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# An Exploration of K–12 School Shooting Threats in the United States

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This exploratory study examines approximately 1,000 shooting threats made at K–12 schools gathered from publicly available news reports over a 4-year academic period, including prepandemic, pandemic, and postpandemic data. The content analysis finds violent threats increased dramatically in 2021–2022. A majority of individuals who make school shooting threats are male students at large public high schools, which is consistent with those who perpetrate mass shootings at K–12 schools. However, those who threaten shootings are a more diverse population than perpetrators themselves in that they are a wider variety of ages and nearly one fifth are female. Text analysis identified words indicating the specificity of a threat and showed threats tended to be both negative and angry. In 40% of cases, it was unclear if the threat was real or a joke/hoax, yet the most common outcome was to arrest the individual making the threat and charge them with a felony. This study concludes with a call for research to better understand who makes school shooting threats and the challenges to this line of research.

***Public Significance Statement***
The results of this exploratory examination of 1,000 school shooting threats over a 4-year period show that threats are increasing. Those who threatened school shootings were a more diverse group than perpetrators of school shootings; and in 40% of cases, it is unclear if the threat is real or a joke. Future research is needed to understand and design appropriate intervention strategies for various forms of threats.

*Keywords:* school violence, school shooting, mass shooting, threat assessment, gun violence

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Threats of school shootings are a serious concern for schools and communities, yet it is currently unknown the extent to which they are happening, where they are happening most frequently, who is making them, the nature of the threats, and how schools are responding to them. This exploratory study is the first step to understanding the nature and extent of school shooting threats in the United States in an effort to identify trends and patterns, inform future research, and help to promote school safety and prevent violence from occurring. The present study examines approximately 1,000 K–12 school shooting threats gathered from publicly available news reports over a 4-year period. It explores the content of the threats using text-based sentiment analysis and public reporting on threats to answer the following research

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questions: Who threatens to commit a school shooting? Do individuals who threaten a school shooting look similar to past perpetrators of K–12 school mass shootings and if so, Can this comparison help differentiate individuals who truly intend violence from others who merely want to threaten or draw attention to themselves? How are schools responding to shooting threats? Are responses consistent across cases and do they follow best practices established by threat assessment and management research?

## Prevalence of School Shootings and School Shooting Threats

The typical U.S. school system consists of elementary, middle, and high schools that cover grades kindergarten through 12. Students usually start in kindergarten (K) at Age 5 or 6 and complete high school by Age 17 or 18. About 50 million students were enrolled in public schools (funded by local, state, or federal government) in 2021, while private schools (funded by tuition) had about 5 million students (National Center for Education Statistics, 2022). That same year, the K–12 School Shooting Database (Riedman, 2023), which, based on media and police reports, documents whenever "a gun is brandished, is fired, or a bullet hits school property for any reason, regardless of the number of victims, time of day, or day of week" going back to 1970, reported a record 250 shots fired on U.S. school campuses (Riedman, 2023). That number was more than double the numbers for 2018, 2019, and 2020, respectively, and 4–10 times more than any other year between 1970 and 2017.

With 130,000 schools nationwide and about 180 school days every year, the statistical odds of being shot at school are slim, but that is little solace to thousands of grieving families and survivors of school gun violence (Cox, 2021), and new survey results point to rising safety concerns among parents of students enrolled in grade school (Brenan, 2022). Most in school student fatalities are associated with mass killings: 20 students at the Sandy Hook Elementary School in Connecticut, 19 students at Robb Elementary School in Uvalde, Texas, 14 students at the Marjory Stoneman Douglas High School in Florida, 12 students at Columbine High School in Colorado, six students at Red Lake Senior High School in Minnesota, eight students at Santa Fe High School in Texas, five students at Cleveland Elementary School in California, five students at the Amish West Nickel Mines School in Pennsylvania, four students at Marysville High School in Washington, and four students at Westside Middle School in Arkansas (Peterson & Densley, 2022). The deadliest school shooting of 2021 was on November 30, when 11 people were shot, four fatally, at Oxford High School, about 45 miles north of Detroit. This mass killing brought new attention to the responsibility of schools to handle threats and warning signs because the weekend before the shooting, the alleged shooter, a 15-year-old boy, posted photos of the murder weapon on social media with the caption: "Just got my new beauty today. SIG SAUER 9 mm" (Elamroussi, 2021, para 11).

The day before the Oxford shooting, a school administrator also called the shooter's parents because their son was allegedly looking at firearms ammunition online during class. His mother texted her son, "LOL I'm not mad at you. You have to learn not to get caught" (Peterson & Densley, 2023, para 9). Then, on the day of the shooting, the parents were called into school because their son drew a gun on his math worksheet with the words: "The thoughts won't stop Help me" and "Blood everywhere" (Peterson & Densley, 2023, para 10). The parents did not immediately take their son out of school, and later that afternoon, he murdered four of his classmates.

While shots fired at a school are statistically rare, thousands of school shooting threats are made every year that come in many forms—direct communication, social media posts, written plans and drawings, messages on the bathroom wall, hearsay, and anonymous 911 calls. Some are real, while others are hoaxes. Few states and school districts publicly report the school shooting threats they receive, making it impossible to know the true nature and extent of the problem. Oxford Community School District in the suburbs of Detroit, Michigan, United States, typically receives about 500 threats per year, but following December 2021 shooting at Oxford High School, 35,000 threats were reported in a month (Brooks & Brown, 2022). In Texas, 67,440 threats were reported to school officials in 2021–2022 across 16,845 schools total, for an average of four threats per school (New, 2022). Schools are reportedly dealing with a rise in false, automated, "swatting" threats (Yousef, 2022), and in the 2022–2023 school year, at least nine

schools in Wisconsin and a dozen schools in Maine received school shooting threats on the same day (Jacobo, 2022; WABI News Desk, 2022). On December 17, 2021, schools nationwide also closed in response to an anonymous threat on the social media platform TikTok warning against "National Shoot Up Your School Day" (Riedman et al., 2021, para 4).

Decisions for how to handle school threats typically begin and end locally with school and police personnel. Formal "threat assessment" is required by law in 18 U.S. states, encouraged in five states, and is in noncodified policy in 16 states (National Association of State Boards of Education, 2022). Less than half of U.S. schools have a formal threat assessment team, defined as "a formalized group of persons who meet regularly with the common purpose of identifying, assessing, and managing students who may pose a threat of targeted violence in schools," and only 9% have a threat assessment team that meets more than once a month (National Center for Education Statistics, 2018). Many threats made against schools lack context and other key details required to conduct a formal behavioral threat assessment.

## School Mass Shootings

Several studies have examined the perpetrators who actually carry out school mass shootings. One of the largest studies, The Violence Project study of mass shootings, was a 3-year study funded by the National Institute of Justice to build a database of mass public shootings and conduct interviews with mass shooting perpetrators, families, survivors, and first responders (Peterson & Densley, 2021). The Violence Project Database (VPD; Peterson & Densley, 2022) tracks mass shootings in which four or more people were killed in a public space (excluding the perpetrator), where most of the victims were nonfamily members and the shooting was not related to other underlying criminal activity. VPD includes 186 mass shootings perpetrated by 190 mass shooters (in four cases, there were two perpetrators acting together) between 1966 and December 2022, coded on nearly 200 different life history variables (Peterson & Densley, 2022).

