the perpetrator and the school where the attack occurred. Perpetrators who have attacked elementary schools, and colleges and universities, are typically adults, and therefore their attacks are more lethal (Langman & Straub, 2019).

School Size

Several studies have found a significant relationship between school size, teacher-student ratios, and rates of school violence (Baird et al., 2017; Devoe et al., 2002; Flores de Apodaca et al., 2012; Kaiser, 2006). In a sample of 22 mass school shootings that occurred between January of 1995 and June of 2014, Baird et al. (2017) found that the schools that were targeted had a significantly higher number of students enrolled when compared to the respective state average enrollment rates. Similarly, Langman and Straub (2019), found that the largest proportion of completed attacks occurred at schools with between 1001 and 2000 students. In three separate studies, the largest proportion of averted attacks occurred at schools with between 501 and 1000 students (Althari et al., 2021; Langman & Straub, 2019; National Police Foundation, 2021). However, a linear trend was not found between school size and the completed or attempted perpetration of a school shooting. Conversely, Flores de Apodaca et al. (2012), found no relationship between school size and targeted or rampage school shootings. Interestingly, however, Baird et al. (2017), found that a significant proportion of perpetrators had recently transitioned from smaller schools, or schools with a lower student to teacher ratio.

There have been mixed results with respect to the role that school features play in school shootings. However, the most robust findings are that higher levels of education are targeted at the highest frequency. This may be reflective of the level of cognitive maturity that one needs in

order to be able to plan and carry out a school shooting. Additionally, there is significant research backing to demonstrate that larger schools are more often chosen to be locations of shootings (Baird et al., 2017; Flores de Apodaca et al., 2012; Fridel, 2019). In the 2021 evaluation of averted school shootings, 78% of the schools targeted had a teacher-to-student ratio at or above the national average (Althari et al., 2021).This may be a result of warning signs of planning behavior being missed due to the extra demands placed on schools that are substantially larger, and most likely understaffed.

CHAPTER 4: PERPETRATOR CHARACTERISTICS

Much of the research to date has either focused on the external environmental factors that have contributed to a shooting, or they have focused on the characteristics of the perpetrator themselves. Evaluating the nuances of the individual may shed light on characteristics that result in higher risk and propensity for committing such an act.

Gender

Despite the inconsistencies found throughout the research on school shootings, there is one factor that remains consistent across studies: At least 90% of perpetrators of both completed (Kimmel & Mahler, 2003; Langman, 2013; Langman & Straub, 2019; Sommer et al., 2014) and averted (Agnich, 2015; Althari et al., 2021; Daniels, 2019; Langman & Straub, 2019) school shootings are male. In a systematic review of 35 studies of school shootings, internationally, in 121 of 126 cases the perpetrators were males (Sommer et al., 2014).

One potential difference that may account for this robust gender difference is that boys are more willing to be violent than girls (Archer, 2004; Newman et al., 2004; Nivette et al., 2019). Beyond this, males are more willing than females to see and use violence as a form of conflict resolution (Kimmel & Mahler, 2003), and are more likely to have access to firearms within the home (Ruback et al., 2011).

Age

The age of perpetrators of school shootings, both internationally and in the United States alone, have ranged from 6 to 62 (Langman & Straub, 2019; Sommer et al., 2014). Internationally, the mean age of perpetrators was between 19 (Sommer et al., 2014) and 24-years

of age (Agnich, 2015), depending on the sample. These mean ages are consistent with the ages of perpetrators of shootings exclusively in the United States. Langman (2013) found that school shootings with most casualties and fatalities were completed by a perpetrator that was 19-years-or-older.

Internationally, the age of the perpetrators was found to be dependent on the school level targeted; perpetrators who targeted elementary schools or colleges and universities were, on average, older than 30-years-of-age. However, perpetrators of completed attacks at middle school or high schools were, on average, significantly younger and closer to the age of the victims, 16.8 and 17.5-years-of-age, respectively (Agnich, 2015).

With regard to averted school shootings in the United States, the majority of school perpetrators are found to be under the age of 18 (Althari et al., 2021; *Averted School Violence (ASV) Database: 2021 Analysis Update* 2021; Daniels, 2019). Internationally, the average age of suspects involved in averted school shootings was 18-years-of-age.

Perpetrators of completed mass shootings are on average older and perpetrators of averted mass shootings are on average younger (Agnich, 2015). There is a positive correlation between perpetrator age and the number of victims; however, the type of attack being committed mediates this relationship. Targeted attacks, where the shooter is focused on killing a particular person or groups of persons, are typically perpetrated by individuals older than 30-years-of-age and result in a lower number of average victims (Langman & Straub, 2019).

Race/Ethnicity

Like gender, ethnicity has also been a consistent finding; Caucasian perpetrators account for over 2/3s of attackers in rampage style shootings (Kimmel & Mahler, 2003; Langman &

Straub, 2019; Newman et al., 2004; Vossekuil et al., 2002). In a sample assessed between 1982 and 1991, 26 out of 28 cases of school shootings were completed by boys who were white (Kimmel & Mahler, 2003). When evaluating perpetrators that were not Caucasian, Vossekuil et al. (2002) found that 12% of the shooters in their sample were African American, 5% were Hispanic , 2% of the sample was Native American and the final 2% were Asian. These findings are consistent with the works of Ruback et al. (2011), who found that white adolescent males had easier access to firearms within the home.

Information regarding perpetrator characteristics in averted school shootings is limited, predominately because most of the perpetrators are juveniles and their information cannot be released to the public. However, for the cases were ethnicity was reported, the same ethnic pattern was observed, Non-Hispanic Caucasians made up the majority of suspects (86.4%), 4.5% were black or African American, 4.5% were Asian or Asian American, and 4.5% were Latinx (Daniels, 2019).

These findings contradict other weapon carrying (Rajan et al., 2015), violence (Rajan et al., 2015), and deviant behavior (Bartlett et al., 2005) research regarding ethnicity. Non-Hispanic Caucasian adolescents and young adults have been found to engage in these behaviors less in comparison to other racial groups, suggesting that while insight can be gleamed from these areas of research, the factors that influence a perpetrator of a school shooting are not entirely explained by weapon carrying, violence, or deviant behavior research. Instead, there is a different mechanism at play when it comes to the perpetration of a school shooting. Both Nisbett (2018) and others (i.e., Kimmel and Mahler (2003)), theorized that some Caucasian boys and men utilize school shootings as a way to overcome perceived weakness because they feel as though they are required to be independent and invulnerable. Further, Nisbett speculated that women,

members of the LGBTQ community, and minority groups can turn to other members of their group for consoling, while white boys do not feel as though they have this outlet and feel that the duty is on them to regain their power. While there is merit to these proposed explanations for why white males are the overwhelming majority of those involved in school shootings, it is important to note that this may also simply be a result of white males being socialized to weapons starting at a young age through play (i.e., nerf guns, water guns, video games, etc.) and therefore desensitized to the dangers of these weapons in comparison to those in a minority group.

