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Review

Definitional Discrepancies: Defining "School Shootings" and Other Incidents of Gunfire Affecting Schools

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Abstract: The current review explores multiple definitions of school shootings used by myriad data collection platforms and by various scholars. Importantly, the impacts of definitional discrepancies on inclusion criteria, data divergence, research, policy, and public perception are discussed at length. The review concludes with a call to Criminologists and school gun violence scholars to better collaborate on what should be considered a "school shooting" and lists five benefits that may result from modifying school gun violence definitions and data collection methodologies.

Keywords: school shootings; school gun violence; data accuracy; data collection; data methodology

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1. Introduction

In America, the term "school shooting" has come to symbolize a specific type of incident, solidified by incredibly violent and tragic events like those at Columbine, Sandy Hook, and Parkland. Through the 24 h news cycle, related media outlets, videos, news stories, interviews, and minute-by-minute situational updates, these types of incidents have imbedded themselves in popular consciousness as the quintessential "school shooting". This repetitive cycle has produced a generalized narrative of what a school shooting is, and more specifically, what it looks like. Such narratives tend to follow the theme of one of the worst shootings on record—Columbine—wherein two disgruntled teens stormed their local high school with a multitude of guns and homemade explosives. The perpetrators in that event indiscriminately killed 12 students and one teacher (not including themselves) and wounded 23 others. The videos from that shooting (and others) often depict a swarm of ambulances, police cars and SWAT teams around the school, as well as a line of students marching single file from the school with their hands on their heads. In the aftermath, a flurry of news articles detailing these events include images showing the distraught faces of students, parents, and teachers. Scholars have previously discussed the intensity of these events and their sometimes gruesome depictions in various news outlets (see Diamond 2020; Silva and Capellan 2019). Understandably, the profound tragedy and loss associated with school shootings fuels intense emotions. Sometimes these emotions subsequently galvanize a moral panic regarding the public's conception of school shootings, their supposed frequency, and what should be done to prevent them (Jonson 2017; Schildkraut et al. 2015).

From an empirical perspective, however, instances of rampage or mass school violence are a statistical rarity (Elsass et al. 2015; Fridel 2019; Harding et al. 2002). In fact, the overwhelming majority of gun violence afflicting American schools takes the form of accidental shootings, stray bullets, drive-by shootings, gang violence, negligent discharges, student-on-student shootings, police shootings, and targeted forms of violence, to name a few (see, for example, data reported by the following collection platforms: Centers for Disease Control and Prevention 2021; Everytown for Gun Safety 2022; Gun Violence Archive 2024; K-12 School Shooting Database 2024). These "other" incidents and the local news stories covering them garner considerably less attention than the well-known (albeit extremely rare) mass school shootings. As such, the extent and presentation of gun violence

on school grounds is not even remotely similar to the popular understanding and nationally publicized versions of a rampage or mass school shooting (Hendrix et al. 2022). In this sense, it could be argued that the main connection shared between rare instances of mass school gun violence and the ubiquity of random gun violence incidents at schools is that (a) a gun was discharged, and (b) it happened to occur at a school.

Unfortunately, conceptualization and operationalization surrounding the term "school shooting" has produced several errors and confusion in both academic parlance and data collection domains. For example, there are fundamental disagreements between (a) the definitional criteria among the main data collection platforms, (b) scholarly definitions of school shootings in research, and (c) the methodological considerations for what constitutes a school shooting. Additionally, a hyper-focus on rampage and mass school shootings and the particular characteristics of the perpetrators of these incidents has dominated the school shooting literature. Although these sorts of analyses have been empirically fruitful, no specific "school shooter" profile has been established (understandably so), despite classification attempts in some research (Langman 2015, 2016, 2017). Further, a hyperfocus on mass shooters has reinforced a misaligned narrative of "school shootings", leaving analyses of the majority of school gun violence incidents unexamined. With that said, all of these issues potentially impact data collection and methodology, research, policy, and public awareness. Simple research questions, such as "what is a school shooting" and "how many school shootings happen every year" are confounded by eclectic data collection processes, selection methodology and case criterion differences between data sources and between scholars, and variable definitions (Pah et al. 2017). Therefore, it would appear that even a basic understanding of school gun violence remains elusive.

Given the aforementioned issues, the current review explores definitions of gun violence on school grounds and attempts to develop a clearer view of how these events are defined and collected. This review's primary objective is to focus on the various definitions of what constitutes a "school shooting" and the potential implications of definitional variability. First, school shooting definitions used by many of the available data collection platforms as well as by scholars are discussed in depth. This is followed by a discussion surrounding the implications of these discrepancies in terms of their impacts on inclusion criteria, data divergence, research, policy, and public perception. The review concludes by making broad recommendations that focus on effectively communicating with and appropriately educating interested persons about school shootings, as well as potentially modifying definitions and collection of school gun violence events. The potential benefits of reconfiguring our definitions of school gun violence are also discussed.

2. What Is a "School Shooting"?

Incidents of gun violence that are called "school shootings" are not an emergent criminological phenomenon of the 21st century. In fact, scholars have pointed out that some school shooting lists start with an 18th century incident (around the year 1764) involving a Native American raid on a school house (see Paradice 2017). Others have noted various incidents occurring throughout the early and mid-20th century as the beginning of school shootings as we know them, such as the University of Texas bell tower incident where a gunman killed several people on campus before being killed by police (Ferguson et al. 2011). Still, others have analyzed incidents of school gun violence spanning multiple decades, including those occurring between the 18th and 21st centuries (Duplechain and Morris 2014; Katsiyannis et al. 2018). Depending on which data source or scholar is being considered, however, the definition of "school shooting" differs to varying degrees. As a result, it has become commonplace for scholars to state something along the lines of "there is no consensus on what constitutes a school shooting" or something similar (see for example Elsass et al. 2015; Fridel 2019; Gerard et al. 2016; Jonson 2017; Paez et al. 2021; Poland and Ferguson 2021; Reeping et al. 2022).

Different authors appear to acknowledge the definitional discrepancy for different reasons. Some discuss the issue of definitional variability as a way of identifying the limita-

tions of their study or other studies, while others appear to use it as a basis to introduce their own customized definition of a "school shooting" for particular methodological or analytical reasons. As a consequence, the current body of school shooting literature has, perhaps unwittingly, produced more problems than solutions by failing to agree on a stable definition of school shootings (Freilich et al. 2021). In other words, there are too many definitional cooks in the conceptual kitchen.

This problem is further exacerbated by the incongruent definitional criteria used by different agencies and organizations that collect data on school gun violence incidents. For example, depending on the collection platform or specific study being considered, the following incidents will or will not constitute a "school shooting":

- At 1:45 a.m. on South Carolina State University's campus, two women were injured by gunfire when an off-campus fight between two men spilled onto campus property. The two women happened to be caught in the crossfire and were not deliberately targeted (WIS News 10 Staff 2019).
- On 30 March 2022, a 14-year-old high school student accidently discharged a gun on the bus ride home, resulting in a 15-year-old boy being injured. The shooting occurred while the bus was en route, not on or near school property (Associated Press 2022).
- On 3 December 2021, a sixth-grade student was shot in the leg by a plastic pellet from an airsoft gun in a classroom, resulting in a "red mark on the victim's back right thigh" (Barrera and Gomez 2021).

With respect to the first incident on South Carolina University's campus, some data collection platforms would not count it because the shooting occurred at an educational institution other than a designated K-12. Still, others would reject it as a shooting incident because it occurred too early in the morning hours when students and staff were unlikely to be on campus. The same logic has been applied to disregard certain gunfire incidents that occur on K-12 school property. As for the second incident, some data collection platforms include incidents that occur on bus rides to and from school as a "school shooting", thereby extending the inclusion criteria into potentially ambiguous conceptual territory. This, of course, raises interesting and complicated questions about a school's span of tangible control and liability, to where it extends, and where exactly it ends. Some might argue that incidents occurring at bus stops do not count but would count if one student was getting on the bus and got shot by another student standing outside. Still other collection platforms count in their lists the third type of incident, which involved a plastic toy airsoft gun. Immediately the issue arises as to what counts as a "firearm" and if a school shooting requires that a firearm be used to "shoot" other people. In certain cases, incidents in which people were injured or killed by weapons other than guns have been definitionally included under the aggregate total of "school shootings" (see Elsass et al. 2015). Obviously, the inclusion of incidents involving no guns among the tally of school shootings poses substantive empirical limitations, particularly in terms of conceptual meaning and operational measurement.

Despite these differences, available data sources continue to catalogue various school shooting incidents using their specific selection criteria. To date, however, an accounting of the specific selection criteria of school shootings among the various data collection platforms in one place has not been accomplished. Only one study to the author's knowledge has catalogued an extensive list of school shooting definitions, but these definitions specifically belonged to various scholars' publications, not the main data collection platforms (see generally Sommer et al. 2014). As such, it is important to examine the specific definitions used by each one to highlight their unique differences and explore why these differences matter. Given the advent of the internet, open-source data collection, and conflictual definitions, there are possibly dozens of different running lists of school shootings. In fact, scholars have noted that more than 20 different collection platforms have previously been identified (Poland and Ferguson 2021; Rowhani-Rahbar and Moe 2019). For the purposes of the current review, only data from the most commonly used school shooting databases and/or data that have been noted among scholars and the public are used.

3. Data Source Definitions

Several agencies and organizations house data on school gun violence. Among them are the National Center for Education Statistics (2022) (NCES), National School Safety Center (NSSC), and the Centers for Disease Control and Preparedness (CDC). These three sources use the School Associated Violent Death Surveillance System (SAVD-SS). Other data collection platforms include the K-12 School Shooting Database (K-12-SSDB which was formerly known as the Naval Postgraduate School's Center for Homeland Defense and Security School Shooting Database CHDS-SSDB);[1] Everytown for Gun Safety (EGS); Gun Violence Archive (GVA); Columbine Angels (CA); and The American School Shooting Study (TASSS). Beyond these, there are various news and media outlets that collect, house, and report running lists of incidents. Each data source collects and reports "school shootings" according to their own specific selection methodologies.