There are a total of 15 perpetrators in the database who committed a mass shooting at a K–12 school. All of the school mass shootings in the database were carried out by men or boys, 81% of whom were White (Peterson & Densley, 2022). The median age of those involved in carrying out the attacks was 17. The majority of school mass shootings were carried out by a lone gunman, with just two—Jonesboro in 1998 and Columbine in 1999—carried out by two gunmen. School mass shooters tend to have a connection to the school they target. Thirteen of the 15 school shooters in the database were either current or former students at the school (Peterson & Densley, 2022).

Three quarters (73%) of school mass shooters in VPD had a known history of childhood trauma (i.e., physical, sexual, and emotional abuse; Peterson & Densley, 2022). Most perpetrators (85%) showed signs of a crisis prior to the shooting and 93% were suicidal before the shooting or died by suicide in the shooting (Peterson & Densley, 2022). Most perpetrators (85%) showed a high degree of planning before the shooting, and 64% of school mass shooters showed an interest in previous mass shootings and studied them through online searches, documentaries, or books (Peterson et al., 2023). The most common way for a school mass shooter to obtain a firearm was to take it from a family or friend—21 of 37 guns (58%) were accessed this way (Peterson & Densley, 2022). Other studies of school shooters have found similar results. For example, the National Threat Assessment Center (2019) examined 35 perpetrators of targeted school violence between 2008 and 2017, finding 94% of perpetrators had a history of adverse childhood experiences and 100% had experienced recent stressors.

Research shows a majority of K–12 school shooters communicate violent intent ahead of time, either overtly stating or veiling threats, and this is a crucial intervention point on the pathway to violence (Langman, 2021; Meloy et al., 2014; National Threat Assessment Center, 2019; Peterson & Densley, 2021; Peterson et al., 2021). In VPD (Peterson & Densley, 2022), 14 out of the 15 school mass shooters leaked their plans ahead of time (93%). Of those 14 perpetrators who leaked their plans, six told another person, six posted online, and two wrote it down somewhere else. The most common person they leaked their plans to was a classmate. Other studies have identified leakage 81% of the time among perpetrators of targeted school violence (Vossekuil et al., 2004) and 87% of the time

among perpetrators of the 15 deadliest mass shootings (Lankford et al., 2019).

## Prior Research on Threats of School Violence

Prior research has explored the dynamics of averted school shootings (e.g., Cowan et al., 2022; Madfis, 2020; National Threat Assessment Center, 2021; Rocque et al., 2022) and with funding support from the Community Oriented Policing Services office, the National Police Foundation (2021) maintains an Averted School Violence (ASV) database of completed and ASV narratives from across the country. However, incidents of violence on school grounds not related to the school, cases where the motive or intent to carry out targeted school violence are unclear, and social media threats not deemed credible by law enforcement are excluded from the database. There are 230 cases going back to 1999 in the ASV database—more than 170 averted incidents and over 60 carried-out attacks (National Police Foundation, 2021). Yet, a 2022 analysis of just 43 months of SafeOregon tip line data found 228 tips, which illustrates the size of the existing data gap (Hendrix et al., 2022). In the Oregon study, most were direct threats to shoot up the school made at the school by a male student (Hendrix et al., 2022). Further, threats made while at school were more likely to mention a specific date for the violence, and threats that mentioned a specific date were more likely to elicit a police response.

Behavioral threat assessment is a deductive process to help stop school shootings before they occur (Follman, 2022; NASP School Safety & Crisis Response Committee, 2020; National Threat Assessment Center, 2018; Reddy et al., 2001). It is focused primarily on a person's behavior and communications rather than on specific characteristics, and what they tell us about that person's potential to do harm (Meloy & O'Toole, 2011). Some individuals truly intend violence (known by some in the threat assessment field as "hunters"), while others merely want to threaten or draw attention to themselves ("howlers"), for instance (Calhoun & Weston, 2016). Still, some argue threat assessment may impact the school environment in ways that make it feel unsafe or unwelcoming for students (Kelly, 2018) or it may unduly label students as potential school shooters, thus contributing to the school-to-prison pipeline (Whitaker et al., 2020). While the concept of hunters versus howlers (Calhoun & Weston, 2016) may have some utility in certain contexts; moreover, it may not be an appropriate or effective framework for talking about children in a school setting.

Studies show threat assessment can improve campus climate (Fein et al., 2004; Nekvasil & Cornell, 2015), reduce the use of suspensions and other punitive disciplinary measures for students who receive a threat assessment (Maeng et al., 2020), and increase the use of counseling for said students (Cornell et al., 2012). An analysis of 1,836 threat assessments also found no significant differences in threat assessment outcomes by race, although Black students were referred for threat assessment at a higher rate than White students (Cornell et al., 2018).

One of the reported benefits of threat assessment is that it can help create alternatives to arrest in the case of school threats (Maeng et al., 2020), such as diversion, which involves redirecting the individual who made the threat away from the criminal justice system and toward other interventions, such as counseling or mental health treatment. This approach recognizes that many individuals who make threats may be struggling with underlying mental health or emotional issues, and that addressing these issues may be more effective in preventing future harm than simply punishing the individual (Peterson et al., 2021). Other alternatives to arrest may include restorative justice practices or empathy training, which aim to repair harm and restore relationships between individuals (van Berkhout & Malouff, 2015), or community-based interventions, such as mentoring or job training programs. An open question explored in this research is just how often these alternatives to arrest are used in response to school shooting threats.

## Method

A series of daily Google News alerts were set up to identify news reports that contained the phrases "school shooting threat," "school threat," "school shooting," and "school shooter." Everyday, for 4 years, all media reports published in the United States referring to a school threat were reviewed by a trained research assistant. While using open-source media reports for

primary data collection has limitations, there is no government agency that collects, tracks, or publishes reports on school shooting threats. Threats of a school shooting were entered into the database if they met the following criteria: occurred at a K–12 school (i.e., threats to colleges and universities were excluded), occurred in the United States (i.e., international threats were excluded), and threatened a school shooting (i.e., bomb threats or general threats of violence were excluded). Threats were tracked for a 4-year period that covered academic years 2018–2019, 2019–2020, 2020–2021, and 2021–2022. The study was deemed exempt by the institutional review board at Hamline University because it only used publicly available information and there was no risk to human subjects.

## Data Coding

Each threat was coded on variables related to where it occurred (school name, city, state, region, urbanicity, type of school, enrollment, public, or private), when the threat occurred (day, month, year, weekday, time of day), the person who made the threat (gender, race, age, relationship to school, access to a gun, outcome from making the threat, criminal charges), and the threat itself (how it was made, whom it was made to, the specific language used, type of threat—joke or real). For example, a fifth-grade student in Florida was arrested for texting his friends a picture of ArmaLite rifle (AR-15) rifles that he claimed to purchase after scamming a classmate out of a billion dollars (Robinson, 2022). The article includes the name and geographic information for the school, when and how the threat was made, and a description of the threat: "boy texted someone pictures of cash and four AR-15 rifles." The article also includes demographic information about the student who made the threat, the outcome (arrest), and the fact that the statement was intended as a joke because the 10-year old did not have 1 billion dollars in cash or four AR-15 rifles.