Langman and Straub (2019), found that shootings that occurred at secondary education sites had racial and ethnic representations consistent with the findings of Vossekuil et al. (2002). However, when looking at attacks committed on college or university campuses, only 10% of the perpetrators were Caucasian, while 90% of the perpetrators were non-white or of mixed heritage. As stated in Newman and Fox (2009), perpetrators who attack colleges are on average older, further along in the development of a serious mental illness, disconnected from peer groups, and the majority are immigrants and/or ethnic minorities. Additionally, Newman and Fox (2009), speculated that perpetrators' immigrant or minority status may have contributed to difficulties navigating a college setting. A potential contributing factor is that immigrants (Kim et al., 2011) and minorities (Holden et al., 2014) have many more barriers to mental health treatment and the reduced oversight of college and university students may result in perpetrators warning behaviors going undetected.

Familial Background

In 2000, Mary Ellen O'Toole, on behalf of the Federal Bureau of Investigations, released a threat assessment. This threat assessment was created utilizing an in-depth analysis of 14 completed, and 4 averted school shootings. From these cases, Dr. O'Toole compiled a list of potential markers in a perpetrator's life that could contribute to them carrying out a school shooting. With regard to family life, the factors of importance were: a turbulent parent-child relationship, a lack of reaction on the parents' part to pathological behaviors, access to weapons in the home, a student who is in control in the family setting, and a complete lack of limits or monitoring of the television and/or internet in the home (O'Toole, 2000). These findings are consistent with current research regarding child and adolescent deviant behavior. High levels of parent-child conflict are directly associated with conduct disorder and major depressive disorder in adolescence (Marmorstein & Iacono, 2004). Permissive parenting is directly and indirectly related to antisocial behavior via a child's emotional reactivity, specifically anger (Houltberg et al., 2016). Additionally, in a longitudinal study, it was found that the more knowledge a parent had of the activities a child was engaging in inside and outside of the home and with whom, the less a child engage in delinquent behaviors (Bendezú et al., 2018). An adolescent's ease of access to guns within the home has also been associated with significantly greater chances of violent offending and violent victimization (Ruback et al., 2011).

Other researchers have attempted to evaluate the role that familial relationships have on perpetrators; however, this information is both difficult to obtain and to quantify. In their sample of perpetrators who completed school shootings, Vossekuil et al. (2002) found that, 63% came from two parent households, 19% lived with at least one biological parent, 2% split time between both biological parents, and only 5% of perpetrators lived with a foster parent or a legal

guardian. The percentage of perpetrators from divorced families is actually lower than the national divorce rates for men, 21%, and women, 22%, in the United States in 2009, according to the United States Census Bureau (Kreider & Ellis, 2011). Divorce of parents has been found to be associated with an increase in delinquent behavior shortly after the divorce, however, this increase does not continue into later adolescence and adulthood (Boccio & Beaver, 2019), which is when perpetrators are most likely to commit shootings. Additionally, it has been found that adolescents have higher access to firearms in two-parent households, especially households with a father present (Ruback et al., 2011).

Perpetrator Traits

Much like information about familial relationships, data about the traits of perpetrators is difficult to obtain. In the O'Toole FBI analysis, a variety of traits were found to be similar among perpetrators. While any list should not be used to identify potential school shooters, it is still informative to understand what the seminal research has found. O'Toole (2000) found that the most common personality features were poor coping skills, a lack of resiliency, and the inability to forget or forgive perceived "wrongs." Additional traits fall into categories related to antisocial behavior, narcissistic traits, and emotional reactivity and regulation dysfunction. With respect to antisocial behavior, perpetrators were found to dehumanize others, have a lack of empathy, and were manipulative of others. Narcissistic traits observed by O'Toole included an elevated sense of entitlement, an air of superiority, perceived alienation, an extreme or pathological need for attention, inappropriate humor that is aggressive and condescending in nature, low self-esteem, a lack of trust, and limited and closed off social groups. With respect to emotional reactivity and regulation dysfunction, perpetrators were found to have difficulties with anger management, specific intolerances or prejudices, and rigid opinionated ways of thinking.

Finally, a change in behavior from the perpetrator's norm is a large indication of an impending attack.

Branching from the original traits found by O'Toole (2000), Peter Langman examined the profiles of 35 school shooters, and grouped perpetrators into three categories: psychopathic, psychotic, and traumatized (Langman, 2013). Langman classified psychopathic shooters as those who have a group of traits including, "narcissism, rage, a deficient sense of empathy, a lack of guilt, rejection of morality and law, and a sadistic delight in inflicting pain and death; may also be skilled at impression management and take pleasure in deceiving others (Langman, 2013, p. 136)." In contrast, psychotic shooters were defined as individuals who have schizophrenia or schizotypal personality disorder with the common symptoms of these diagnoses such as delusions and difficulty with reality testing. The traumatized category consisted of perpetrators with a history of victimization and abuse who came from families marked by dysfunction, instability, and poverty. Of Langman's sample of 35 school shooters, 29 were able to be classified. He found that 7 could be classified as psychopathic, 14 could be classified as psychotic, and 8 could be classified as traumatized. While classification of perpetrator characteristics is a noble research endeavor, there amount of variability potentially missed by trying to fit people into categories must not be forgotten.