Although it is true that all data collection platforms' definitions vary in their language and inclusion criteria, most of them include incidents that (a) involve the use of some kind of firearm or gun (loosely defined), (b) occur at educational institutions, (c) involve student-on-student, employee-on-employee, or a combination of these shootings at schools, and (d) have perpetrators who are unaffiliated with the affected school. Any set of conditions more specific than that would no longer reflect the particulars of specific data collection platforms' selection criteria. Scholars should be aware that the moment complexity is introduced into a definition, divergence across multiple data collection points immediately follows (see Gerard et al. 2016; Huff-Corzine and Corzine 2020). For example, there are differences among collection platforms' as to what counts as a "firearm" or "gun" and what "educational institution" means for the purposes of data collection. Other differences emerge when considering at what time of day incidents must occur in order to be counted, whether a certain number of injuries or deaths must occur, and who counts as a legitimate victim, to name a few (Böckler et al. 2013). Appendix A provides a detailed list of 13 distinct school shooting collection platforms' selection criteria.

Consider the first three definitions in Appendix A provided by the NSSC, the NCES, and the CDC. Although these three sources use the SAVD-SS platform and therefore likely present the same data, the three collection platforms nevertheless provide slightly different language for what should be the same definition. For example, the beginning of NSSC's definition allows for the inclusion of homicides, suicides, and weapons-related deaths, which the CDC and NCES also state. However, the NSSC does not include "legal intervention deaths" within its language, whereas the CDC and NCES do. On that same point, the NCES version clarifies legal interventions to include "involving a law enforcement officer", whereas the CDC does not. Both the NCES and CDC definitions clarify the meaning of "at school", while the NSSC definition does not. Interestingly, the qualifiers for "at school" vary between the NCES and CDC. The NCES states "at school includes in the school building, on school property, and on the way to or from school", whereas the CDC claims the qualifier "at school" is comparable to "school associated" and means "on the property of a functioning elementary or secondary school, on the way to or from regular sessions at school, and while attending or traveling to or from a school-sponsored event".

Further ambiguity exists in who the victims can and cannot include between these seemingly identical data sources. For example, the NSSC makes no mention of specific victim requirements. The NCES stipulates that students, staff, and other people including parents and community members may be counted as victims. The CDC identifies students, staff, and "nonstudents" as victims. Based on the aforementioned criteria, an incident in which an affiliate of the school (such as a student, teacher, or parent), who on the way to school property or a school sponsored event was shot would count as a school shooting. However, if the same circumstance involving a random unaffiliated individual who intended on accessing the school but was instead shot on the way there (e.g., a limo driver for a high school prom), it is unclear whether it would count according to all three definitions.

In terms of definitional complexity, EGS has the simplest definition. This organization allows for the inclusion of any incident in which a "live round" from a gun is discharged in, into, on, or onto a school's property. Additionally, EGS includes incidents that occur at all levels of schools, including K-12s, specialty schools, colleges, and universities. Although not explicitly stated, it can be inferred from EGS's definitional parameters that shootings not occurring on the geographical land designated as school property do not count as a school shooting. Furthermore, EGS data do not include shootings involving school transportation (i.e., school buses) or incidents that occur on the way to or from schools. Thus, the incident involving the student who discharged a gun on their school bus en route to the bus stop would not count. Further, because EGS specifies that a "live round" must be discharged, non-powder firearm incidents (e.g., BB guns, pellet guns, airsoft guns, rubber band guns, etc.) are not considered as school shootings.

In contrast, the well-known and often-used K-12-SSDB/CHDS-SSDB (herein after referred to as K-12-SSDB) does include incidents involving non-powder firearms among their total count of school shootings. For example, the K-12-SSDB included in their aggregate count an incident that occurred at Greenhalge Elementary School in early October 2019. The incident involved an airsoft gun which was used to shoot plastic BBs at five kids on a playground. As a result, two of the individuals who were struck by the plastic BBs sustained minor injuries and went to the hospital but were released in good health. Another incident included in the K-12-SSDB occurred at Monroe Clark Middle School in mid-July of 2019, where someone shot BBs at the school. But in this case, no damage to school property occurred and no injuries were reported. These events and numerous others like them contribute to the overall count of events in the K-12-SSDB and fall within their definitional parameters of what constitutes a school shooting. Also included in this database are incidents where no shooting occurred because of some kind of intervention. According to the definition, K-12-SSDB will count events where weapons are brandished but not fired, incidents where no shots were fired either because the perpetrator's firearm failed to work or malfunctioned, or the perpetrator was apprehended or subdued before they could fire a shot. Given these particular parameters, some might call these events "thwarted school shooting attempts" rather than "school shootings".

The most detailed definition in Appendix A is for TASSS, which was devised by researchers from John Jay College of Criminal Justice, Michigan State University, Griffith University, and the University of South Carolina (see Freilich et al. 2021). Using grant money from the NIJ and a team of researchers, TASSS was constructed using a multi-tiered collection approach and strict collection parameters which are embodied in six main requirements. To be counted, the incident must have resulted in and/or instigated a "criminal justice response". Presumably, this means that police were notified of the incident and had to show up at the school for an incident to count. Additionally, a person must have been injured or killed in the event, and therefore shootings in which guns were discharged on school property but did not result in any injury would not count.

In contrast to K-12-SSDB's firearm protocol, TASSS's definition stipulates that "a firearm must have discharged explosives to propel a projectile". This automatically excludes any mechanical device designed to eject non-powder projectiles, even if it is labeled, marketed, or referred to as a "gun" or "firearm". Like other definitions, TASSS allows for shootings occurring on school busses in transit to or from the school. However, it clarifies that shootings at bus stops, for example before students enter or after they exit the bus, do not count. Freilich and colleagues (2021) justify this exclusion by establishing that incidents will only be counted "where the school still has the loci of control, and exercises authority over that environment". Lastly, TASSS does not include shooting incidents at colleges or universities. Freilich et al. (2021) indicate that they draw a distinction between K-12 and college/university incident collection because of the differences in preventive policy implications between primary, secondary, and post-secondary educational institutions.

Appendix A also lists several lesser-known data collections of school shootings, including those housed by news outlets like NBC's school shooting tracker (SST) and the

Washington Post (WAPO), as well as public information hubs like Wikipedia (WKP). WAPO's inclusion criterion are quite stringent, only counting incidents that occur on school property immediately before, during, or after school classes. What exactly constitutes "immediately" before or after is unknown, but it can be inferred that WAPO rejects any incident occurring outside of normal school operating hours (i.e., 8 a.m. to 5 p.m.), including incidents occurring at sporting events/games in the evening, in the middle of the night, or on weekends and holidays. WAPO also forgoes the collection of accidental discharges of firearms in school, even if they occur during school hours, as well as suicides wherein only the gunman was at risk of harm or harmed. In line with several other definitions, WAPO does not collect gunfire events at colleges or universities.

When considering the NBC-SST definition, several interesting differences emerge that clearly depart from other collection platforms. First, the term "active shooter" is included in the selection criteria, which specifically refers to an individual who is actively attempting to kill multiple people in a confined space (Musu et al. 2019). Additionally, the NBC-SST lists an intent requirement, noting that the perpetrator must have intent to harm faculty or students. The definition is not clear as to what level of intent suffices, meaning that for the four levels of legal intent (purposefully, knowingly, recklessly, and negligently), each could be considered sufficient for certain types of incidents. A glaring issue here, however, is discerning whether specific levels of intent among perpetrators could be accurately gathered from media reporting. Similar to WAPO and other definitions, NBC-SST excludes accidental discharges, suicides by firearm, student fights, domestic violence incidents, and gang violence. The definition also requires that at least one person other than the shooter is injured or dies. It is not clear from the definition whether the people involved must be students, faculty, or staff. Nor is it clear how the NBC-SST would handle a case where an active shooter on campus intends on killing several people, but the weapon jams and the suspect is apprehended. The minimum injury/fatality requirement is also vague, primarily because it fails to identify whether victims who are injured and/or die from circumstances other than bullets would count. For example, it is unclear whether a victim who sustains an injury while trying to escape would be considered "proximately caused" by the shooter.

Another well-known publicly available listing of "school shootings" in Appendix A is provided by Wikipedia (WKP). A simple Google search using the term "school shooting list" typically returns WKP as the first option. Not only is WKP the first source made available to the public via search engines like Google, data from WKP have been used in different analyses by different scholars (e.g., Lee 2013; Paradice 2017). What is interesting about WKP's definition is that it provides more exclusion criteria than inclusion criteria. Specifically, only two factors are essential in order to be counted: a firearm must have been used to attack an educational institution, and educational institutions include public or private K-12s, colleges/universities, and specialty schools. Strangely, however, WKP excludes various types of incidents that might otherwise seem like a school shooting incident. For example, shootings at schools in which professors, teachers, or staff shoot other school personnel or employees are considered "workplace violence" and therefore would not be counted. This definitional restriction is not applicable when either the shooter(s) or victim(s) is a student or child. Other sorts of incidents not included among WKP's list are suicides, police shootings, and shootings that occur during times of war. On aggregate, WKP provides an extensive list of incidents dating as far back as the 1840s, including one such incident wherein a professor at the University of Virginia was shot and killed by a student.

In sum, the list of definitions in Appendix A demonstrates that the data gathered and used are the product of multiple permutations of "school shooting" as conceptualized and operationalized by individual collection platforms. While there are fragments of similar definitional language and selection criteria across the various collection platforms, it is apparent that little agreement exists between sources on this type of gun violence. To better illustrate this point, Table 1 provides a simplified breakdown of select criteria and shows whether or not the platform in question includes the definitional element.

Table 1. Select inclusion criteria presence in school shooting data collection platforms.