Ten advanced undergraduate students were trained on the variables and codebook. Five reliability cases were initially coded by all research assistants to check the utility of the codebook and discuss any coding discrepancies. Each case was coded initially by one research assistant and then double checked by a different coder. Basic frequency data were analyzed using SPSS.

## Text and Sentiment Analysis

Text mining, examination, and sentiment analysis were also conducted using R (R Core Team, 2022) in this study. First, the threats were cleaned (i.e., punctuation removed, whitespace removed) and a corpus was constructed. Next, the corpus was used to create a term-document matrix that describes the frequency of term usage that occurs throughout the threat corpus. The term-document matrix was then used to assess word frequency to reflect the significance of a word throughout the threat collection and develop term association linkage networks using the count-based evaluation methods in the text mining architecture of the "tm" package (Feinerer et al., 2008).

Next, text-based sentiment analysis was performed on the corpus using two different functions integrated from the "syuzhet" package (Jockers, 2020). The "syuzhet" package provides four sentiment dictionaries with crowdsourced lexicons developed by the National Resource Council Canada for sentiment extraction of text strings (Jockers, 2020). The first approach utilized in this work measured the sentiment valence (from positive to negative) of the threat text strings using a dictionary approach (Jockers, 2020). Each threat was assigned a continuous score within a range from a minimum negative value (−6) to a maximum positive value (+6) for the sentiment valence of the string. The second approach consisted of categorical classifications of the threat text strings into the following sentiment classes: anger, anticipation, disgust, fear, joy, sadness, surprise, trust, negative, and positive.

Both approaches for sentiment analysis rely on lists of words and phrases with positive and negative connotations. Examination of valence shifter, that is, negators, amplifiers (intensifiers), deamplifiers (downtoners), and adversative conjunctions, presence was conducted using functions provided by the "sentiment" package (Rinker, 2021). Valence shifters are significant since their occurrence affects the polarization of words in the threats, ultimately changing the meaning of the statement. Additionally, the equation used by the "syuzhet" package algorithm to assign value to the polarity of each sentence first utilizes a sentiment dictionary to tag and account for polarized words (Jockers, 2020).

### Data Analysis

Finally, the similarity of the threats was examined using functions within the "stringdist" package (van der Loo, 2014). Pairwise string distances between all threats were calculated using Jaro–Winkler distance, a string metric used for the measurement of edit distance between two sequences. Edit distance is commonly used in natural language processing as a metric or way of quantifying how dis/similar two strings are by counting the minimum number of operations needed to transform one string into the other (Winkler, 1990). Using the computed Jaro–Winkler distance, a dendrogram was developed to demonstrate the hierarchical clustering of the threats, outlining which threats are most similar in their construction.

## Results

### Schools Receiving Threats

The most common states for threats to occur in this sample were Florida (13.4% of threats) and California (9.8% of threats), but it is worth noting that Florida and California are two of the three largest states by population. Threats were mostly likely in the South (40.4%), followed by the Midwest (22.8%), West (20.5%), and Northeast (16.3%). Threats were more likely at suburban schools (55.9%) than urban (21.0%) or rural schools (23.1%). Enrollment at schools receiving the threats ranged from 41 to 4,788 with a mean of 1,247 students. In total, 98% of threats were made to public schools. Of the schools receiving the threats, 4.6% were elementary schools, 22.8% were middle schools, 62.5% were high schools, and 10.1% were a combination of grades.

### Timing of Threats

A total of 1,038 threats had enough information available to be included in this analysis. Only threats that took place during the school year between September and June when students were on campus were analyzed. Table 1 shows the number of threats by academic year. The fewest threats took place in the 2020–2021 academic year while most students were attending school virtually owing to the COVID-19 pandemic (5.7%). Upon return to the classroom, the 2021–2022 academic year had the largest number of threats (61.7%).

**Table 1**
*Prevalence of School Shooting Threats by Year*

| School year | Frequency | % of threats |
|---|---|---|
| 2018–2019 | 186 | 17.9 |
| 2019–2020 | 153 | 14.7 |
| 2020–2021 | 59 | 5.7 |
| 2021–2022 | 640 | 61.7 |
| Total | 1,039 | 100.0 |

The most common months for threats to occur were transitional months in the school year: December (21.4%), September (13.6%), October (12.8%), and January (11.7%). Threats were mostly likely to occur on Mondays (19.1%) and Thursdays (19.9%). Of cases where the time of day was known, 60% of threats took place during the school day.

### Nature of the Threats

Threats were most commonly made online (see Table 2). Of cases with known data (78.7%), threats were specific (specified a school shooting threat) 42.1% of the time and nonspecific 57.9% of the time. In total, 28.9% of threats were determined to be genuine, while 31.5% were jokes or hoaxes. However, it was most often unclear if the threat was a real/credible threat or a joke/hoax because in 40% of cases, the nature of the threat was unknown.

### Individuals Making Threats

Threats were most commonly made by a specific person (67.4%), as opposed to anonymous threats (28.8%) or threats coming from fake

**Table 2**
*Types of School Shooting Threats*

| Mode | Frequency | Percentage |
|---|---|---|
| In person | 136 | 13.1 |
| Letter | 11 | 1.1 |
| Other writing | 103 | 9.9 |
| Phone/text | 123 | 11.8 |
| Online/social media | 538 | 51.8 |
| Anonymous tip | 19 | 1.8 |
| Other | 23 | 2.2 |
| Total | 953 | 91.8 |

online accounts (3.8%). Of cases with information available (80.6%), threats were most often made by a current student (63.6%), followed by anonymous threats (23.7%), someone unaffiliated with the school (9.6%), a former student (2.4%), or teacher (0.8%—seven cases).

Of cases with information available (only 41.7% of cases), the person making the threat was usually male (82.7%), but threats in 17.3% of known cases came from females. The racial background was only able to be coded in 7.2% of cases using publicly available records. The age of the person making the threat ranged from 5 to 70 with a mean of 16.8 (Figure 1). The vast majority (75.8%) of individuals who made threats were minors under the age of 18.

The individual making the threat had known access to a firearm in 8.6% of cases, no access to a gun in 16.5% of cases, and in the majority of cases it was unclear whether or not the person making the threat had access to a gun (74.9%). For 78.5% of cases with known outcome data, the most common outcome was an arrest of the person making the threat (63.7% of cases). The person making the threat was not found in 16.4% of cases. The case was investigated and dismissed in 12.1% of cases and there was some other type of intervention in 7.7% of cases.

In cases where an arrest was made, individuals were charged with a felony, a crime of high seriousness, 87.0% of the time. Of the 44 threats that occurred at elementary schools, arrest was still the most common outcome (students were arrested in 24 cases).

## Threat Text Analysis

For this analysis, to be as inclusive as possible, language was also used from the 99 cases where the threat took place outside of the regular school year, over the summer. There were 396 cases where the exact language of the threat was publicly available and examined in this study. Evaluation of word usage throughout the threat archive was completed using the term-document matrix. A bar plot of the most frequently used words is given in Figure 2. The terms "school" and "shoot" were most frequently used in the threats. The terms "tomorrow" and "Monday" were also among the most utilized words, speaking to the timing of the threat relative to the commission of the incident. The word frequencies are further exhibited through word clouds in Figure 3.