Mental Health

A narrative that has frequently been perpetuated, is that a failure to detect, or properly treat mental health problems is a predominant cause of the perpetration of school shootings (e.g., when 549 faculty, staff, and students were surveyed at a Central Connecticut State University about the perceptions of the contributing factors to the school shooting that took place at Virginia

Polytechnic Institute and State University (Virginia Tech), they deemed mental health issues and lack of friendship to be the leading causes for school shootings (Fallahi et al., 2009)). Research, however, has not supported the claim that the perpetrators' mental health is the sole cause of school shootings (Flannery et al., 2013). Despite the lack of evidence for global mental health problems, depression and suicidal ideation have been found to be the two most common mental health concerns in perpetrators (Cornell, 2013; Langman, 2013; Madfis & Levin, 2013; Meloy et al., 2001; O'Toole, 2000; Vossekuil et al., 2002). After evaluating the data from 35 school shooters, Langman (2013), found that older shooters were more likely to be suicidal and more frequently ended their lives during the course of the attack. Furthermore, a significant positive association has been found between the overall number of victims killed and the perpetrator's resulting suicide (Towers et al., 2015). In the variety of mental health disorders included in the sample evaluated by Langman and Straub (2019), the only disorder that was more robustly represented was a history of substance abuse or addiction, which was found in 21.6% of the perpetrators in the sample.

Academic Performance

Behavioral changes have been shown to be a warning sign for the planning and implementation of an attack (O'Toole, 2000), however, academic performance changes have not been shown to be predictive of a potential attack. Vossekuil et al. (2002) found that most school shooting perpetrators were performing well academically prior to the attack, and that more than half of perpetrators showed no change in academic interest or performance prior to the attack. A small portion actually demonstrated noticeable improvements in their academic performance prior to the attack.

Social Dynamics

There have been numerous early theories that suggested a single causal factor for the perpetration of a school shooting. However, research has demonstrated that the social dynamics that contribute to the carrying out of a school shooting are much more complicated (Sommer et al., 2014).

Number of Perpetrators

There has been an overgeneralization that school shootings are committed by "loners" with no friends. Completed school shootings, both nationally and internationally, are most often completed by one perpetrator (Agnich, 2015; Langman & Straub, 2019), averted school shootings almost always involve more than one person (Agnich, 2015; Langman & Straub, 2019; Larkin, 2009). These findings are consistent with what is known about perpetrators of completed school shootings who are on average, older than perpetrators of averted shootings (Agnich, 2015), and can be categorized as adults. Adult shooters are also more likely to plan and complete attacks alone (Langman, 2010). Whereas, adolescent perpetrators are more likely to work with at least one other person or at least have support from one other person during the planning at implementation of an attack (Flannery et al., 2013). Langman and Straub (2019) found that the more perpetrators were involved in the planning of an attack, the more likely it was to be averted.

Relationship to the School

School shootings are most often completed by a current student at the school, or an outside person who has a connection to someone in the school (Duplechain & Morris, 2014). In the sample evaluated by Langman and Straub (2019), 42 out of the 51 completed attacks, 82.4%,

were either current students, former students, or were employees of the school, and, 90.2% of suspects in averted attacks, had the same relations to the school.

Violent/Criminal Behavior

In the sample evaluated by Vossekuil et al. (2002) 27% of the perpetrators had a prior arrest history, and 31% had acted violently toward others prior to the incident. Vossekuil et al. (2002) also found that 12% of the sample had harmed or killed animals in the past. An interesting finding was that out of this sample 68% of the perpetrators showed no change in disciplinary problems prior to the attack and 7% actually showed a decline in disciplinary issues prior to committing the attack. When 51 completed attacks were compared to 51 averted attacks, nineteen perpetrators of completed attacks were known by the criminal justice system prior to completing the attack as compared to nine of the plotters in averted attacks (Langman & Straub, 2019).

Social Conflicts within the School

O'Toole (2000) found, in the sample of perpetrators assessed, common markers of the school environment that facilitated an attack were a school wide tolerance of disrespectful behavior, inequitable discipline, inflexible culture, a pecking order among students, a code of silence, and unsupervised access to school computers. Consistent with these findings, of 67 cases evaluated by Sommer et al. (2014), 88.1% of perpetrators experienced social conflict within the school environment.

Bullying and Peer Rejection

Similar to the media perpetuated supposition that mental health problems are the predominant "cause" of school shootings, there has been a large emphasis on the role of bullying. However, the data does not support bullying as a causal factor in school shootings. In a meta-analysis conducted by Kennedy (2019), rates of bullying have significantly decreased for males since the 1990s and rates of bullying decrease as boys move into later adolescence. If bullying was contributing to an increase in school shootings, then it would be expected that rates of bullying would increase proportionally to rates of school shootings, yet the opposite trend is occurring. From the data available, perpetrators of completed school shootings have been bullied, or bully others, or both in many circumstances (Langman, 2013). While Vossekuil et al. (2002), found that 71% of the perpetrators had felt bullied, persecuted, or injured by others prior to the attack, Langman (2013), found that only 43% of the perpetrators in his respective samples had been the victims of bullying. Further, of those perpetrators that were bullied, only 6% of perpetrators targeted those who bullied them in their attacks. In a sample of 67 school shootings completed internationally, 29.9% of the perpetrators were victims of physical bullying, while 53.7% of perpetrators experienced some form of peer rejection (Sommer et al., 2014). In the sample evaluated by Langman and Straub (2019), the majority of both completed and averted attackers were the perpetrators of bullying rather than victims of bullying, with only nine of the averted attackers reported to have been bullied by their peers.

Given the mixed results with respect to the role that bullying plays in the perpetration of a school shooting and the decrease in face-to-face bullying and inconsistent trends in cyberbullying for males (Kennedy, 2019), it cannot be considered a causal factor, but rather it may be, in some cases, a contributing factor in a larger conglomeration of events.

Social Withdrawal

Concerns about isolation have been raised as a risk factor for perpetration of school shootings. A proportion of the perpetrators assessed in the O'Toole (2000) sample were found to have a detachment from school. In an international sample, Sommer et al. (2014) found that almost 54% of perpetrators experienced peer rejection, while only about a third of the perpetrators in the Vossekuil et al. (2002) sample were classified as loners or reported feeling like a loner. Furthermore, Vossekuil et al. found that 41% of the perpetrators socialized with mainstream students or were mainstream students themselves. Only 27% of the perpetrators socialized with disenfranchised students (who disliked students who were considered mainstream), and only a small portion of the perpetrators were considered to have no close friends. Internationally, it was found that of 163 perpetrators assessed, 13.49% were considered to be well socialized (Dumitriu, 2013). These results reveal that while social isolation may be a contributing factor for some perpetrators, it is not a consistent finding. Just as with bullying, social withdrawal can, in some cases, be a contributing factor, but other factors may play a bigger role in someone's choice to commit an attack.