Criteria	NSSC	NCES	SAVD-SS	GVA	TASSS	EGS	K-12-SSDB	CA	WAPO	NBC-SST	EW-SST	SSS-DB	WKP
College and University shootings included				✔		✔		✔		✔		✔	✔
Non-powder firearms included (e.g., BB, pellet, airsoft guns)							✔						*
Shootings outside of normal school hours included	✔	✔	✔		✔	✔	✔	✔				✔	✔
Shootings on the way to/from school property included	✔	✔	✔										
Shootings that occur on school buses in transit included	✔	✔	✔	✔	✔		✔	✔			✔	✔	✔
Shootings at school bus stops included	✔	✔	✔	✔			✔	*					
Suicides, or suicide attempts included	*	*	*	✔	✔	✔	✔	✔				✔	
Shootings by persons other than current or former students included	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Employee-on-employee shootings included	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	
Shootings by police or other law enforcement included		✔	✔	✔	✔	✔	✔	✔	✔			✔	
Shootings at school sponsored events not on campus included	✔	✔	✔	✔	✔		✔	✔		✔	✔	✔	
Accidental shootings included				✔	✔	✔	✔	✔	*		*	✔	✔
No injuries or deaths included				✔		✔	✔	✔	✔			✔	✔
Injury/death must involve person other than shooter										✔	✔		
"Skirt" shootings allowed (e.g., sidewalk or other contiguous area next to school grounds)				✔			✔						
Stray bullets from off campus strike school grounds included				✔		✔	✔	✔				✔	✔
Shooter must have intent to cause harm										✔			

Notes: Asterisks * indicate exceptions or qualifiers relating to the specific criterion element in the data source's definition.

4. Scholarly Definitions

Similar to the main data collection platforms, there is a lack of consistent conceptualization and operationalization among the school shooting definitions used by scholars. Unfortunately, this has produced very little consensus. In some cases, scholars have modified preexisting data source definitions for methodological reasons within their individual studies. Relatedly, some scholars have attempted to reconcile multiple data sources to generate a single comprehensive list of shooting events (Freilich et al. 2021; Levine and McKnight 2020; Pah et al. 2017). Still other scholars have independently collected their own data under completely new definitions. Whatever the case may be, modified scholarly definitions of broader data platform definitions further compounds the lack of consensus as to what constitutes a school shooting. Consider the following Figure 1:

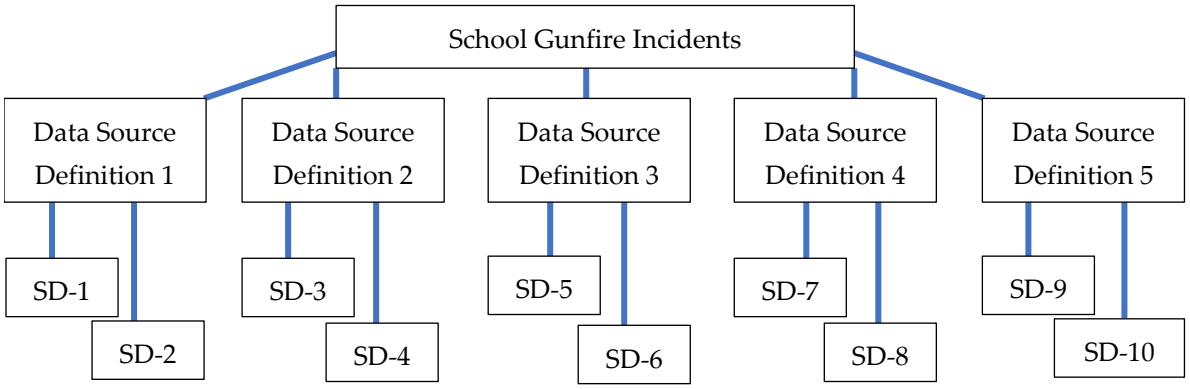

Figure 1. Example of variant scholarly definitions of school shootings. Note. "SD" means "Scholarly Definition".

Figure 1 shows the process by which the population of school gun violence events is collected differently according to various data collection platforms, which are subsequently used and modified by individual scholars. As depicted in Figure 1, the overarching phenomenon of school gun violence is first converted into running lists of "school shootings" according to various data collection platforms. From there, data source definitions are then modified by scholars to fit their specific definitional criteria and/or methodological and analytical approaches (see for example Levine and McKnight 2020; Pah et al. 2017). The result (in the case of Figure 1) is 15 unique definitions of the same population of incidents. Noteworthy is that Figure 1 does not include circumstances wherein scholars bypass existing data source definitions altogether and independently define and collect school gun violence incidents on their own. Currently, there is no known count of all school shooting definitions in use by academic scholars. As such, there could be hundreds of definitional permutations used by scholars worldwide. Researchers recognize this issue and often note the many methodological implications that emerge when using variable definitions (see generally Flannery et al. 2021; Gerard et al. 2016; Harding et al. 2002; Levine and McKnight 2020; Poland and Ferguson 2021; Sommer et al. 2014).

To illustrate, Sommer and colleagues (2014) conducted a systematic review of 35 different school shooting studies worldwide. Among the 35 studies they assessed, 32 provided specific definitions of what counted as a school shooting, and every one of those definitions were different from each other. Additionally, Sommer and colleagues provided the sample sizes for each study, which ranged from as low as two cases to 160 cases per study. Such wide variability in both definitions and sample sizes necessarily implicates different analyses and results, and therefore empirical conclusions may differ. Another problem concerns the effects of Sommer et al.'s (2014) definition of a school shooting which they employed as a screener for what studies would be included in their systematic review. Specifically, they defined school shootings as "offenses committed by a current or former student who purposely chooses his or her school or university campus as the site of an attempt to kill one or more persons" (Sommer et al. 2014, p. 14). By limiting the scope of their definition to this specific criterion, the inferences drawn from their systematic review of the literature are necessarily skewed.

Another glaring issue concerns essential terminology from which definitions stem. More specifically, the term "school shooting" has been swapped out for other terms, including "mass school shooting", "active school shooting", "rampage school shooting", "targeted school shooting", "school massacre", "classroom avenger", and "mass murder", to name a few (see Blair and Schweit 2014; Farr 2018; Gerard et al. 2016; Harding et al. 2002; Katsiyannis et al. 2018; Levin and Madfis 2009; Muschert 2007; Newman et al. 2004; Paez et al. 2021; Reeping et al. 2022). The proliferation of terminology used to describe gun violence at schools represents yet another precursor to the current definitional conundrum. That is, each of these specific terms (and many others) carry their own specific definitional criteria, thereby further granularizing the overarching or umbrella term "school shooting".

This problem has not only appeared between studies, but within single studies as well. For example, Muschert (2007) noted that although rampage school shootings have traditionally dominated the school shooting narrative in the media, a variety of incident subtypes exist and should be accounted for. In all, Muschert (2007) identified five separate school shooting types and termed them as the following: "rampage shootings, school-related mass murders, terrorist attacks on schools or school children, school-related targeted shootings, and government shootings" (p. 63). The main operators that distinguish Muschert's typology are (a) whether the perpetrator was an in-group or out-group member, and (b) whether victims were chosen at random versus intentionally chosen for symbolic reasons. On its face, this typology may serve as a good subsidiary definitional separator that can coherently organize school gun violence data generally. A similar typology of school shooting types was recently developed by Levine and McKnight (2020) as well. The problem is, however, that when scholars take one or two of these types and use them as the definitional basis for the school shooting phenomenon in their particular research, generalizability of the research diminishes. For example, Appendix B provides 25 studies and the specific definitions of "school shooting" used by scholars.

Appendix B demonstrates that what scholars consider to be a school shooting is incongruent at best. Consider the aforementioned term "rampage school shooting". Appendix B provides four different studies that used that specific term in data collection and analysis (Farr 2018; Harding et al. 2002; Levin and Madfis 2009; Newman et al. 2004). Upon review, it becomes immediately apparent that even when considering the specific subset of incidents termed "rampage" school shootings, differences in selection criteria still emerge between scholars. Farr (2018), for example, has the peculiar requirement that the shooter must be a current or former member of the school and has to be under the age of 21 at the time of the shooting. Conceptually, it is unclear why this age cutoff would matter. For instance, would a 22-year-old former student who perpetrates a rampage school shooting make a substantive difference as compared to a 21-year-old former student who commits the same offense?

Additionally, none of the other rampage definitions include this specific age requirement for case inclusion, although Levin and Madfis (2009) do require that a former student was only "recently withdrawn" from the particular institution they attacked. How "recent" and what that means is up for debate. Relatedly, Harding et al. (2002) stipulate that the shooter must be a former or current student, but also require that at least some of the victims are chosen for symbolic reasons, such as deliberately shooting the principal or members of specific groups (athletes, preps, "jocks", etc.). On the point of symbolic victim selection, Newman et al. (2004) agree. Albeit slightly different, their definition notes that shooters must select their victims for symbolic purposes, and some may be shot completely at random. However, Newman and colleagues indicate that the shooting must occur "on a school-related public stage before an audience" (2004). Harding et al. (2002) provide a similar requirement but fail to mention the need for an audience. Similarly, Neither Farr (2018) nor Levin and Madfis (2009) make any mention of an audience in their definitions of rampage school shootings.

Similar problems are evident when comparing the two definitions of "mass school shootings" in Appendix B (see Katsiyannis et al. 2018; Paez et al. 2021). Despite the fact that both studies use the exact same term, the definitional requirements do not add up. Numerically speaking, the count of necessary victims for an incident to be considered a mass school shooting, according to Katsiyannis et al. (2018), is four or more. In contrast, Paez et al. (2021) require three or more, and their definition does not stipulate whether the perpetrator(s) is included in that count or not. This particular issue of victim counts and what constitutes a "mass shooting" is a hotly debated issue in current gun violence scholarship that focuses on mass violence collectively (Booty et al. 2019; Huff-Corzine and Corzine 2020). Although mass shootings are not necessarily "mass school shootings", the definitional divide on how many people must be killed in order for an incident to count is

an issue between school shooting studies as well. As for the remaining 19 definitions in Appendix B, they vary in the following ways:

- What counts as a firearm (Böckler et al. 2013; Paez et al. 2021; Vossekuil et al. 2002).
- Whether a firearm is even acknowledged by the definition (Anderson and Sabia 2016; Arcus 2002; McCabe and Martin 2005).
- What counts as a qualified educational institution and where on the property counts (Fridel 2019; Kalesan et al. 2016; Langman 2016; Pah et al. 2017).
- Who the victims of the shooting can and cannot be (Pah et al. 2017; Paradice 2017; Reeping et al. 2022).
- Whether shootings must occur on property where the school is or whether shootings on buses count (Farr 2018; Fridel 2019; Vossekuil et al. 2002).
- Whether shootings at school-sponsored events and the like count or not (Gabbard et al. 2019; Farr 2018; Fridel 2019; Katsiyannis et al. 2018; Leary et al. 2003).
- Stipulations as to perpetrator motives, intent, and whether only an attempt to shoot is sufficient to be counted (Kaiser 2006; Reeping et al. 2022).