Next, the most frequent words from the term-document matrix were examined to determine if their occurrence was correlated with one another.

**Figure 1**
*Age of the Individual Making the Threat*

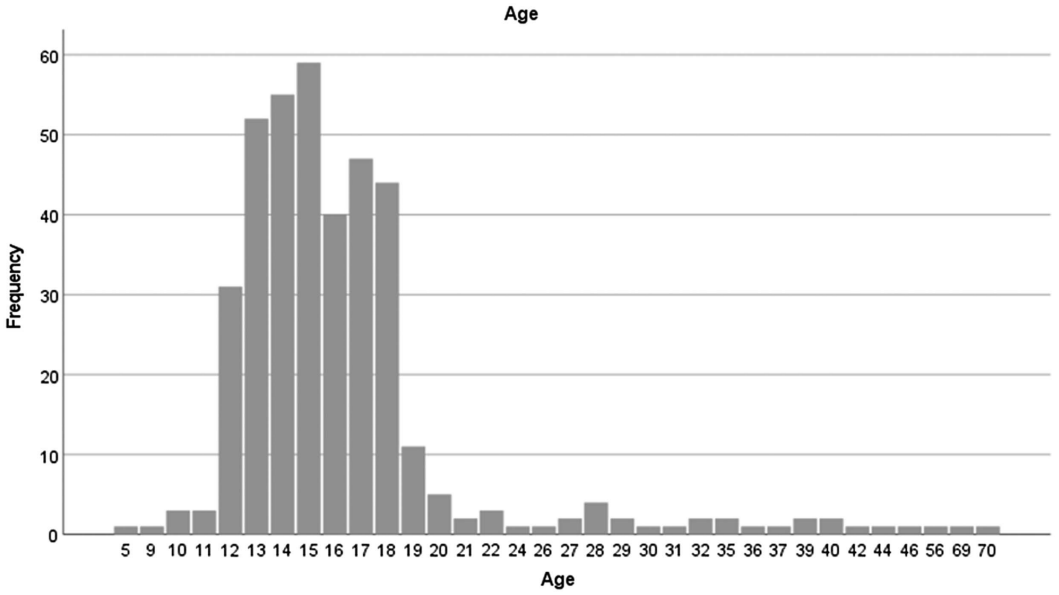
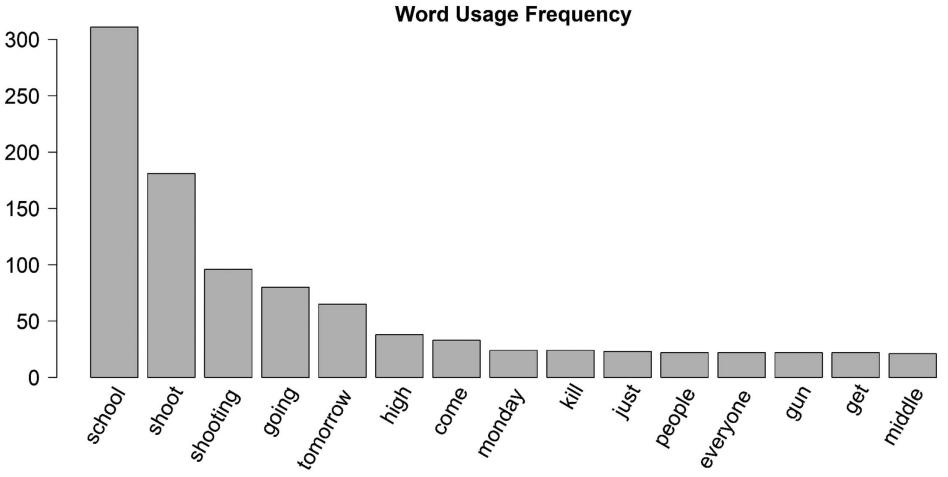
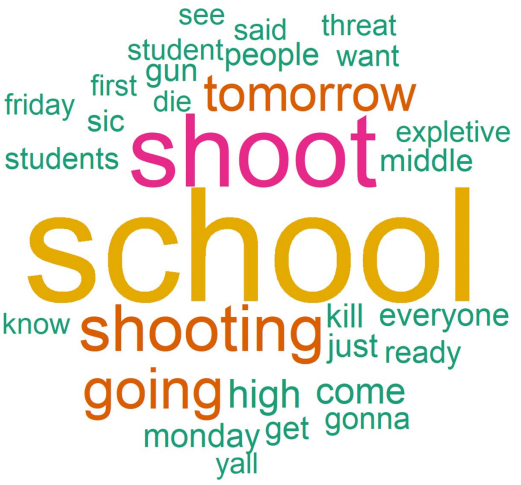


**Figure 2**
*Word Usage Frequencies in the Constructed Term-Document Matrix; Most Frequent Terms Shown*




A network was created using terms that were correlated as occurring together within the threats. A plot of the term-document matrix which visualizes the correlations over 0.5 between frequent terms is given in Figure 4. Note that terms that occur in combination more often have thicker edges connecting the terms in Figure 4. Overall, the term "school" is the most utilized and connected term across the content, as evidenced by the thicker edges originating at that node. Additionally, the word "kill" is used less frequently (<40 occurrences); however, it is also highly connected with the other terms when utilized.