O'Toole (2000) suggested that students having outside interests was a potential mitigating factor for engaging in a school shooting. However, one study found that 44% of the perpetrators were involved in some organized event inside or outside of school (Vossekuil et al., 2002). Additionally, in another study, perpetrators were enrolled in Boy Scouts of America at a rate three times that of the national average (Dumitriu, 2013). It is possible that while outside interests and activities may act as a mitigating factor for a majority of people, for a select few this involvement may in some way contribute to their desire to commit a school shooting.

Romantic Rejection

While social rejection, in general, has been cited as a potential contributing factor in the perpetration of a school shooting, romantic rejection has also been implicated (Klein, 2005; Leary et al., 2003; Sommer et al., 2014). In international samples, romantic rejection was found in 29.9% of the 67 cases evaluated (Sommer et al., 2014). In a national sample, 12 school shootings that occurred between 1997 and 2002 involved perpetrators targeting girls who had rejected them, or implied that a motivation for the attack was perceived rejection from a female (Klein, 2005). It is theorized that committing a school shooting is a violent act aimed at regaining the perceived loss of power that occurred after experiencing a real or perceived rejection (Dumitriu, 2013; Klein, 2005).

School Disciplinary History

There are mixed findings with regard to disciplinary histories of school perpetrators. For example, Vossekuil et al. (2002), found that 63% of the attackers had never been in trouble or were rarely in trouble at school. Additionally, 27% had never been suspended from school and only 10% of the perpetrators had been expelled from the school they targeted. However, the works of Dumitriu (2013) and (Sommer et al., 2014) found that conflicts with teachers were prevalent in a significant majority of school shootings. In fact, internationally, 43% of school shooters had a conflict with at least one teacher (Sommer et al., 2014). For comparison, in the 2009-2010 school year, only 5% of Caucasians were suspended in the United States, nationally (Losen & Martinez, 2013), which indicates that both peer and authority relationships within the school system must be evaluated.

Planning

Perpetrators rarely engage in a school shooting out of impulse (Cornell, 2013; Daniels et al., 2007; Langman, 2013; O'Toole, 2000; Vossekuil et al., 2002). Plans for a school shooting are started for weeks or months prior to its execution (Cornell, 2013). In the sample assessed by Vossekuil et al. (2002), 93% of perpetrators had planned out the attack in advance, 69% of the perpetrators planned their attack at least two days in advance, and 51% developed the idea at least one month before the attack. Internationally, approximately 44% of school shooters planned their attacks well in advance, while only about 13% appeared to act impulsively (Dumitriu, 2013).

Planning Behaviors

As described in the works of Meloy and O'toole (2011), perpetrators of school shootings plan their attacks in a series of four stages. These stages are: researching, planning, preparation, and finally implementation of the attack. These stages are referred to as pathway warning behaviors.

In the research phase, the perpetrator finds information to utilize from past attacks. In a sample of 12 rampage school shootings between 1999 and 2007, 2/3s of the shooters directly referenced Columbine (Larkin, 2009) when discussing their own attacks. The planning phase entails, choosing a time, place, method of attack, and method of entry. The preparation phase involves weapon and material acquisition. O'Toole (2000) found that access to weapons was the most significant risk factor in the perpetration of a school shooting. The majority of perpetrators assessed by Vossekuil et al. (2002) and Dumitriu (2013) had easy access to weapons in their families' homes. The final stage is the implementation of an attack (Calhoun & Weston, 2003;

Meloy & O'toole, 2011). With each step on the pathway, risk increases substantially of an act being carried out.

Leakage Warning Behaviors

Leakage refers to the communication of an intent to carry out an attack in the form of a journal or directly to a person that is not the intended target (Meloy & O'toole, 2011). Leakage warning behavior is found to be the most common and pervasive form of warning behavior. Examples of leakage warning behavior include threatening statements to peers about death, asking peers to assist with an attack, asking for assistance in the acquisition of weapons, referring to past school shootings in a positive manner (Langman, 2015), but these are just to name a few. In 93% of the cases studied by Vossekuil et al. (2002), the perpetrators engaged in behaviors that caused others concern, and in 81% of the cases, at least one person was aware that the perpetrator was at least in the research phase of planning an attack. In 93% of the cases the person that had this information was a peer. Only 17% of the sample ever directly threatened their intended targets. Reporting the leakage behavior of potential perpetrators has been found to be one of the most important factors in the stopping of an attack prior to its implementation. The more people are aware of these leakage-warning behaviors, the more attacks can potentially be averted in the long run.

Additional Warning Behaviors

Additional warning behaviors include an obsession with a person or cause, identification with a previous attacker, or a perceived responsibility to forward a cause or belief system (Meloy & O'toole, 2011). Further, individuals who test out their ability to inflict violence in another area who directly communicate a threat, or express that they have no other choice than to carry out a

shooting are significant warning behaviors of an impending shooter (Meloy & O'toole, 2011). From the sample evaluated by Daniels (2019), the most common warning signs in perpetrators of school shootings were depressed mood and social withdrawal, impairment in social and/or emotional functioning, quickness to anger, and hypersensitivity to criticism.

Motives

One of the most common questions posed after a school shooting is what made the person or persons decide to commit a school shooting? With respect to the research, Vossekuil et al. (2002), found that 73% of perpetrators had a grievance against at least one person they attacked, and almost half of the perpetrators had more than one target prior to the attack. Over half of the sample targeted an employee of the school, whether it be an administrator, faculty or other staff member, leaving other students as the chosen targets less than half of the time. While the sample assessed by Langman (2013), found that in 9 of 35 cases perpetrators chose to target school personnel, a significant portion of those targeted were females, 8 of 35 cases, and 4 cases targeted family members. In an assessment of 67 averted school shootings, potential perpetrators were found to be primarily motivated to commit an attack due to a grievance with a classmate (Althari et al., 2021). Further, assessment of rampage school shootings that occurred between 2002 and 2008 revealed that perpetrators that attacked college campuses were older and were more likely to be experiencing a serious mental illness (Newman & Fox, 2009).

The findings of teenage perpetration, or attempted perpetration, of school shootings are consistent with the trajectory of violent behavior that peaks during teenage years, especially for white and black males (Newman et al., 2004). Antisocial and criminal activity increases during adolescence and peaks at 17-years-of-age, followed by a decline upon entry into adulthood

(Sweeten et al., 2013), this decline occurs at approximately 20-years-of-age (Monahan et al., 2009).