Somewhat recent definition and data collection recommendations were outlined in the School Shooting Safety and Preparedness Act (SSSPA), H. R. 4301 (Gabbard et al. 2019). Proposed by Democrat Representative Tulsi Gabbard and colleagues, the definition of a school shooting and the subsidiary elements that are present for the events to be counted are well-defined. For example, Gabbard et al. (2019) establish in the SSSPA that "school" includes early childhood education programs, elementary schools, secondary schools, and institutions of higher education, each according to their preestablished definition as outlined in public law (see Gabbard et al. 2019, pp. 3–4). Additionally, terms such as "firearm", "mass shooting" and "school shooting" are each clarified in detail according to their legal meanings (see Appendix B for Gabbard et al.'s definition of "school shooting"). To be included as a school shooting, the SSSPA requires that at least one individual be injured or killed, which has the drawback of eliminating myriad incidents where guns are fired in or on school property but result in no injuries. Unfortunately, the relationship between the victim(s) and the educational institution is not made clear. As such, it cannot be ascertained whether incidents in which victims are not students or affiliated with the affected institution count as a school shooting. The SSSPA also mimics several other definitions by counting shooting incidents that occur on the way to or from school and school-sponsored events. However, clarity as to who can be counted among the victims headed to or from school or a school-sponsored event is not definitionally established. Further, allowing events "on the way to or from" a school's physical property may muddy rather than clarify the conceptual boundaries of school shootings.

Beyond the definitional elements, H. R. 4301 also calls for the implementation of a government-operated national school shooting data collection platform which would systematically collect and house incidents falling within the aforementioned definitional parameters (Gabbard et al. 2019). According to the bill, the NCES, the Bureau of Justice Statistics (BJS), and the Department of Justice (DOJ) would be responsible for disseminating annual reports on school shootings that include no less than 18 specific data collection points. Some of these collection points require subsidiary data elements to be collected (e.g., multiple demographic characteristics of perpetrators and highly specific data on weapon types, makes, models, number of bullets discharged per event, how weapons were acquired, etc.). To the author's knowledge, this is the first ever attempt officially made by governmental representatives to systematize the collection of school gun violence incidents in such detail. Whether or not this house bill passes and is subsequently implemented remains to be seen. As of 2024, the bill was reintroduced and referred to the House Committee on Education and the Workforce on 25 April 2023 (Congress.gov 2024).

5. Definitional Discrepancies and Impacts

Collectively, Table 1 and the aforementioned lists of definitions, as well as prior literature examining different school shootings and data collection platforms (see

Pah et al. 2017; Sommer et al. 2014), clearly reveal that no stable definition of school shootings exists (Gerard et al. 2016; Hendrix et al. 2022; Pah et al. 2017; Reeping et al. 2022). It is important to note that lack of definitional clarity has serious implications for the empirical understanding of school shooting events. This is true with regard to data accuracy and data convergence, empirical research, policy development and implementation, and public apprehension of the scope and nature of the problem.

5.1. Impacts on Data Divergence

When assessing the available data housed within each collection platform, it becomes immediately apparent that each one reports different aggregate counts of school shooting events. This remains salient even when comparing counts of shooting events for the same years. A similar issue arises when comparing and/or contrasting scholarly publications on school shootings: most publications use different data sources and therefore report different aggregate counts of shootings. Thus, analyses and findings regarding the frequencies of these events, although sometimes alarming, have been described by scholars as being "all over the map, literally" (Levine and McKnight 2020, p. 1; see also Booty et al. 2019; Cox et al. 2022; Elsass et al. 2015; Flannery et al. 2021; Gerard et al. 2016; Hendrix et al. 2022; Lee et al. 2020; Muschert 2007; Pah et al. 2017; Paradice 2017; Rowhani-Rahbar and Moe 2019; Reeping et al. 2022; Sommer et al. 2014).

For example, using a random span of time, EGS's website reports that between 1 January and 28 March 2022, approximately 27 school gun violence incidents occurred and resulted in 22 casualties nationally (casualties combine both deaths and injuries) (Everytown for Gun Safety 2022). During the same time frame, EW-SST reported that 22 school shootings occurred, resulting in 38 total casualties nationally. In contrast, the K-12-SSDB recorded 80 school shooting incidents between 3 January and 28 March 2022, which resulted in somewhere north of 90 casualties. These numbers suggest that the K-12-SSDB reported 2.96 times as many incidents and more than four times the number of casualties as reported by EGS *during the same three-month time span*. Similarly, K-12-SSDB reported 3.63 times as many incidents and over two times the number of casualties as reported by EW-SST during that time frame as well. Fundamentally, this divergence highlights the fact that three different narratives about the frequency and extent of harm generated by "school shooting" events emerge. This is one of the main problems between individual studies and between the specific data collection platforms. Rowhani-Rahbar and Moe (2019) noted some prior research reported about 179 school shootings between April, 1999 and May, 2018. During that same time frame, Rowhani-Rahbar pointed out the K-12-SSDB reported that 657 school shootings occurred (2019). In this case, the data collection platform suggested there were 3.67 times as many school shootings, or 478 more shooting incidents. Similar discrepancies between reporting modalities have been demonstrated elsewhere (see Levine and McKnight 2020).

With respect to the K-12-SSDB, the count of "school shootings" comprising that data are likely inflated due to the inclusion of incidents perpetrated with toy guns, non-powder weapons, or similar instruments that are not mechanically or materially equivalent to standard firearms. Further, their definition allows for incidents occurring on school busses away from the actual school building, whereas EGS does not. Because these incidents are included, they may amount to a misrepresentation of what can reasonably be considered "gunfire" on school property, or even more strictly, a "school shooting". Similar divergences in reported data emerge when comparing other data collection platforms as well, such as WKP, NBC-SST, and TASSS.

The discrepancies between reporting modalities also influences the frequency of specific subtypes of school shootings reported by scholars. For example, in reference to mass school shootings, Lee et al. (2020) stated that "Since 1966, depending on the definition used, 13% to 27.6% of mass shootings have occurred in K–12 or collegiate settings" (p. 1). In another article, Burton et al. (2021) claimed that "American schools endured approximately 296 shooting incidents between 2013 and 2018. From 1966 to 2016, American

schools endured 94 mass shootings" (p. 3; see also Kaiser 2006; Kalish and Kimmel 2010). Discrepancies also emerge when authors focus on mass school shootings versus other forms of school gun violence. Recall that myriad incidents, including accidental gunfire, drug deals, vandalism with guns, stray bullets, shootings at school athletic and sporting events, stadium and athletic field shootings, drive-by shootings, officer-involved shootings, gang violence, suicides, murder—suicides, parental disagreements, disgruntled employees, and so on are variably represented in different collection platforms. Therefore, the frequency of these types of events are fully, partially, or not classified under the guise of a "school shooting".

Yet another consequence of the divergence in data is distributional discrepancies. Here the issue is that the distributions of events over specified time frames do not match up between data sources. Therefore, the fact that certain data sources report increases while others report decreases or no change over time can generate great confusion as to what the frequency of these events actually look like (Levine and McKnight 2020; Pah et al. 2017). For example, Pah and colleagues (2017) used six different data sources on school shootings to build a composite dataset for their study. Importantly, they provided a figure which showed the distribution of each data source, as well as their composite sample, for the years 1990–2013. Unsurprisingly, each source reported variable frequencies of events over that time frame. For example, their descriptive results indicated SAVD reported 236 events, the Brady Campaign reported 202 events, Wikipedia reported 174 events, and the remaining three sources (i.e., two scholars and one official report) each reported different counts as well (Pah et al. 2017).

Second, and more alarming, is that the distributions of reported events had degrees of skewness and kurtosis unparalleled between each source. Specifically, Pah et al.'s (2017) descriptive statistics revealed that for the same temporal span (roughly 1990–2013), some data sources were severely negatively skewed and leptokurtic, others were positively skewed and leptokurtic akin to a Poisson distribution, and still others were platykurtic and showed frequencies substantially lower than other data sources. Additionally, Pah et al.'s composite dataset appeared to be a bimodal distribution of 381 events that did not distributionally mirror any of the data sources from which it was created in terms of frequency, skew, or kurtosis (see Pah et al. 2017, p. 2).

Thus, from a basic descriptive and visual standpoint, differing inclusion criteria and definitions have lent themselves to a serious issue of data divergence across time (Booty et al. 2019; Levine and McKnight 2020). Consequently, basic descriptive questions, such as how many school shootings occur every year or what types of shootings occur at schools, are quantitatively confounded. Worse still is that the conclusions drawn from available sources on one hand may indicate a sharp increase in events, while others may indicate a sharp decrease or no change at all. Indeed, the careless use of the term "school shooting" has led to perceived inflation of prevalence rates and occurrences. For example, one scholarly paper might suggest in its introduction that mass school shootings have increased over the decades (Haan and Mays 2013) while another scholarly paper will suggest that claim is overblown (Fox and Fridel 2018; Jonson 2017). Elsewhere, some scholars and collection platforms completely dismiss any gunfire or shootings afflicting college campuses despite the fact that these incidents represent a substantial percentage of gunfire impacting school property in the U.S. (see Table 1, Appendices A and B, and the exclusion criteria in the following studies: Baird et al. 2017; Farr 2018; Fridel 2019; Katsiyannis et al. 2018). In such instances, the extent of gun violence would be underestimated.