**Figure 3**
*Word Cloud Constructed From the Term-Document Matrix Where Size and Color Indicate Relative Occurrence*

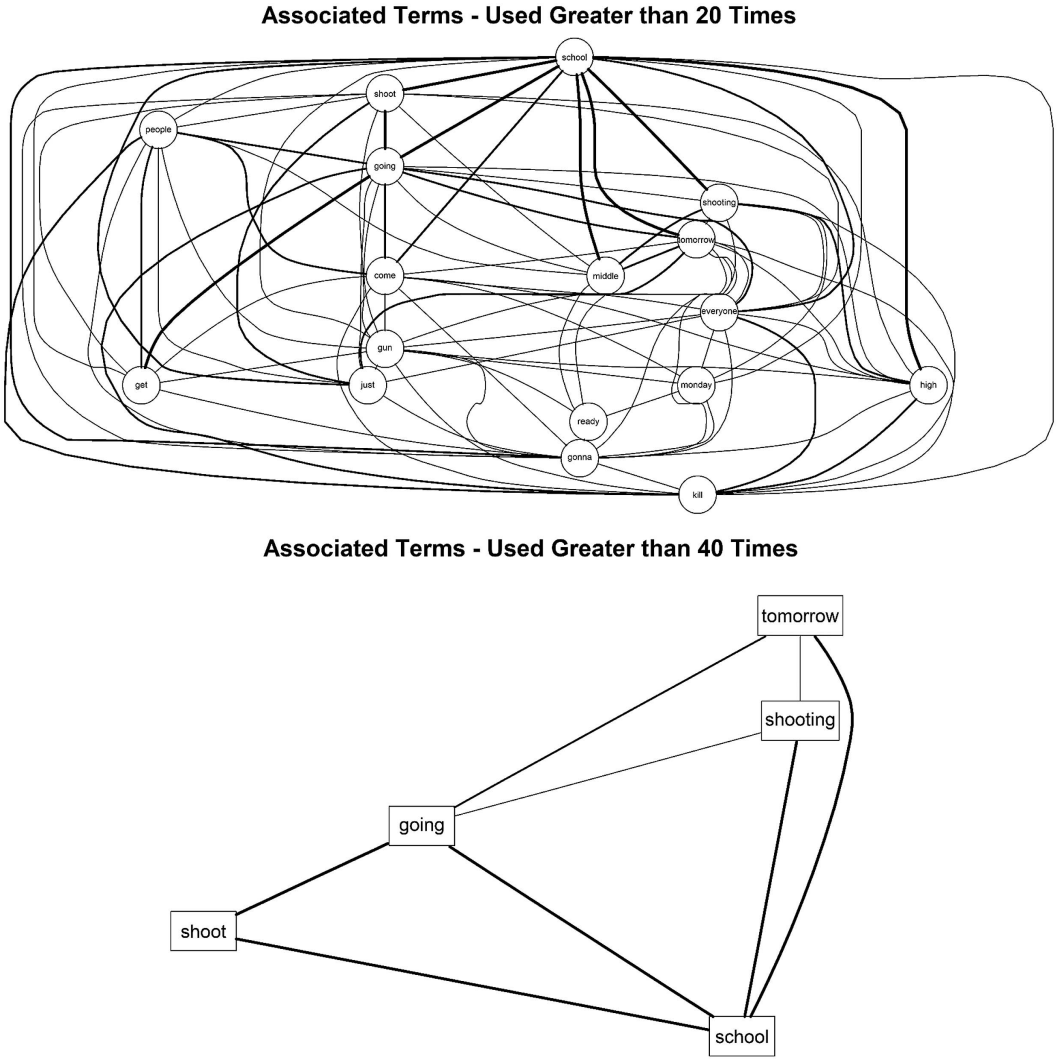



*Note*. See the online article for the color version of this figure.

Another important aspect of the content is the sentiment of the threats. The sentiment extraction and analysis were performed using the algorithm and lexicons developed by the National Research Council. The categorical sentiment classifications of the threats are provided in Figure 5. The highest sentiment detected was "negative"; however, "fear" and "anger" were the highest emotions detected in the threats. Both "negative" and "anger" would be expected; however, the high frequency of fear extracted from the data is somewhat surprising. The reason that "fear" returned such a high score was due to the usage of the words "kill" and "killing," both of which have very high emotion intensity scores within the National Research Council lexicon of 0.962 and 0.906, respectively. In the context of a school shooting threat, these terms would be expected to be associated with "negative" sentiment and "anger" emotion, which is shown, but is also inflating the "fear" emotion frequency as detected by the algorithm. Another key finding is the high emotion associated with "trust" in the data. Very few of the terms associated with "trust" in the lexicon were present in the threat data, which would indicate that the individual was writing in a polarizing manner. For example, one threat

**Figure 4**

*Word Association Networks From the Term-Document Matrix by Words Used Greater Than 20 Times (Top) and 40 Times (Bottom)*

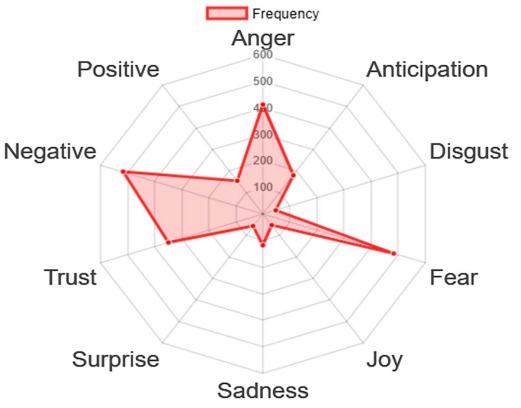



*Note*. The linkages depict terms used concurrently in threats.

included all of the following: "infiltrate the school from all entrances," "start little by little killing people," "should probably steal the teachers' vehicles," and "have good armor so we would not die." illustrates an array of sentiment and emotion. In this case, the following sentiment and emotion scores were computed: anger—3, anticipation—4, disgust—0, fear—5, joy—1, sadness—4, surprise—2, trust—3, negative—4, and positive—2. Most notable in this threat are the scores for "anticipation" and "surprise" while demonstrating "anger," "disgust," and "negative" emotion/sentiment. This trend of many different emotions was observable throughout the threats.

Additionally, the sentiment was evaluated by valence by using a dictionary approach where each threat was assigned a continuous score (from −6 to +6). A sentiment score was calculated for each threat and the scores were aggregated into a histogram given in Figure 6. The analyses suggest

**Figure 5**
*Text-Based Sentiment Analysis by National Resource Council Sentiment Type for All Content*




*Note.* See the online article for the color version of this figure.

that on average, threats were characterized with neutral sentiment with some skew to the negative valence. The combination of sentiments and emotions lead to approximately 12% of the data demonstrating text polarity within the sentiment valence. Of these polarized strings, 14% demonstrated a negator and an additional 11% demonstrated an amplifier. A negator flips the sign of a polarized word (e.g., "I do not like it"), whereas an amplifier or intensifier increases the impact of a polarized word (e.g., "I really like it"; Rinker, 2021).

Finally, the threats were examined to determine pairwise similarity through the calculation of Jaro–Winkler distance, or the number of transformations required to convert one string to another. Using these distances, threats could be associated with their closest neighbors hierarchically. The diagrammatic representation of the hierarchical clustering of the threats is given as a dendrogram in Figure 7. Furthermore, rectangles were added to the dendrogram around branches to highlight corresponding clusters of threats. The largest cluster of threats is given as an excerpt in Figure 7 (bottom) to demonstrate the lowest level of association among the threats.

## Discussion

This exploratory study looked at approximately 1,000 threats over a 4-year academic period, prepandemic, during the pandemic when many schools were closed, and postpandemic when schools reopened. Text analysis identified words indicating the specificity of a threat (i.e., tomorrow and Monday) and showed threats tended to be both negative and angry. The majority of individuals who make school shooting threats are male students at large public high schools, which is consistent with those who perpetrate mass shootings at K–12 schools (Peterson & Densley, 2021). However, those who threatened shootings in this study were a more diverse population than actual shooting perpetrators in that they are a wider variety of ages (as young as Age 5 and as old as 70, Figure 1) and nearly one fifth were female. Perpetrators of school mass shootings tend to be older teenage