Intervention

Once a perpetrator begins an attack, it is not typically stopped by law enforcement (Vossekuil et al., 2002). Only 27% of the cases were thwarted by law enforcement. Administrators, faculty or school staff apprehended or forced the perpetrator to surrender in 27% of the cases. In 5% of the cases, it was students who intervened. In 13% of the cases the attack ended with the perpetrator committing suicide.

CHAPTER 5: POINTS OF DIFFERENCE IN AVERTED CASES

While outside of the scope of this study, it is important to note the difference between an averted and completed attack is almost always intervention prior to the implementation phase of an attack. As previously discussed, The majority of attacks are discovered and reported by fellow students (Daniels, 2019; Daniels et al., 2007). Other planned attacks were discovered by school administrators, parents, or the police who received tips (Daniels, 2019; Daniels et al., 2007). Once a plot is discovered, this information can then be taken to the appropriate school and law enforcement officials who can take the appropriate steps to intervene and prevent the attack from happening.

The media has perpetuated inaccurate impressions of the characteristics, motivations, and behaviors of school shooters. School shooters are romanticized as bullied loners or angry, violent individuals motivated by revenge (O'Toole, 2000). In reality, it has been postulated that it is not possible for a profile to be created of a person who would commit a school shooting, nor is it possible to determine a list of characteristics or traits of a person that would follow pathway warning behavior all the way to the implementation of an attack (O'Toole, 2000; Vossekuil et al., 2002).

Bullying has been a large talking point in the media as the cause of school shootings; however, it does not hold explanatory weight. Although research has shown that over half of students report being verbally bullied within the last two months (Wang et al., 2009), or in some way teased during their time in the school system, the overwhelming majority will not become school shooters (Langman, 2009). In fact, virtually none of those who are bullied as youth will go on to become school shooters (Mears et al., 2017). Research has shown that the role of

bullying in the perpetration of school shootings is still unclear (Rocque, 2012). While it is true that in some cases perpetrators or attempted perpetrators of school shootings have been the victims of bullying, it is also true that a significant portion of school shooters are actually the perpetrators of bullying (Langman, 2013; Langman & Straub, 2019; Vossekuil et al., 2002).

Because bullying has been a large focus of intervention efforts over the past 20 years in an effort to combat school violence, school shootings should be decreasing over time. However, the opposite is true, between 2000 and 2013 there have been an average of 21 mass shootings per year resulting in 4 or more deaths as a result of gunfire, in the United States alone (Fox & Fridel, 2016; Krouse & Richardson, 2015). From 1970 to 2013 there has been an average increase of 1.1 mass shootings per year (Krouse & Richardson, 2015). While these numbers do not represent school shootings alone, school shootings are reflected in these samples, and a growing number of mass shootings are being completed by younger individuals (Katsiyannis et al., 2018).

Much of the research has looked at the role of adversarial relationships and their contributions to school shootings. However, little has been done to examine fully the role that friends play in school shootings, whether it be through recruitment, encouragement, or commands (Langman, 2013). A review of the literature regarding more common delinquent behaviors, such as weapon carrying, and antisocial behaviors may provide some insights. Weapon carrying behavior among adolescents is largely related to the perceived weapon carrying behavior of their peers (Cao et al., 2008; Martin et al., 1996), or their friends (Dijkstra et al., 2012; Luster & Oh, 2001; Williams et al., 2002). Furthermore, weapon carrying may be associated with increased social status. In one study of adolescent weapon carrying behavior, it was found that adolescents who carried weapons received more friendship nominations and delegated fewer friendship nominations, signifying an elevated popularity (Dijkstra et al., 2010).

In a longitudinal study examining peer relations, the teen's level of aggressiveness, as rated by peers, was the greatest predictor of their weapon carrying behavior one year later (Dijkstra et al., 2010).

Research has found that antisocial and criminal behavior is at its peak when the perpetrator is around 17 years-of-age, and then declines as the person matures and transitions into adulthood. This rapid increase and then decrease is known as the age-crime curve and has been replicated across ethnic groups, countries, and historical era (Farrington, 1986; Moffitt, 1993; Piquero et al., 2003; Sweeten et al., 2013). However, when individuals' relationships were assessed, it was found that after age 16, peer socialization was the primary factor in the relationship between criminal activity and one's relationship to antisocial peers (Monahan et al., 2009).

Due to the robust findings of the relationship between peer socialization and other antisocial behaviors, it is important to examine if this relationship is also present in relation to school shootings.

CHAPTER 6: PRESENT STUDY

The purpose of this study was to evaluate the variables that were most readily available about both completed and averted school shootings. The goal was to examine the relationship between these variables and group membership, in other words, can these variables predict whether a shooting was completed or averted?

Hypotheses

Hypothesis 1: There will be significant differences in averted and completed school shootings, with respect to

A) The age of the perpetrators. It was hypothesized that the average age of perpetrators of completed school shootings would be older than the average age of the perpetrators of averted school shootings.

B) The number of accomplices. It was hypothesized that the average number of perpetrators of completed school shootings would be lower than the average number of perpetrators of averted school shootings.

C) Participation in leakage warning behavior, such as posting intent for an attack on social media or telling a peer in school. It was hypothesized that perpetrators of completed school shootings would engage in a lower average of leakage warning behaviors in comparison to perpetrators of averted school shootings.

Hypothesis 2: A combination of leakage warning behaviors, age of perpetrators, and number of accomplices would predict membership in either the completed or averted school shooting group. It was hypothesized that

CHAPTER 7: METHOD

Participants

For the purposes of this study, 172 averted school shooting cases and 92 completed school shooting cases taken from the Averted School Violence (ASV) database were evaluated. This database was created with funding support from the COPS office, and the National Police Foundation.

The ASV database is the result of collaboration with school safety subject matter experts and numerous national and state-level organizations. The ASV database is comprised of incident-level information about averted or completed attacks, as well as lessons learned and potential safety strategies that can be implemented to prevent future attacks. The ASV is comprised of both open source information collected by staff at the National Police Foundation and accounts shared by those directly involved in the averted or completed attacks, whether it be school personnel, or law enforcement officers. Identifying information with respect to the perpetrators was removed from the case information prior to inclusion in the data set. Variables, related to mental health or social functioning were not evaluated because the measurement techniques did not meet standards set by the ethics of the author's profession. Prior to analysis of the data an assessment of inter-rater reliability was conducted, however, greater than 50% of the websites urls being out-of-date, only four of 10 randomly sampled cases could be evaluated. Of the cases that could be evaluated, there was 100% agreement between the author and the original rater on the variables of interest.