Further compounding this issue is that the demographic variables associated with each incident, the afflicted schools, the perpetrators, victims, weapons used, and so on also will have variable distributions since they are embedded within the broader context of overall incident frequencies. To illustrate, an otherwise basic categorical variable, like whether shootings occur more or less often in rural, suburban, or urban spaces, will likely differ in both frequency and distribution among various data sources because the overall incident frequencies differ in their distribution across time. Relatedly, even if two or more

data sources approximate the same distribution of shooting events, the changes in their frequency magnitudes from month to month or year to year will likely differ as well. In other words, one data source might reveal a 10% increase in incidents and casualties across five years, while another might report a 20% increase across the same years. These and other related issues impact the nature and quality of empirical research on school shooting phenomena and subsequently influence policy responses and public awareness (Levine and McKnight 2020; Flannery et al. 2021).

5.2. Impacts on Research

In a broad sense, conceptual agreement regarding particular phenomena is essential to the scientific and empirical analysis of criminal events. When conceptual agreement is achieved, this allows for consistency in both the operationalization and measurement of specific events. It is also true that the quality of research is largely contingent on the quality of data being used. In short, the better the data, the better the research. As such, conceptual disagreements that directly impinge on the initial collection of data, as well as on subsequent analysis of different versions of data can have implications at nearly every stage of the research process. As demonstrated thus far, the lack of conceptual agreement on school shootings is at the crux of most problems in this area of research. There are also practical statistical limitations that impact this research as well, such as small sample sizes, generalizability, a lack of statistical power, limited degrees of freedom, and limited multivariate analytical options when assessing events as rare as school shootings. Because methodological issues like those previously mentioned tend to plague both data collection platforms and scholarly research on school shootings, several scholars have expressed serious concerns about the scientific viability and reliability of findings in school shooting studies (Böckler et al. 2013; Harding et al. 2002; Muschert 2007).

According to Harding et al. (2002), there are at least five methodological challenges researchers encounter when conducting research on rare events like school shootings: case definitions, case comparisons, limited degrees of freedom, multiple causes for rare events, and different causes for similar events. In reference to case definitions, Harding and colleagues suggest that the scope of inclusion criteria will influence sample sizes of already rare events (see also Böckler et al. 2013; Muschert 2007). As a result, the rigor of statistical analyses will largely depend on how scholars choose to define cases that are to be included in their samples. With respect to case comparisons, Harding et al. (2002) argue that because school shootings are exceptionally rare, the variables that bring these events to fruition are likely more extreme, and therefore selection of relevant and/or reliable comparison cases may prove to be difficult. Further, the ratio of a small number of cases to a potentially large number of causes creates a degrees of freedom problem. Indeed, disproportionality between cases and relevant variables could result in model misspecification, which is a statistical issue. Because of this limitation, small sample sizes mean fewer variables can be considered (Harding et al. 2002). This can result in omitted variable bias and a failure among scholars to control for relevant confounders.

The fourth limitation noted by Harding and colleagues (2002) is that of complex causes. Essentially, the occurrence of rare incidents like school shootings are likely dependent on the interaction between multiple variables in highly complex combinations. They also note that many of the variables that are present in school shooting incidents, such as gun access and violence exposure, are also present in the lives of millions of other school-aged children who do not commit school shootings. Thus, identifying the causal combinations of relevant variables resulting in school shootings may be an extremely complex research challenge. Last is the issue of different causes for similar events. To illustrate, Harding et al. (2002) use the idea of copycat shooters. In the first school shooting event, some hypothetical set of variables converge and generate its occurrence. Although a subsequent copycat shooting looks similar, the causal chain of variables leading up to that event are likely very different. As a result, the authors suggest that it may be problematic to consider two events like this

as similar because the application of a successful causal chain for one may not necessarily be applicable for a "similarly situated" case (Harding et al. 2002).

Broadly speaking, a general complaint among scholars is that the available research is far from being unified (Böckler et al. 2013; Levine and McKnight 2020; Muschert 2007; Pah et al. 2017). The lack of uniformity is expressed in a variety of ways. In most cases, data divergence and the lack of conceptual uniformity is responsible for the lack of empirical consistency. Here, empirical inconsistency partially refers to broad descriptive discrepancies, such as frequency and rate differences of school shootings as well as incongruences among specific demographic variables considered at varying units of analyses (i.e., state, county, city, school, individual-level variables) within specific studies (see Fridel 2019; but see Kaiser 2006). Pah et al. (2017), for example, noted that there is "concern about the reliability of previous quantitative analyses. Even simple questions—such as whether the rate of shootings is increasing—are impossible to answer without valid data" (p. 1; see also Booty et al. 2019; Hendrix et al. 2022).

Other empirical inconsistencies emerge in the results from multivariate inferential statistics and in the correlates which are identified as relevant predictors of school shootings, such as historical information related to the perpetrators and their home life, their personality traits and psychological makeup, and what factors either increase risk or protect against the occurrence of school shootings generally (Langman 2016; Poland and Ferguson 2021). Other scholars have suggested that there are major difficulties in conducting meta-analyses of preexisting school shooting studies due to the lack of a unified body of research (Böckler et al. 2013; see also Muschert 2007). Still others have suggested that the impact of news and media "reporting biases" on data collection and availability restrict what researchers have to work with, and this subsequently influences what kinds of empirical research can be accomplished (Levine and McKnight 2020).

Further, the lack of unity as a consequence of data divergence has impacted scholars' ability to pinpoint reliable profiling criteria among perpetrators (Borum et al. 2010; Ferguson et al. 2011; Mongan et al. 2009; Neuman et al. 2015; Poland and Ferguson 2021). One potential explanation is that different data sources are comprised of different incidents, which means different perpetrators and their associated characteristics are being analyzed in the pursuit of a unified shooter profile. Different data sources also likely impact available sample sizes, which in turn affects availability of specific variables and/or measures and generalizability. Although researchers have identified many different correlates associated with school shooters (Alathari et al. 2019; Livingston et al. 2019), and some have developed different classifications of both school shooters and shootings (Ferguson et al. 2011; Langman 2015; Langman 2017; Newman et al. 2004), there is no agreed upon or unified classification system and/or typology which appropriately categorizes and subcategorizes school shooters or incidents of gunfire affecting schools.

On a related point, the entire body of school shooting literature has largely been slanted toward analyses of a few particular subtypes of school gun violence (Fridel 2019). In particular, the overwhelming majority of research on school shootings has actually been hyperfocused on mass or "rampage" school shootings and perpetrator characteristics (Alathari et al. 2019; Fridel 2019; Levin and Madfis 2009) rather than the various other gun violence incidents and their associated characteristics. Unfortunately, mass and "rampage" school shootings have come to emblematize gun violence on school campuses, and therefore a lot of research has targeted these types of incidents for empirical scrutiny. Although it is important to analyze subtypes of gun violence affecting schools, focus on extremely rare events generates serious methodological and statistical limitations. One problem is the issue of generalizability. Analytically speaking, using too small of a sample size means very few variables can be considering in multivariate models, and moreover, any estimates from that small sample are unlikely to be generalizable back to the population from where they came. Such empirical findings, then, would be largely useless when trying to inform national policy and Criminal Justice responses to school gun violence. Another problem with this approach is that by using a rare type of gun violence as the research standard, scholars,

policy makers, and the public are potentially misled in thinking that mass shootings at school are the main problem: this is absolutely not true. This misconception is partly responsible for other scholars (e.g., Fox and Fridel 2018; Fridel 2019) publishing articles that are specifically aimed at countering that narrative. Recent scholarship has recognized that issue as well and has begun to analyze the broader occurrence of gunfire affecting schools, thereby moving the body of school shooting literature away from a hyperfocus on mass shootings and perpetrator characteristics (see Freilich et al. 2021; Fridel 2019; Levine and McKnight 2020; Reeping et al. 2022).

5.3. Impacts on Policy

It is not surprising that the perceived inflation of school shootings, their assumed prevalence rates, and their emotional toll have dramatically impacted policy related to schools, guns, security, and safety (Booty et al. 2019; Borum et al. 2010; Flannery et al. 2021; Jonson 2017; King and Bracy 2019; Fox and Savage 2009; McKenna and Petrosino 2021; Mongan et al. 2009; Nedzel 2014; Neuman et al. 2015; Peguero et al. 2020; Schildkraut and Hernandez 2014; Sulkowski and Lazarus 2011). Indeed, Rowhani-Rahbar and Moe (2019) noted that "in the wake of an increasing number of school shootings in recent years, schools have scrambled to re-evaluate safety plans and implement additional safety measures, spawning a 2.7 billion school security industry" (p. 683). The emergence of a multibillion-dollar school security industry, however, was first preceded by a series of legislative and funding initiatives. Since the late 1980s and early 1990s, numerous pieces of federal legislation and considerable funding have been produced to combat school gun violence. Much of the impetus for certain pieces of gun legislation in the 1990s emerged in the wake of rising juvenile gun crime and overall violent crime increases during the 1980s and early 1990s. Some of the later pieces of legislation were specifically crafted in response to some of the worst school shootings on record.

For example, Brock et al. (2017) noted that in the early 1990s, the Gun-Free Schools Act of 1994 was passed which instituted a zero-tolerance policy for any weapons being carried on school property, minus legal exemptions (see also Borum et al. 2010). Shortly thereafter, the Safe Schools Act of 1994 was passed which provided competitive grants to law enforcement agencies and were meant to incentivize the increase in school safety and reduction of violence in American schools. During the same decade, the Clinton administration introduced the COPS in Schools program, a subsidiary but substantial component of the Safe Schools Initiative, which provided more than $800 million dollars for the hiring of school resource officers (SRO) between 1999 and 2005. A total of $2 billion was awarded to 49 states through the Safe Schools Initiative between 1999 and 2012 (Brock et al. 2017).