**Figure 6**
*Average National Resource Council Sentiment by Threat*

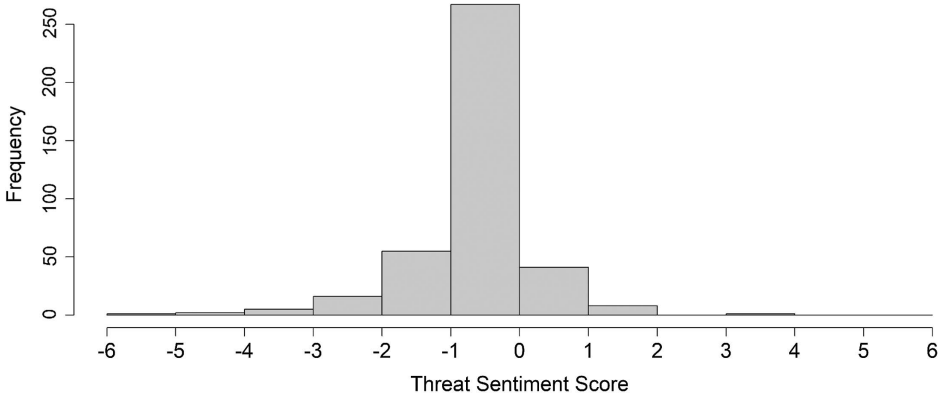
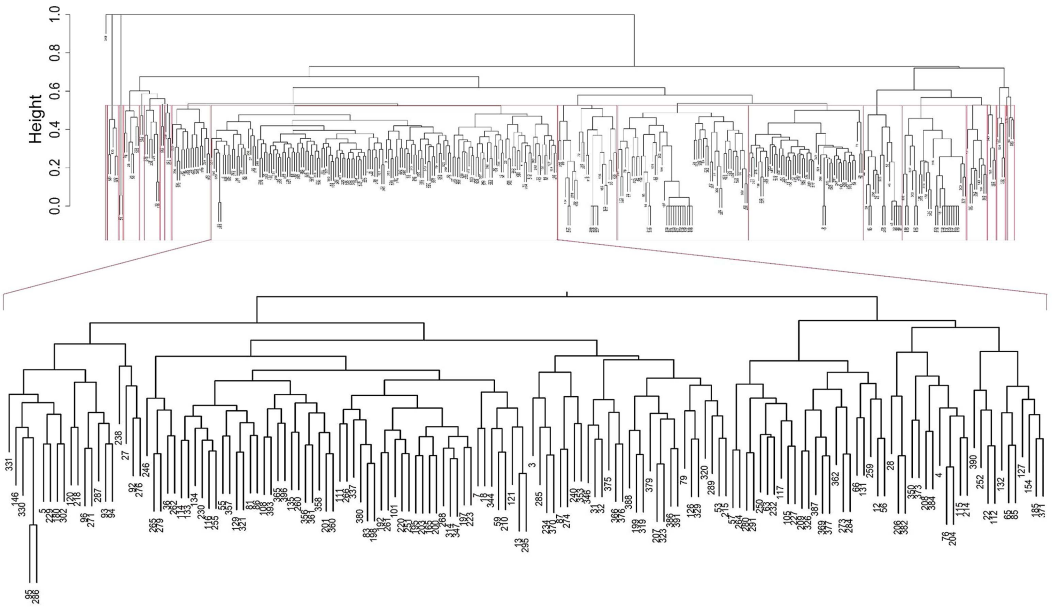


**Figure 7**
*Dendogram of Threats by Threat Index*




*Note*. Complete dendrogram (Top) of threats by threat index illustrating the arrangement of the hierarchical clusters produced through Jaro–Winkler distance analysis. A subset (Bottom) is also provided to illustrate the clustering of threats at lower levels of the dendrogram. See the online article for the color version of this figure.

current or former students of the school, and they are 100% male (Peterson & Densley, 2021).

There was a large jump in school shooting threats after the pandemic—a 985% increase in 2021/2022 from 2020/2021, and a 244% increase in 2021/2022 compared to prepandemic rates. Although in 40% of cases, it was unclear if the threat was real or a joke/hoax, the most common outcome was to arrest the individual making the threat and charge them with a felony. Felony charges result in lifelong consequences and juvenile justice involvement is a strong correlate to future adult offending (Gatti et al., 2009). For these reasons, the long-term impact of bringing criminal charges against students for obvious jokes/hoaxes needs further evaluation.

## Limitations

This study is one of the first to examine over 1,000 threats of school violence quantitatively, but it has several limitations. One significant potential limitation of this study is that the sample was restricted to media reports, which may not necessarily reflect the full scope and nature of school shooting threats. It is likely only the most serious or egregious threats that result in arrests make the news, thus biasing results. Schools likely quietly handle thousands of threats of shootings that do not make the news, making the totality of threats difficult to study. The study also relied exclusively on publicly available information reported by the media. Even when a case is reported by the media, often little information is available (such as the race and age of the person making the threat), especially because most people making threats are students at the school who are underage.

The rise of shooting threats in recent years may also be an artifact of social media lowering the threshold for posting threats of violence in some cases (Peterson et al., 2023). Social media has become an increasingly important platform for communication and information sharing, and it is possible that it has impacted the prevalence and nature of school shooting threats. Social media platforms provide a quick and easy way for people to communicate and share content with a wide audience, and this can create a sense of anonymity and detachment that may make it more

likely for some people to post threatening or aggressive content (for a review, see Peterson & Densley, 2017). In addition, social media can also create a sense of immediacy and urgency, which may make it more tempting for some people to post threats or other types of aggressive content in the heat of the moment, without fully considering the consequences.

## Implications for Research

The process of identifying, evaluating, and responding to potential threats of violence in schools is complicated. An exploratory study such as this can help generate hypotheses for further and necessary research on school shooting threats. One important area of research is to identify patterns and motivations that may differentiate between those who carry out school mass shootings and those who merely threaten them. This information can help to inform law enforcement and school officials on how to respond to threats and develop effective prevention strategies. For instance, if the data show that those who threaten school shootings are often motivated by a desire for attention online, then interventions that focus exclusively on providing mental health support and treatment in person may not be effective in preventing future incidents.

This study hints at the use of natural language processing techniques to analyze the text of a threat and identify keywords or phrases that might indicate a high level of credibility or risk. Future research should further explore the potential for artificial intelligence (AI) to analyze the specificity and severity of violent threats to determine credibility, focusing on the context in which the threat was made, such as the location, the relationship between the person making the threat and the intended target, and any other relevant factors. Future research is needed using larger data sets, but the findings here suggest that AI is likely to be most effective when used as part of a larger system that includes human expertise and judgment. For example, AI might be used to help prioritize and triage threats, but it would be up to a team of trained professionals to assess the risk based on the individual circumstances of the student in question.

At the same time, generative AI like chat Generative Pre-Training Transformer could empower people to craft well-written, automated, and coordinated threats that are harder for school officials to decode and dismiss. To this end, more research is needed into the reasons why students make threats of school shootings with no intention to follow through. Perhaps threats are a way to gain attention or notoriety or to copy or emulate others who have carried out similar attacks in the past. If so, research is needed to identify the appropriate threat response for students or school staff, especially in cases where the threat has been determined to be a joke or a hoax. Research is also needed into what types of programming could prevent this behavior among students. Or perhaps a threat is a cry for help and an early indication of risk, providing a key moment for holistic and individualized intervention.

## Implications for Practice

The results of this study are consistent with other reports of a marked rise in school shooting threats after the pandemic (Yousef, 2022). Prior research has found that threats of school shootings that are leaked online or to other people are often a "cry for help" correlated with prior counseling and suicide attempts (Peterson et al., 2021). The pandemic had devastating effects on the mental health and well-being of students (Sparks, 2022). A nationally representative survey of high school students conducted by the Center for Disease Control and Prevention in 2021 found that 37% of high school students reported they experienced poor mental health, 44% reported they persistently felt sad or hopeless, and 55% experienced emotional abuse by a parent in the home (Center for Disease Control and Prevention, 2022). At the same time, access to firearms increased as U.S. state gun laws became more permissive and the United States saw a historic spike in gun sales during the pandemic (Helmore, 2021).