Due to the lack of research investigating comparing completed and averted school shootings, there is a lack of data to inform sample size estimations. As a result, the suggestions

outlined in Peduzzi et al. (1996) were employed. The "rule of thumb" is that for each variable they suggest a minimum of 10 observations, for the purposes of this study, 3 independent variables were evaluated, as well as their interactions. Second, G*power version 3.1 was utilized to determine sample size as suggested in Faul et al. (2009). Power was calculated based on a likelihood ratio test assuming a pseudo R^2 of .34, which was based on the findings in the works of Athey et al. (2018). Based on the guidelines outlined in Cohen (1988); Cohen et al. (2013), a minimum sample size of 178 cases was determined to be appropriate for a R^2 of .34, and larger than needed for a Cohen's $f^2 = 0.09$, which is a medium effect size.

Measures and Procedures

The data for this study was obtained from the ASV database. Information was entered into the ASV database via an online questionnaire located at avertedschoolviolence.org. The questionnaire consisted of six main sections: basic information (i.e., date, time, location); school information; event information; suspect information; documentation; and assessment. Due to the nature of the data available in the AVS database, only the variables with the most data available were evaluated in this study. These variables included the age of the perpetrator(s), the number of accomplices, and participation in leakage warning behaviors. Demographic variables were also evaluated.

Only cases that fit within the scope of this study, school shootings, were included. Of the 264-total number of cases in the data set, 39 cases were eliminated because they did not involve the use or planned use of a firearm. An additional 6 cases were eliminated because they were duplicate entries. Attacks were completed if they resulted in at least one injury. A completed attack was included, if it took place on school grounds during school hours, or at a school related

function after school hours. An averted attack was included if there was evidence that a person engaged in any pathway (i.e., researching previous school shootings, buying a gun, writing down a plan for an attack) behavior related to preparation for a school-based attack.

Cases were either entered by people directly involved with an averted or completed school shooting, or by a trained member of the National Police Foundation staff. In order to facilitate a larger sample size, National Police Foundation staff conducted an analysis of printed news articles related to school-based attacks that were both completed and averted. Cases were found by completing Google internet searches for recent averted or completed school-based attacks. Once case information was entered by a first-person account, or by a member of the National Police Foundation staff, a panel of experts selected by the National Police Foundation de-identified information that could not readily be found on open-source databases. The panel also evaluated the cases for identification of factors such as pathway warning behavior and suggestions for prevention of these incidents in the future.

Based on demographic information collected from Suspect 1, the sample was largely male (90.9%) with ages that ranged from 12 to 62 (M = 20.51, SD = 9.57). Most of the suspects were either current students at the target school (68.5%) or former students (19.2%) of the target school. A full list of demographic variables for Suspect 1 for both the completed and averted cases can be found in Table 1, demographics for cases involving multiple suspects can be found in Table 2 through 4, respectively. Environmental characteristics with respect to the location of the targeted school can be found in Table 5 and the number of averted and completed shootings per state can be found in Table 6.

CHAPTER 8: RESULTS

Analyses were conducted utilizing SPSS Version 27. Prior to analyses, data were examined for potential issues with skewedness, multicollinearity, and other violations of statistical assumptions. It should be noted that because not every case had complete data, numbers of cases included in a comparison varies across analyses. For hypotheses 1a and 1b, one-tailed t-tests were utilized to determine if the averted and completed groups differed significantly with respect to the average age of the perpetrators and the average number of accomplices. Hypothesis 1c was tested utilizing the Chi-Square test of variance. Finally, logistic regression was completed in order to determine if a combination of participating in leakage warning behavior, the age of the perpetrators, and the number of suspects could predict whether cases were averted or completed. In the following sections, hypothesis testing will be presented first followed by supplemental analyses.

Hypothesis 1a. Age of Perpetrators

This hypothesis stated that the average age of the perpetrators of completed school shootings would be older than the average age of the perpetrators of averted school shootings. To test this hypothesis, the reported age of 119 primary suspects in the averted school shootings and 81 in the completed school shootings were compared. The average age of the suspects in the averted group (M = 19.48, SD = 8.55) was significantly younger than the average age of the completed group (M = 22.02, SD = 10.77; t (198) = -1.78, $p < .05$; [95% CI -5.25 to .16]; d = .27). Based on this analysis, hypothesis 1a was supported, see Table 7.

Hypothesis 1b. Number of Accomplices

To test this hypothesis, the number of perpetrators per event from 136 averted cases and 82 completed cases were compared. Based on the one-tailed t-test, the number of accomplices was significantly higher for the averted group (M = 1.39, SD = .81) in comparison to the completed group (M = 1.04, SD = .19; t (216) = 3.89, $p < .001$; [95% CI .21 to .50], d = .54). These results support hypothesis 1b, that the number of individuals involved in the perpetration of averted school shootings was, on average, larger than the number of individuals involved in a completed school shooting.

Hypothesis 1c. Participation in Leakage Behavior

For this analysis, leakage behavior from 137 averted cases and 82 completed cases was examined. Leakage behavior was characterized as a dichotomous variable. In the averted cases, 83.9% involved disclosure of the intended plan in the form of leakage warning behavior. In the completed cases, 40.2% engaged in leakage warning behavior. Results indicate that there was a significant difference in leakage warning behavior between the groups (χ^2 (1) = 44.71, $p < .001$). This suggests that averted school shooting cases were significantly more likely to have perpetrators who told other people or whose plans were overheard by others in comparison to the completed school shooting cases.

Hypothesis 2. Combination of Age, Number of Accomplices, and Leakage Warning Behavior Predict Group Membership

A logistic regression was utilized to determine if the age of the perpetrators, the number of accomplices and participation in leakage warning behaviors could be used to accurately predict group membership (i.e., averted or completed school shootings groups). The Box and

Tidwell (1962) procedure was first utilized to determine if age, a continuous variable, was linearly related to school shooting classification. A Bonferroni correction was completed utilizing the eight terms in the model. Statistical significance was adjusted to be accepted based on $p < .0065$ (Tabachnick & Fidell, 2013). Based on this assessment, it was determined that age was linearly related to the logit of school shooting classification. After running the logistic regression model, there were three standardized z residuals that had standard deviations that were greater than 2.5. As a result, these outliers were removed from the analysis and the logistic regression was re-run.