In response to the Columbine shooting, the School Emergency Response to Violence, also called Project SERV, was created (Brock et al. 2017). SERV provided different educational services to police agencies that were specifically allocated for recovery from school shooting tragedies. In 2001, the Secure Our Schools program was created by Congress, and it specifically allocated $122 million toward enhancing and/or implementing a variety of security mechanisms and/or protocols in schools across the country. A short time later in 2002, Project Sentry was implemented by the Department of Justice (DOJ). Project Sentry was specifically designed to combat gun violence by providing necessary resources to U.S. Attorneys offices to prosecute state and federal gun crimes. In 2003, the Readiness and Emergency Management for Schools was created to help police agencies, school districts, and specific school buildings develop crisis reaction plans in response to school shootings. After the devastating shooting in 2012 at Sandy Hook, the Obama administration created the Now is the Time Initiative, a multi-agency operation devoted to the reduction of gun violence in schools and enhanced mental health services for victims of school gun violence. More recently, the Comprehensive School Safety Initiative was created by Congress and enacted by the National Institute of Justice and the DOJ to enhance research on school gun violence, identify possible causes and correlates of the events, and produce relevant policy

and safety responses in order to prevent school shootings (Brock et al. 2017). Despite the flurry of legislative responses to school shootings, many of these implements have not been successful, and some have disappeared before they could take effect. Some scholars have noted that many of these legislative acts are mere knee-jerk reactions to egregious shooting incidents, representing "feel good legislation" rather than effective prevention policies (Schildkraut and Hernandez 2014).

More specific types of policy changes involve ramping up security protocol within schools, most of which are theoretically designed to either prevent and/or quickly react to gun violence. King and Bracy (2019) explored at least 13 different school security implements in relation to school shootings, including CCTV and other security cameras, metal detectors, access control mechanisms (either guarded or locked doors/windows), frequent weapon sweeps, and even the requirement that students use clear backpacks, all of which closely mimic the sorts of security implements used in jails, prisons, and other correctional institutions. Borum and colleagues (2010) reported similar security responses to school shootings, noting that locker searches, faculty/staff patrols in and around schools, and threat assessment teams are used by many schools. Other scholars have discussed firearm access prevention laws, "smart guns" and related weapons technology, advanced weapons detection software, the increase in SROs, the implementation of school police departments (a common component of colleges and universities), and active shooter drills (Flannery et al. 2021; Poland and Ferguson 2021). One of the more concerning policy responses to the fear of school shootings is the social and legislative push to arm teachers, professors, students, and even "janitors, cafeteria workers and support staff" (Reid 2022; see also Comer et al. 2023; Flannery et al. 2021; Nedzel 2014; Poland and Ferguson 2021; Sulkowski and Lazarus 2011).

Of course, there are a litany of problems with the majority of these school security responses and their parent policies as they particularly relate to school shootings. Primarily, given that the state of data on "school shootings" is nothing short of a mess, the development and application of specific security responses predicated on questionable data may be completely misguided. In another sense, if there is no agreement on what a "school shooting" is, then developing effective policy is questionable. For example, the allocation of hundreds of millions of dollars for state-of-the-art security systems in halls and classrooms, metal detectors, bullet proof doors and safety rooms, locker sweeps by staff, and more SROs may be completely disproportionate in reference to both the frequency and type of gun violence affecting schools. Given that mass, rampage, and other multi-victim shootings at schools are the rare exception, not the rule, the very notion that certain security implementations are proportionate to the "threat" and are "effective" is questionable at best.

Second, and perhaps more important, is that very little empirical research supports the effectiveness of most of these security implements in preventing school shootings (King and Bracy 2019; Flannery et al. 2013; Flannery et al. 2021; Jonson 2017). As for armed personnel at schools, Jonson (2017) noted, "evaluations of these measures show that they often have little to no effect on crime occurring at school and at times can increase fear and anxiety within the school setting" (p. 961). Other research supports this dismal empirical reality, such that evidence indicates that SROs in schools produce more problems than they solve (King and Bracy 2019). Further, no empirical evidence currently demonstrates that SROs, armed teachers, or having armed personnel of any kind is causally associated with a reduction in school shootings. Logic also suggests that certain security responses are, by their nature, completely ineffective in preventing the majority of gun violence on school grounds. For example, there is no reason to believe that locker or weapon sweeps, CCTV, metal detectors, weapon detection technology in schools, or armed teachers would have any preventive utility against gunfire in school parking lots, shootings on school property after hours, shootings on "open campuses", or the other types of gunfire that make up nearly 90% of all gun violence at schools (see Fridel 2019). While it may be true that certain policy responses are beneficial and have some appreciable effect on reducing school gun

violence, empirical support for most policies' effectiveness is conspicuously absent (Fox and Savage 2009; McKenna and Petrosino 2021; Peguero et al. 2020).

5.4. Impacts on Public Perception

Yet another impact of divergent data and all the associated problems with understanding school shootings is public misperception of the phenomenon. Indeed, despite the statistical rarity of mass school gun violence, media outlets and the 24-h news cycle propagate a seemingly endless stream of videos, images, commentary, and opinions about them. In turn, the inundation of mediatized narratives fuels misguided beliefs among the public as it relates to the number, type, and dangerousness of school shootings (Elsass et al. 2015; Hagan et al. 2002; Madfis 2017; Schildkraut and Hernandez 2014; Schildkraut et al. 2015). Nowhere is this more evident than the media and public response to the Columbine shooting. Although Columbine was not the first nor deadliest school shooting, it was the first shooting that garnered considerable media attention (King and Bracy 2019). According to one study, more than 10,000 articles were published about Columbine in the nation's top 50 newspapers in the first year after it occurred (Elsass et al. 2015). Such an overwhelming amount of information on a singular event had profound implications in shaping public consciousness surrounding school shootings. Subsequently, media reports on school gun violence, particularly mass school shootings, typically follow a similar pattern to this day.

Specific issues involving public misperception of school shootings have been discussed by scholars (Lee et al. 2020; Madfis 2017; Muschert 2007). For example, Madfis (2017) has pointed out that the media erroneously propagate the narrative that school shootings are random and unpredictable acts of violence. Within this narrative, school shootings are portrayed as patternless, pointless, and indicative of social deterioration (Madfis 2017), which is empirically false (Cornell 2015; Hendrix et al. (2022). Nevertheless, the public consumes this information, which can result in the solidification of a fearful misapprehension of what school shootings are, what they look like, how often they occur, what predicts them, and what can be done to stop them. Some scholars have described this problem within the framework of "moral panics" as well (see Jonson 2017; Schildkraut et al. 2015).

Elsewhere, Muschert (2007) described the public's misapprehension of school shooting phenomena using the *Rashomon effect*. This effect refers to the "subjective construction of reality in which observers of a single event perceive incompatible, yet plausible versions of what happened" (p. 61). As it relates to school shootings, Muschert (2007) notes that individuals seeking to understand these events are bombarded with various claims about what they are, how they occur, how many occur, and so on. On one end, the media reporting on these events exerts a powerful influence on the construction of sensationalized narratives, and on the basic availability of information regarding each incident. Indeed, most people experience the occurrence of mass shootings via the media (Silva and Capellan 2019), and so whatever information is made available through these platforms is likely what people use to stay apprised of the situations. The views purported by the media, however, are often contrary to what research says and what empirical findings indicate. As a result, discordant views propagate among members of the public and distort the empirical reality surrounding school gun violence (Hagan et al. 2002; Muschert 2007; see also Schutten et al. 2020; Silva and Capellan 2019).

Media distortions and public misperceptions surrounding school shootings have also been influenced by narratives centering on race and socio-economic class. For example, researchers have noted that the newsworthiness of shooting events is often shaped by demographic considerations, particularly the age, race, sex, and gender of perpetrators (Ball and Suleyman 2023; Birkland and Lawrence 2009; Gruenewald et al. 2009; Silva and Capellan 2019). To illustrate, Gruenewald and colleagues (2009) reported that among perpetrator–victim homicide dyads, those homicides involving Hispanic perpetrators received significantly more news coverage than homicides involving Black perpetrators (see also Silva and Capellan 2019). Similar disparities in coverage emerge when perpetrators are White and the event is a mass shooting, which garner considerably more news attention.

Relatedly, the media differentially emphasize characteristics and motivations depending on the race of perpetrators, such as focusing on the mental health of White mass shooters while simultaneously problematizing gun violence perpetrators who are not White (see Ball and Suleyman 2023). Scholars have also noted that "newsworthiness" of gun violence events is often determined by their occurrence in supposedly "unexpected" communities. To the media, the typical "unexpected" community is predominantly White, suburban, and/or more affluent (Ball and Suleyman 2023; Gruenewald et al. 2009; Silva and Capellan 2019). Indeed, both Columbine and the more recent Covenant shooting in Tennessee highlight this kind of distorted emphasis, where these events unfolded in predominantly White locales, subsequently fueling deep concerns and disbelief that such violent events could happen in otherwise quiet, White suburban communities (see Ball and Suleyman 2023).

In sum, whether it is the *Rashomon effect*, a moral panic, or the perception-shaping power of the 24 h news cycle, public opinions and responses to school shootings are in many ways misaligned with empirical reality. Further problematizing public understanding of this issue is that, again, available data and definitions of school shootings are disjointed and incongruent. Thus, even if members of the public sought to research this issue on their own, they are likely to encounter one of the many iterations of school shooting data, each of which necessarily purports a certain view of the school shooting phenomenon that does not align with other sources.

6. Conclusions

Having explored the data collection platforms responsible for cataloguing school gun violence incidents, as well as the various implications stemming from definitional discrepancies, there are a few important considerations that should be taken away from this review. First, it is clear that in certain cases the term "school shooting" has become synonymous with rampage or other mass school shooting events. This is particularly problematic given that the overwhelming majority of gun violence incidents affecting school property are not these types of events. In response to this issue, effort should be made on the part of Criminologists and other academics to communicate clearly that construing "school shootings" in this way is a misnomer. As experts in Criminology and Criminal Justice, we have a responsibility to educate interested parties as to the nature and extent of gun violence affecting educational institutions in America. Importantly, that education starts with effectively communicating that there are a variety of types of school gun violence beyond the sensationalized massacres at schools, and any mitigation efforts must consider these other types of incidents. Furthermore, scholars should continue stating that school gun violence events are rare and that mass school gun violence events are *exceedingly* rare. The benefits of doing this can increase public understanding, facilitate more applicable social, political, and policy responses to school gun violence, and perhaps increase the robustness of empirical literature.