In this context, the most common response to threats in the data was to arrest and criminally charge the student. It is important to carefully weigh the risks and benefits of this approach. A punitive response may make students less likely to report concerns about their classmates. This can make it more difficult to identify and intervene in cases of potential violence. Furthermore, a punitive response can intensify feelings of crisis and suicidality for the student making the threat, while intensifying feelings of anger and grievance toward the school. Students may be more likely to deny or cover up their

actions, which can make it more difficult to identify and address future threats of violence.

Approaches such as Fixated Threat Assessment Centers in Britain may be a promising approach, where threats are assessed using a team of both police and mental health professionals, and a diversion approach is taken to avoid punitive responses and improve access to necessary care and resources (Barry-Walsh et al., 2020).

With so many threats coming from so many different angles, a national crisis hotline that functions much like the national poison control number (staffed 24 hr a day, 7 days a week, free and confidential) could help triage a variety of threats and provide immediate support and intervention to those in need. Individuals who may be contemplating violent actions could be identified and connected with the appropriate resources. Several states, such as Colorado, Ohio, and Pennsylvania, have established versions of a crisis hotline. A national crisis hotline would provide a centralized location for such reports to be made, ensuring that they are promptly and appropriately addressed as well as tracked over time. Additionally, laws requiring schools to report all threats to a centralized agency for assessment and tracking will help improve our understanding and create more research opportunities.

## Conclusion

Threats of violence can have serious consequences for the safety and well-being of students, teachers, and other school staff. They can have a significant impact on the overall learning environment, as well as on the physical and mental health of a community. By understanding the characteristics of threats and the factors that may contribute to their occurrence, researchers can develop strategies and interventions to prevent violence from occurring and keep schools safe. Research that compares people who perpetrate school mass shootings with those who threaten them but do not carry them out is crucial to inform prevention and intervention efforts. The findings of this study provide some initial evidence that those who threaten school shootings are a more diverse group than the perpetrators who carry out school mass shootings—the question for future research is why? More information is needed about the backgrounds of students who threaten shootings on a large-scale level to be statistically analyzed to provide data-driven recommendations for threat assessment and management.

## References

Barry-Walsh, J., James, D. V., & Mullen, P. E. (2020). Fixated threat assessment centers: Preventing harm and facilitating care in public figure threat cases and those thought to be at risk of lone-actor grievance-fueled violence. *CNS Spectrums*, *25*(5), 630–637. https://doi.org/10.1017/S1092852920000152

Brenan, M. (2022, September 1). Parent, student school safety concerns elevated. *Gallop*. https://news.gallup.com/poll/399680/parent-student-school-safety-concerns-elevated.aspx

Brooks, L., & Brown, E. (2022, November 30). Experts talk school safety measures in the wake of Oxford shooting. *WILX 10*. https://www.wilx.com/2022/11/30/experts-talk-school-safety-measures-wake-oxford-shooting/

Calhoun, F. S., & Weston, S. W. (2016). *Threat assessment and management strategies: Identifying the howlers and hunters*. Routledge. https://doi.org/10.1201/b19689-2

Center for Disease Control and Prevention. (2022, March 31). *New CDC data illuminate youth mental health threats during the COVID-19 pandemic*. https://www.cdc.gov/media/releases/2022/p0331-youth-mental-health-covid-19.html

Cornell, D., Allen, K., & Fan, X. (2012). A randomized controlled study of the Virginia student threat assessment guidelines in grades K-12. *School Psychology Review*, *41*(1), 100–115. https://doi.org/10.1080/02796015.2012.12087378

Cornell, D., Maeng, J. L., Burnette, A. G., Jia, Y., Huang, F., Konold, T., Datta, P., Malone, M., & Meyer, P. (2018). Student threat assessment as a standard school safety practice: Results from a statewide implementation study. *School Psychology Quarterly*, *33*(2), 213–222. https://doi.org/10.1037/spq0000220

Cowan, R., Tedeschi, P., Corbin, M., & Cole, R. (2022). A mixed-methods analysis of averted mass violence in schools: Implications for professional school counselors. *Psychology in the Schools*, *59*(4), 817–831. https://doi.org/10.1002/pits.22647

Cox, J. W. (2021). *Children under fire: An American crisis*. Ecco.

Elamroussi, A. (2021, December 4). The shooter "methodically and deliberately" fired at students. A timeline of a school shooting tragedy. *CNN*. https://www.cnn.com/2021/12/04/us/michigan-oxford-high-school-shooting-timeline/index.html

Fein, R., Vossekuil, B., Pollack, W., Borum, R., Modzeleski, W., & Reddy, M. (2004). *Threat*

*assessment in schools: A guide to managing threatening situations and to creating safe school climates*. U.S. Secret Service, U.S. Department of Education.

Feinerer, I., Hornik, K., & Meyer, D. (2008). Text mining infrastructure in R. *Journal of Statistical Software*, *25*(5), 1–54. https://doi.org/10.18637/jss.v025.i05

Follman, M. (2022). *Trigger points*. Dey Street.

Gatti, U., Tremblay, R. E., & Vitaro, F. (2009). Iatrogenic effect of juvenile justice. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *50*(8), 991–998. https://doi.org/10.1111/j.1469-7610.2008.02057.x

Helmore, E. (2021, May 31). *U.S. gun sales spiked during pandemic and continue to rise*. The Guardian. https://www.theguardian.com/us-news/2021/may/31/us-gun-sales-rise-pandemic

Hendrix, J. A., Planty, M. G., & Cutbush, S. (2022). Leakage warning behaviors for mass school violence: An analysis of tips reported to a state school safety tip line. *Journal of Threat Assessment and Management*, *9*(1), 33–51. https://doi.org/10.1037/tam0000171

Jacobo, V. (2022, October 20). Multiple alleged "swatting calls" of false active shooters made across southeastern Wisconsin school districts. *KTVZ*. https://ktvz.com/news/2022/10/20/multiple-alleged-swatting-calls-of-false-active-shooters-made-across-southeastern-wisconsin-school-districts/

Jockers, M. (2020, October 29). *Extracts sentiment and sentiment-derived plot arcs from text*. Cran. https://cran.r-project.org/web/packages/syuzhet/syuzhet.pdf

Kelly, S. R. (2018). The school psychologist's role in leading multidisciplinary school-based threat assessment teams. *Contemporary School Psychology*, *22*(2), 163–173. https://doi.org/10.1007/s40688-017-0153-y

Langman, P. (2021). *Warning signs: Identifying school shooters before they strike*. Langman Psychological Associates.