The logistic regression model was statistically significant, χ^2 (5) = 68.15, $p < .001$. The model explained 39.6% (Nagelkerke R^2) of the variance in school shooting cases. Of the 197 cases evaluated, 76.6% were correctly classified. With respect to the individual groups, 86.6% of the averted cases were correctly identified and 61.5% of the completed cases were correctly identified. The only significant predictor variable was leakage warning behavior. Those who participated in leakage warning behavior were significantly more likely to be in the averted school shooting group in comparison to the completed school shooting group (OR = .12, $p <$ .001). Neither suspect age nor number of suspects served as significant predictors of group membership, see Table 8.

CHAPTER 9: DISCUSSION

Summary and Key Findings

Despite the amount of media attention school shootings have received over the last two decades, much of the research has focused exclusively on assessing the events in the aftermath of tragedy. Based on a review of the current literature, this is the first comparison study of completed and averted school shootings. The findings of this study revealed some valuable and important insights that may be helpful in future research and prevention efforts. While there is a significant age difference between the average age of perpetrators of completed and averted shootings when looked at in isolation, it should be noted that age had a small effect size with regard to group membership. This indicates that regardless of a person's age a threat of mass violence against a school should be taken seriously. While it is true that older individuals may have more ability to acquire weapons due to legal restrictions, it should be noted that those under the legal age restrictions for purchasing weapons can still acquire them within their own homes, through friends or acquaintances, through theft, or illegal transactions (Bushman et al., 2016).

When examined separately, the number of accomplices was significantly higher in averted cases in comparison to completed cases, with a medium effects size. The number of accomplices, however, did not serve as a significant predictor of group membership when examined in the presence of other variables in the logistic regression model. This suggests that although a plan involving more than one perpetrator may have a higher likelihood of being detected prior to its execution, the presence of accomplices alone does not predict completion or aversion when leakage warning behavior is considered. In contrast, leakage warning behavior was a significant predictor of group membership when looked at in isolation and when evaluated in the full logistic regression model.

When the findings with respect to age, number of accomplices, and leakage warning behavior are looked at in combination it reveals important information. While it was hypothesized that averted shootings are prevented because the potential perpetrators are younger, working with more people, and disclosing information regarding their plans, this did not end up being the case. Because leakage warning behavior was the only variable with predictive validity in the model demonstrates that no potential threat to a school should be ignored. It cannot be assumed that younger age will serve as a preventative factor, nor can it be assumed that working with an accomplice significantly increases one's odds of having their plot discovered prior to its execution. These findings, instead support the conclusions of past research, that the most substantial way a potential plan can be averted is by people reporting the leakage behaviors of potential perpetrators (Meloy & O'toole, 2011; Vossekuil et al., 2002).

Findings from this study may inform prevention efforts surrounding school shootings. Potential efforts could include educating the public about the warning signs of leakage warning behaviors, with a particular emphasis on educating peers, school personnel and parents of students. Althari et al. (2021), found that peers were the most likely to discover a shooting plot. Additionally, there should be an increase in education around how to report concerns regarding a potential school shooting plot and an increase in access to methods of anonymous reporting. Lastly, with increasing access gun safety remains an important primary prevention effort. Additional training for parents around eliminating their children's access to means to complete an attack is critical (see Langman, 2009).

Future research should investigate barriers to reporting concerns related to school shooting plots. These studies should focus on determining the factors that influence whether someone would or would report their concerns. Additionally, researchers should examine and

determine the most efficient ways to deliver education around leakage warning behavior. Finally, researchers should collaborate with law enforcement to explore the best practices for reporting leakage warning behavior to law enforcement agencies.

Diversity and Inclusion

While an in-depth analysis of the characteristics of the perpetrators was outside the scope of this study, it is important to note, that regardless of group membership school armed violence is still predominantly a white-male perpetrated act, involving mainly current or former students at the targeted school. While it is not clear why this is an action completed predominately by a group that has been demonstrated to be of highest social status in the United States (Liu, 2017), several theories have emerged. Unlike those who identify as part of a minority group, white males are not typically marginalized, therefore research have suggested that any slights that affect their perceived masculinity are more egregious to them than to someone who has be disenfranchised based on their status in one or more minority groups (Kimmel & Mahler, 2003; Nisbett, 2018). Another possibility is that it is more socially acceptable for white males to utilize guns in everyday life, as they are more likely to grow up with guns in the home in comparison to females, racial minorities (Ruback et al., 2011), and sexual and gender minorities (Blosnich et al., 2020). The mere exposure to weapons could serve as a desensitization to the severity of consequences that can come from their use. While there needs to be a more significant push to understand minority involvement in many areas, this is one area that is the exception. This is predominantly a white-male problem and needs to be emphasized as such.

Limitations

This research study is the first to compare completed school shootings to averted school shootings, but it is not without limitations. Despite some of the entries being first person accounts, much of the data was obtained utilizing open-source media reports. As a result, planned or completed school shootings involving perpetrators that were minors have much of the data withheld. Therefore, only information regarding age, affiliation to the targeted school and brief information regarding the planned or completed attack are typically reported. More information is available when perpetrators are tried as adults. Additionally, when utilizing open-source media information, it is unclear how much of the information is fact checked prior to publication. However, when creating this study, these limitations were taken into consideration, so only more robust variables were utilized for the purposes of comparing the groups. Future research studies should focus on attempting to gain more first person reports and disclosure of more specific information regarding suspect characteristics.

Conclusion

In summary, the current study was the first comparison of variable characteristics between completed and averted school shootings. Despite it being hypothesized that averted school shooting suspects would be younger in age, have more planned accomplices, and engage in more leakage behavior compared to suspects involved in completed school shootings, only leakage warning behavior demonstrated statistical significance in the full model. These findings are important for the development of future prevention efforts and research. Efforts should be made to assess ways to increase reporting of potential school shooting plots so that they can be appropriately investigated. Due to the low base rate of school shootings, shifting research focus from perpetrators and instead focusing efforts on how to educate people of the warning signs of a

potential plot, may help increase our detection and intervention efforts resulting in more averted plans.

APPENDIX: TABLES

Table 1 Descriptive statistics for Suspect 1.