Success in these ways, however, is in part dependent on a second and equally important point. That is, the way school gun violence incidents are collected under variable definitions is exceptionally problematic. One response to this issue might involve consulting multiple of the available data sources to compile a "master" data set of school gun violence. In doing so, Criminologists and school gun violence scholars will have a more complete and comprehensive listing of the variety of gun violence events impacting educational institutions. Some have argued that a broad definition of school gun violence is the best starting point. For example, the value of a broad definition has been promoted by David Reidman, the creator of the K-12-SSDB. The argument here is quite simple: the wider the definitional net, the more incidents we capture. The more data we have at our disposal means more freedom of choice in empirically analyzing specific subtypes of school gun violence. Theoretically, using a broad definition may allow for a better approximation of the true population of gun violence events impacting schools. This could solve the notorious generalizability problems that plague those studies that have used small samples of school gun violence incidents. This point, however, should not be construed so as to

completely reject the value of qualitative and/or small sample size research of school gun violence. As it happens, qualitative research has the benefit of deeply conceptualizing and operationalizing very particular elements of school gun violence that quantitative research cannot address, and these sorts of insights may be integral in correcting pre-existent methodological errors. As such, any attempt to reconcile the existing errors in school gun violence research must also allow for qualitative assessment of school gun violence phenomena. Nevertheless, there are serious drawbacks in using too broad of a definition. Particularly, broad definitions could generate ambiguity conceptually, methodologically, and analytically speaking. In a practical sense, there is a risk that broad definitions will capture events that ought not be considered as school shootings conceptually, which subsequently inflates the overall count of school shootings. In such cases, a narrower definition might be the optimal approach.

Yet another, although perhaps less desirable option would be to create a new "master" definition which works to reconcile the inconsistencies between all of the different data collection platforms. This could cause more problems than solutions, given that another definition could just "muddy the waters". Though this idea may have drawbacks, it could be undertaken seriously and produce certain benefits. If Criminologists were to agree on a baseline set of criteria, they should not make the definition too broad for the aforementioned reasons. For example, shootings that occur miles from the actual school building, shootings at bus stops, shootings perpetrated with toy guns, and shootings that occur on the way to or from schools and so on are too broad. Nor should they make it too narrow, such as only including mass school shootings, or shootings perpetrated only by current or former students, or shootings only involving perpetrators who are under a certain age, or shootings that require specific intent to harm on the part of perpetrators. As previously mentioned, the main threat facing school campus safety in the modern era is the various other forms of gun violence that occur multiple times a week at schools across the country or that spill over on to school property. However difficult it may be, restructuring and redefining the nature of school gun violence in a way that strikes a balance between broad and narrow inclusion criteria could instigate positive change in a variety of ways, including the following:

- Enhanced consistency in data collection results in the capture of relevant incidents, thereby better approximating the nature, frequency, and extent of gun violence on school property.
- Consistent conceptual and operational terminology/measurement of school gun violence produces consensus on what constitutes school gun violence and how it will be consistently measured.
- Research and analysis that employs consistent interpretations of identical data can produce convergent empirical findings, therefore resulting in a grounded objective reality of what school gun violence is and what factors/correlates are essential in its occurrence.
- Legislative, political, community, and school district responses to school gun violence that are based on consistent data/measurement stand a better chance of instigating proportional and reasonable policy directives, which in turn may be more effective than current prevention strategies.
- Promoting public awareness of school gun violence that is rooted in empiricism and objectivity can modify the historically dominant narrative of "school shootings" to better align with criminological research, thereby correcting public misperception of this issue.

Furthermore, implementing a new definition can potentially create a new discourse informed by the expertise of Criminologists and the empirical bases of school gun violence. This discourse would be in line with the concept of "newsmaking criminology" which can create "a supportive discourse that deconstructs prevailing structures of meanings and replace them with new conceptions, words, and phrases that offer alternative meaning" (Reinsmith-Jones et al. 2015, p. 107). Of course, this dialogue and definitional change ought

to be shifted inwardly toward Criminologists as well, primarily to dissuade the continued perpetuation of divergent datasets and incohesive conceptualizations and operationalizations of "school shootings". While it is possible that placing the onus of definitional change in the hands of Criminologists and/or gun violence scholars alone runs the risk of being "technocratic", logic would suggest that producing change in the scientific community first may subsequently produce trickle-down benefits in non-academic settings. Specifically, by first collectively organizing the community of scientists who study school gun violence, modifications in how we empirically define and examine criminal phenomena are likely better achieved. As a consequence of "being on the same page" so to speak, better governmental policy responses may follow, and clearer discussions and representations of the issue can be made and be better comprehended by the public and media. In this vein, a shared definition of school gun violence has the potential to systematize scientific methodology and analytics, impact political discourse and social policy in communities that are affected by school gun violence and produce more objective perceptions of school gun violence among the American populace.

Collectively, school gun violence scholars and interested Criminologists should first promote the movement away from the traditional imagery and narratives imbued in the term "school shooting", both in public discourse and in research on the matter. That rare and sensationalized events have dominated perceptions surrounding this particular type of criminal event is a problem, and better communication on this point is in order. Second, Criminologists and school gun violence scholars should collaborate and determine the best strategy for combining and effectively using the available list of school gun violence events across the various data collection platforms. Third, school gun violence scholars should seriously consider collaborating and working together to either (a) accept a pre-existent definition as the standard, or (b) develop a new definition with broad selection criteria to systematically gather and report school gun violence incidents that occur on school property in the U.S. Each of these nascent steps can help push the criminological discipline and school gun violence scholars' research toward a cohesive and more objective empirical reality of gun violence affecting American schools.

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Appendix A

Table A1. Examples of school shooting definitions across different data sources.

Source	Definition
National School Safety Center (NSSC) (2010) (NSSC)	A school-associated violent death is any homicide, suicide, or weapons-related violent death in the United States in which the fatal injury occurred: 1. on the property of a functioning public, private or parochial elementary or secondary school, Kindergarten through grade 12, (including alternative schools); 2. on the way to or from regular sessions at such a school; 3. while person was attending or was on the way to or from an official school-sponsored event; 4. as obvious direct result of school incidents, functions or activities, whether on or off school bus/vehicle or school property.

Table A1. *Cont.*

Source	Definition
National Center for Educational Statistics (NCES)	A school-associated violent death is defined as a homicide, suicide, or legal intervention death (involving a law enforcement officer), in which the fatal injury occurred: 1. on the campus of a functioning elementary or secondary school in the United States, 2. while the victim was on the way to or from regular sessions at school, 3. or while the victim was attending or traveling to or from an official school sponsored event. 4. victims may include not only students and staff members, but also others at school, such as students' parents and community members. 5. "at school" includes in the school building, on school property, and on the way to or from school.
Center for Disease Control (SAVD-SS)	A school-associated violent death is defined as "a homicide, suicide, or legal intervention death in which the fatal injury occurred: 1. on the campus of a functioning elementary or secondary school in the United States 2. while the victim was on the way to or from regular sessions at school 3. or while the victim was attending or traveling to or from an official school-sponsored event. 4. victims may include nonstudents as well as students and staff members. 5. "at school" includes on the property of a functioning elementary or secondary school, on the way to or from regular sessions at school, and while attending or traveling to or from a school-sponsored event. In this indicator, the term "at school" is comparable in meaning to the term "school-associated".
Gun Violence Archive (GVA)	A school shooting as an incident that occurs on property of the elementary, secondary or college campus where: 1. there is a death or injury from gunfire 2. that includes school proper, playgrounds, "skirt" of the facility which includes sidewalks, stadiums, parking lots 3. the defining characteristic is time. Incidents occur when students, staff, faculty are present at the facility for school or extracurricular activities. 4. not included are incidents at businesses across the street, meetings at parking lots at off hours. 5. incidents that take place on or near school property when no students or faculty/staff are present are not considered "school shootings" 6. in those incidents where someone is injured/killed we include any gunfire, whether intended to shoot/kill students or not. Those can be sorted by extra characteristics such as suicide or accidental.

Table A1. *Cont.*

Source	Definition
Freilich et al. (2021); The American School Shooting Study (TASSS)	To qualify as a school shooting, TASSS requires that the shooting: 1. must have occurred between 1 January 1990 and 31 December 2016. 2. must have occurred in the 50 United States, including Washington DC. 3. must have resulted in a criminal justice response. 4. a firearm must have discharged explosives to propel a projectile. 5. must have occurred at a K-12 school. This includes elementary, junior high, middle, and high schools of all types, including vocational, alternative, career centers, and private schools. a. the shooting must have occurred on the K-12 school's grounds. The school's grounds include both inside the school building, and outside places such as yards, parking lots, etc., that are also school property. b. includes shootings that occur on school buses, or at school stadiums that are not on the school's precise grounds, but where the school still has the loci of control, and exercises authority over that environment. i. includes football games/basketball games/dances when they occur on or off school property, if the school has insured the event and is in control c. the shooting only has to occur on the school grounds, it does not have to be related to the school. d. includes shootings that take place both during and after scheduled school hours and when school is not in session such as the summer or winter breaks. 6. the gun discharge must injure or kill at least 1 person with a bullet wound. This includes intentional shootings, accidental discharges, and suicides. Excluded are the following types of incidents: a. that occurred in US territories, or in other nations b. plots (no discharge occurred) as well as cases where the offender used a knife, blunt instruments, their fists, explosive devices, cars, a BB or pellet gun or any other non-gun weapon to cause injury or death. c. that occurred at colleges, universities, nurseries, or school board meetings occurring at non-school locations. d. that are right next to a school, such as the sidewalk right in front of the gate, or at the corner, if they are outside the school's property. e. shootings at bus stops and victims walking to and from school when they are outside school grounds. f. shootings that resulted in no gun injuries or deaths, such as when a school is hit by a stray bullet
Everytown for Gun Safety (EGS) (2020) (EGS)	EGS defines a school shooting as: 1. any time a gun discharges a live round inside (or into) a school building, 2. or on (or onto) a school campus or grounds, 3. where "school" refers to elementary, middle, and high schools—K–12—as well as colleges and universities.
K-12 School Shooting Database (K-12-SSDB)	The K-12-SSDB defines a school shooting as: 1. a gun is brandished, is fired, or a bullet hits school property for any reason, regardless of the number of victims (including zero), time, day of the week, or reason. 2. instances where the shooter initially made threatening gestures with a firearm, but was stopped (weapon malfunction, shooter was tackled) prior to getting off a shot, are also included in the K-12 SSDB Excluded are the following types of incidents: a. shootings that occur on any school property not defined/treated as a K-12 institution