Lankford, A., Adkins, K. G., & Madfis, E. (2019). Are the deadliest mass shootings preventable? An assessment of leakage, information reported to law enforcement, and firearm acquisition prior to attacks in the United States. *Journal of Contemporary Criminal Justice*, *35*(3), 315–341. https://doi.org/10.1177/1043986219840231

Madfis, E. (2020). *How to stop school rampage killing: Lessons from averted mass shootings and bombings*. Palgrave Macmillan Cham. https://doi.org/10.1007/978-3-030-37181-4

Maeng, J., Cornell, D., & Huang, F. (2020). Student threat assessment as an alternative to exclusionary discipline. *Journal of School Violence*, *19*(3), 377–388. https://doi.org/10.1080/15388220.2019.1707682

Meloy, J. R., Hoffmann, J., Roshdi, K., & Guldimann, A. (2014). Some warning behaviors discriminate between school shooters and other students of concern. *Journal of Threat Assessment and Management*, *1*(3), 203–211. https://doi.org/10.1037/tam0000020

Meloy, J. R., & O'Toole, M. E. (2011). The concept of leakage in threat assessment. *Behavioral Sciences & the Law*, *29*(4), 513–527. https://doi.org/10.1002/bsl.986

NASP School Safety and Crisis Response Committee. (2020). *Behavior threat assessment and management: Best practice considerations for K-12 schools, brief overview*. National Association of School Psychologists.

National Association of State Boards of Education. (2022). *State police database: Threat assessment*. https://statepolicies.nasbe.org/health/categories/physical-environment/threat-assessment

National Center for Education Statistics. (2018). *What are threat assessment teams and how prevalent are they in public schools?* https://nces.ed.gov/blogs/nces/post/what-are-threat-assessment-teams-and-how-prevalent-are-they-in-public-schools

National Center for Education Statistics. (2022). *Enrollment in public elementary and secondary schools, by level, grade, and state or jurisdiction, Fall 2021*. https://nces.ed.gov/programs/digest/d22/tables/dt22_203.40.asp

National Police Foundation. (2021). *Averted school violence (ASV) database: 2021 analysis update*. Office of Community Oriented Policing Services.

National Threat Assessment Center. (2018). *Enhancing school safety using a threat assessment model: An operational guide for preventing targeted school violence*. U.S. Secret Service, Department of Homeland Security.

National Threat Assessment Center. (2019). *Protecting America's schools: A U.S. Secret Service analysis of targeted school violence*. U.S. Secret Service, Department of Homeland Security.

National Threat Assessment Center. (2021). *Averting targeted school violence: A U.S. Secret Service analysis of plots against schools*. U.S. Secret Service, Department of Homeland Security.

Nekvasil, E., & Cornell, D. (2015). Student threat assessment associated with positive school climate in middle schools. *Journal of Threat Assessment and Management*, *2*(2), 98–113. https://doi.org/10.1037/tam0000038

New, B. (2022, November 18). Texas schools received more than 67,000 "threat reports" last year. *CBS News*. https://www.cbsnews.com/dfw/news/texas-schools-received-more-than-67000-threat-reports-last-year/

Peterson, J., & Densley, J. (2017). Cyber violence: What do we know and where do we go from here?

*Aggression and Violent Behavior*, *34*, 193–200. https://doi.org/10.1016/j.avb.2017.01.012

Peterson, J., & Densley, J. (2021). *The violence project: How to stop a mass shooting epidemic*. Abrams Press.

Peterson, J., & Densley, J. (2022). *The violence project database of mass shootings in the United States*. https://www.theviolenceproject.org/mass-shooter-database/

Peterson, J., & Densley, J. (2023, March 28). Opinion: Crumbley parents lose their appeal. Why that could be a game changer on school shootings. *CNN*. https://www.cnn.com/2023/03/28/opinions/school-shooting-crumbley-parents-trial-peterson-densley/index.html

Peterson, J., Densley, J., Spaulding, J., & Higgins, S. (2023). How mass public shooters use social media: Exploring themes and future directions. *Social Media + Society*, *9*(1). https://doi.org/10.1177/20563051231155101

Peterson, J., Erickson, G., Knapp, K., & Densley, J. (2021). Communication of intent to do harm preceding mass public shootings in the United States, 1966–2019. *JAMA Network Open*, *4*(11), Article e2133073. https://doi.org/10.1001/jamanetworkopen.2021.33073

R Core Team. (2022). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. https://www.R-project.org/

Reddy, M., Borum, R., Berglund, J., Vossekuil, B., Fein, R., & Modzeleski, W. (2001). Evaluating risk for targeted violence in schools: Comparing risk assessment, threat assessment, and other approaches. *Psychology in the Schools*, *38*(2), 157–172. https://doi.org/10.1002/pits.1007

Riedman, D. (2023). *Incidents per year 1970–2022* [Database record]. K-12 school shooting database. https://k12ssdb.org

Riedman, D., Densley, J., & Peterson, J. (2021, December 20). *School closures are costly caution—But are still not enough to prevent tragedies*. Star Tribune. https://www.startribune.com/school-closures-are-costly-caution-but-are-still-not-enough-to-prevent-tragedies/600128982/

Rinker, T. (2021, October 13). *sentimentr: Calculate text polarity sentiment* (Version 2.9.0). GitHub. https://github.com/trinker/sentimentr

Robinson, C. (2022). *Arrest report: Florida 10-year-old texted picture of AR-15 rifles, said "get ready"*. The Associated Press. https://www.wesh.com/article/florida-child-school-shooting-threat/40150970#

Rocque, M., Gerdes, M., Fox, J. A., Duwe, G., & Clark, M. (2022). Averting tragedy: An exploration of thwarted mass public shootings relative to completed attacks. *Criminal Justice Review*. Advance online publication. https://doi.org/10.1177/07340168221117107

Sparks, S. (2022, January 18). New research shows how bad the pandemic has been for student mental health. *Education Week*. https://www.edweek.org/leadership/new-research-shows-how-bad-the-pandemic-has-been-for-student-mental-health/2022/01

van Berkhout, E., & Malouff, J. M. (2015). The efficacy of empathy training: A meta-analysis of randomized controlled trials. *Journal of Counseling Psychology*, *63*(1), 32–41. https://doi.org/10.1037/cou0000093

van der Loo, M. P. J. (2014). The stringdist package for approximate string matching. *The R Journal*, *6*(1), 111–122. https://doi.org/10.32614/RJ-2014-011

Vossekuil, B., Rein, R. A., Reddy, M., Borum, R., & Modzeleski, W. (2004). *The final report and findings of the Safe School Initiative: Implications for the prevention of school attacks in the United States*. U.S. Secret Service, United States Department of Education.

WABI News Desk. (2022, November 15). Multiple Maine schools report threats Tuesday. *WABI 5*. https://www.wabi.tv/2022/11/15/multiple-maine-schools-report-threats-tuesday/

Whitaker, A., Torres-Guillén, S., Morton, M., Jordan, H., Coyle, S., Mann, A., & Sun, W. (2020). *Cops and no counselors: How the lack of school mental health staff is harming students*. American Civil Liberties Union. https://www.aclu.org/sites/default/files/field_document/030419acluschooldisciplinereport.pdf

Winkler, W. E. (1990). *String comparator metrics and enhanced decision rules in the Fellegi-Sunter model of record linkage*. Education Resources Information Center. https://files.eric.ed.gov/fulltext/ED325505.pdf

Yousef, O. (2022, October 7). False calls about active school shooters are rising. Behind them is a strange pattern. *NPR*. https://www.npr.org/2022/10/07/1127242702/false-calls-about-active-shooters-at-schools-are-up-why

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