	Averted		Completed	
Variable	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Sex ($N = 214$)				
Male	125	94.0	74	91.4
Female	8	6.0	7	8.6
School Affiliation ($N = 215$)				
Current Student	100	75.2	50	61.0
Former Student	21	15.8	21	25.6
Former Employee	2	1.5	0	0.0
School Official	3	2.3	1	1.2
Other Affiliation	7	5.3	10	12.2
Race/Ethnicity ($N = 208$)				
White	63	48.8	41	51.9
Black/Af.Am.	4	3.1	15	19.0
Native/Alaskan	1	0.8	4	5.1
Asian	6	4.7	9	11.4
Latino/a	7	5.4	5	6.3
Middle Eastern	2	1.6	1	1.3
Other	0	0	2	2.5
Unknown	46	35.7	2	2.5
	Mean	***SD***	**Mean**	***SD***
Age ($N = 200$)	19.48	8.55	22.02	10.77

Table 2 Demographic characteristics for Suspect 2.

	Averted		Completed	
Variable	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Sex ($N = 30$)				
Male	23	85.2	1	50.0
Female	4	14.8	1	50.0
School Affiliation ($N = 30$)				
Current Student	22	81.5	2	100
Former Student	2	7.4	0	0
Former Employee	0	0	0	0
School Official	0	0	0	0
Other Affiliation	3	11.1	0	0
Race/Ethnicity ($N = 13$)				
White	7	70.0	2	100
Black/Af.Am.	1	10.0	0	0
Native/Alaskan	0	0	0	0
Asian	0	0	0	0
Latino/a	1	10.0	0	0
Middle Eastern	1	10.0	0	0
Other	0	0	0	0
	Mean	***SD***	**Mean**	***SD***
Age ($N = 27$)	16.67	4.13	16.50	.71

Table 3 Demographic characteristics for Suspect 3.

Variable	Averted Frequency	Averted Percentage
Sex ($N = 12$)		
Male	9	75.0
Female	3	25.0
School Affiliation ($N = 10$)		
Current Student	10	100
Former Student	0	0
Former Employee	0	0
School Official	0	0
Other Affiliation	0	0
	Mean	***SD***
Age ($N = 9$)	15.89	1.83

Table 4 Demographic characteristics for Suspect 4.

Variable	Averted Frequency	Averted Percentage
Sex ($N = 6$)		
Male	5	16.7
Female	1	83.3
School Affiliation ($N = 6$)		
Current Student	6	100
Former Student	0	0
Former Employee	0	0
School Official	0	0
Other Affiliation	0	0
	Mean	***SD***
Age ($N = 4$)	14.50	1.73

Table 5 School Demographics

	Averted		Completed	
Variable	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Demographic Location (*N* = 213)				
Rural	66	50.4	42	51.2
Urban	65	49.6	40	48.8
Type of School (*N* = 218)				
Public	117	86.0	72	87.8
Private	9	6.6	5	6.1
Charter	5	3.7	1	1.2
Faith Based	5	3.7	4	4.9
Education Level (*N* = 218)				
College	28	20.6	22	26.8
High School	86	63.2	47	57.3
Middle School	19	14.0	8	9.8
Elementary	3	2.2	5	6.1
School Size (*N* = 163)				
2001 or more	12	11.7	10	16.7
1001 to 2000	33	32.0	24	40.0
501 to 1000	44	42.7	12	20.0
500 or less	14	13.6	14	23.3

Table 6 Frequency of incidents by state.

	Averted		Completed	
State	N	%	N	%
Alabama	2	1.5	3	3.7
Alaska	1	0.8	0	0.0
Arizona	1	0.8	2	2.4
Arkansas	2	1.5	2	2.4
California	15	11.3	11	13.4
Colorado	2	1.5	5	6.1
Connecticut	2	1.5	2	2.4
Delaware	1	0.8	0	0.0
Florida	11	8.3	5	6.1
Georgia	4	3.0	2	2.4
Hawaii	0	0.0	0	0.0
Idaho	0	0.0	0	0.0
Illinois	1	0.8	2	2.4
Indiana	4	3.0	0	0.0
Iowa	1	0.8	0	0.0
Kansas	3	2.3	0	0.0
Kentucky	3	2.3	1	1.2
Louisiana	1	0.8	1	1.2
Maine	0	0.0	0	0.0
Maryland	3	2.3	3	3.7
Massachusetts	1	0.8	0	0.0
Michigan	7	5.3	0	0.0
Minnesota	2	1.5	2	2.4
Mississippi	0	0.0	0	0.0
Missouri	3	2.3	1	1.2
Montana	1	0.8	0	0.0
Nebraska	2	1.5	1	1.2
Nevada	0	0.0	3	3.7
New Hampshire	0	0.0	0	0.0
New Jersey	3	2.3	0	0.0
New Mexico	1	0.8	3	3.7
New York	7	5.3	1	1.2
North Carolina	4	3.0	2	2.4
North Dakota	0	0.0	0	0.0
Ohio	5	3.8	5	6.1
Oklahoma	4	3.0	1	1.2
Oregon	3	2.3	2	2.4
Pennsylvania	9	6.8	3	3.7
Rhode Island	0	0.0	0	0.0
South Carolina	1	0.8	3	3.7

	Averted		Completed	
South Dakota	0	0.0	1	1.2
Tennessee	3	2.3	1	1.2
Texas	3	2.3	3	3.7
Utah	4	3.0	0	0.0
Vermont	3	2.3	0	0.0
Virginia	2	1.5	3	3.7
Washington	4	3.0	6	7.3
West Virginia	1	0.8	0	0.0
Wisconsin	2	1.5	2	2.4
Wyoming	1	0.8	0	0.0

Table 7 Result of T-test for age, T-test for number of accomplices, and Chi-Square for leakage warning behaviors

.

Variable	Averted *M (SD)* *N* = 119	Completed *M (SD)* *N* = 81	t-test
Suspect Age	19.48 (8.55)	22.02 (10.77)	-1.86*
	N = 136	*N* = 82	t-test
Number of Accomplices	1.39(.81)	1.04(.19)	3.89***
	N = 137	*N* = 82	χ^2
Leakage			47.71***

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

Table 8 Logistic regression model for suspect age, leakage warning behaviors, and number of suspects are predictors of group membership.

	B	*SE B*	*Wald* χ^2	*df*	*p*	*Odds Ratio*	*95% CI for Odds Ratio*	
							Lower	Upper
Suspect Age	.01	.02	.58	1	.45	1.01	.98	1.05
Leakage Behavior	-1.99	.36	30.19	1	<.001***	.14	.07	.28
Number of Suspects	-19.64	4832.0	.00	1	1.00	.00	.00	
Constant	20.45	4832.0	.00	1	1.00			

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

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