Table A1. *Cont.*

Source	Definition
Columbine Angels (2021) (CA)	CA defines school violence/shootings as: 1. any act of violence that results in the physical injury or death of any student, teacher, school administrator, school support staff, or visitor to a school while on school grounds 2. any act of violence that results in the physical injury or death of any student, teacher, school administrator or school support staff, while at a school function not on school grounds 3. any act of violence that results in the physical injury or death of any student or driver while on a school bus. 4. an attack that starts on the bus and then continues when the students leave the bus Excluded are the following types of incidents: a. shootings across the street from the school, a block from the school, in the park next to the school, in an off-campus college apartment building b. if the attack happens after the students have stepped off the bus and are on the street or sidewalk, or attacks at school bus stops.
The Washington Post (WAPO)	The Washington Post defines school shootings as: 1. any act of gunfire at a primary or secondary school during school hours since the Columbine High massacre on April 20, 1999. 2. counted only those that happened on campuses immediately before, during or just after classes. Excluded are the following types of incidents: a. shootings at after-hours events, accidental discharges that caused no injuries to anyone other than the person handling the gun, and suicides that occurred privately or posed no threat to other children were excluded. b. gunfire at colleges and universities, which affects young adults rather than kids, also was not counted.
Chiwaya et al. (2022); NBC School Shooting Tracker (NBC-SST)	NBC defines a school shooting as incidents meeting the following criteria: 1. one or more active shooters. The FBI defines an active shooter as an individual engaged in attempting to kill people in a confined space or populated area. 2. on school property during school hours and as students are arriving or leaving, or at school-sanctioned or school-sponsored events. "Schools" are defined as ranging from nursery schools to colleges, universities, and technical schools. 3. there is intent to harm students or faculty with a gun. 4. at least one person, other than the shooter, is injured or dies. Excluded are the following types of incidents: a. accidental discharge of a weapon at school b. suicide by firearm at school c. isolated fights, altercations, or domestic disputes, including gang violence
Education Week (2022) School Shooting Tracker (EW-SST)	Education Weekly defines a school shooting as incidents: 1. where a firearm was discharged 2. where any individual, other than the suspect or perpetrator, has a bullet wound resulting from the incident 3. that happen on K-12 school property or on a school bus 4. that occur while school is in session or during a school-sponsored event 5. we only track incidents resulting in at least one bullet wound Excluded are the following types of incidents: a. incidents in which the only shots fired were from an individual authorized to carry a gun, such as a school resource officer, and who did so in their official capacity. b. do not include suicides or self-inflicted injuries. c. do not include incidents that involve the accidental discharge of weapons carried by law enforcement officers that do not kill or harm

Table A1. *Cont.*

Source	Definition
Laurine (2021); SchoolShootingDatabase.com (SSS-DB)	The SSS-DB defines school shootings as incidents where: 1. a firearm was discharged on school property (inside or outside) no matter the type or cause of the shooting a. includes shootings at all levels of K-12 institutions, preschools, four-year colleges and universities, community colleges, vocational (or trade) schools, military schools, private and public institutions, district offices 2. includes shootings at school-sponsored events, like the prom, talent shows, athletic events, school plays, field trips, etc., even if the shooting occurred off campus 3. a firearm is discharged at the school from off campus and a bullet strikes the school building or people on campus it is included in the database no matter the cause or classification (or type) of shooting 4. includes police shootings, accidental shootings, gang related shootings, suicides (where no one else but the shooter was injured), shootings that have nothing to do with the school other than the location, shootings on school buses en route to or from the school, shootings that happen after school hours and in the early morning hours, shootings with no deaths and injuries, stray bullets that strike the school (usually involve target practice or hunting accidents), drive-by shootings where the school building or people get struck with a bullet Excluded are the following types of incidents: a. no shots fired incidents involving firearms (or where a gun is only brandished) b. off campus (or near) school shooting incidents (shootings that occurred across the street that did not strike the school or hit someone on school property are excluded, etc.) c. BB gun school shootings d. shootings at bus stops (unless the bus is at the school)
Wikipedia (2022) (WKP)	Wikipedia defines a school shooting as: 1. an attack at an educational institution, such as a primary school, secondary school, or university, involving the use of firearms 2. includes any school shootings that occurred at a K-12 public or private school, as well as at colleges and universities, and on school buses Excluded are the following types of incidents: a. incidents that occurred during wars b. incidents that occurred as a result of police actions c. murder-suicides by rejected suitors or estranged spouses d. suicides or suicide attempts involving only one person. e. shootings by school staff, where the only victims are other employees

Note. All information in this table is directly quoted from each source's webpage/document. Each source is listed in the reference section of this manuscript.

Appendix B

Table A2. Select examples of school shooting definitions proposed/used by different scholars in chronological order.

Source	Definition
Harding et al. (2002)	Rampage school shooting is defined as follows: 1. The location of the incident is a "public stage" either on the school property or at a school-related function. 2. The shooters must be current or former students of the school. 3. There must be multiple victims (although the injuries do not have to be fatal) or, at the very least, multiple targets. 4. While some victims may be targeted specifically because they have wronged the shooter, there are typically others who are chosen only for their symbolic significance (the principal, the preps, the prayer circle, the jocks) or are shot at random. (p. 203)

Table A2. *Cont.*

Source	Definition
Arcus (2002)	A school shooting is defined as follows: 1. Student deaths from shootings inside the school or on school grounds. (p. 177)
Vossekuil et al. (2002)	A school shooting is defined as follows: 1. Any incident where a current student or recent former student attacked someone at his or her school; 2. With lethal means (e.g., a gun or knife); 3. Where the student attacker purposefully chose his or her school as the location of the attack. Excluded the following types of incidents: 4. Incidents where the school was chosen simply as a site of opportunity; 5. Incidents that were solely related to gang or drug trade activity or to a violent interaction between individuals that just happened to occur at the school. (p. 7)
Leary et al. (2003)	A school shooting is defined as follows: 1. A shooting incident must have occurred at a school during the school day. 2. In addition, the shooting must have been perpetrated by students and resulted in injury or death to at least one student. Excluded the following types of incidents: a. Cases in which shots were fired but no one was injured were excluded because the perpetrators may have intended to impress or intimidate their peers rather than harm them (and, thus, would not constitute acts of aggression). b. Shootings that occurred after school hours, for example at school dances and athletic events, were not included. c. Furthermore, incidents in which the only victims were nonstudents were not considered (such as the shooting of an assistant principal in Greensboro, NC) because we were explicitly concerned only with students' aggression toward their peers. (pp. 204–5)
Newman et al. (2004)	Rampage school shootings must 1. Take place on a school-related public stage before an audience; 2. Involve multiple victims, some of whom are shot simply for their symbolic significance or at random; 3. Involve one or more shooters who are students or former students of the school. (p. 50) Excludes the following types of incidents: a. A student who comes to the school looking to shoot a particular antagonist, or the school principal, but does not fire at others. b. Gang violence. c. Revenge killings following drug deals that go bad. (p. 50)
McCabe and Martin (2005)	A school shooting is defined as follows: 1. One that results in, at minimum, an injury or death of a student or teacher; 2. At the hands of another student; 3. Within the physical location of the school setting. (p. 42)
Kaiser (2006)	A school shooting is defined as follows: 1. An incident that took place on school grounds; 2. Was committed by students of the school; 3. With clear lethal intent; 4. Which resulted in multiple victimizations; 5. One "school shooting" incident included in this analysis took place without the use of a firearm, when seven fellow students were injured by a machete and tree saw. Excluded the following types of incidents a. Events perpetrated by adults, ex-students, or unknown assailants. (p. 105)

Table A2. *Cont.*

Source	Definition
Levin and Madfis (2009)	A rampage school shooting is defined as follows: 1. Cases in which multiple human targets were killed or injured on school property by a student or recent former student of the targeted school, where three or more victims were killed or injured. 2. Those perpetrators who themselves, at the time of the attack, were enrolled in or were recently withdrawn from the middle school, high school, or college that they targeted. Excluded the following types of incidents: 3. This analysis excludes the episodes in which outsiders, often much older adults who lack any direct connection with the school, invade a school building with the intention of amassing a large body count. 4. School shooting cases with single victims as well as double murders in which particular individuals, and no other students or teachers, were targeted, for example, in the case of domestic violence. (pp. 1228–29)
De Apodaca et al. (2012)	A school shooting is defined as follows: 1. A deliberate act of homicide; 2. Committed by gunshot(s); 3. By a perpetrator who had a formal, legitimate, and ongoing membership in the school (e.g., student, faculty, employee).; 4. Random shootings when the perpetrator shot and killed people (typically multiple victims) without having a specific conflict, grievance, or relationship with them. The victims were selected seemingly at random or as symbolic targets of the shooter's diffuse rage; 5. Targeted shootings were characterized by a perpetrator who had a specific individual victim with whom a personalized grievance was held at the time of the fatal shooting. Excluded the following types of incidents: a. Shootings by someone unaffiliated with the school. (pp. 368–69)
Böckler et al. (2013)	A school shooting is defined as follows: 1. Location of violent incident was a school (elementary or secondary) or an institution of further or higher education. 2. Perpetrator was a current or former student at the educational facility. 3. Use of a potentially lethal weapon (firearm, knife, explosives, etc.) to attempt to injure or kill more than one person. The crucial criterion is not the outcome (actual number of victims) but the intent. 4. The attack took place during school hours on school premises, usually in front of an audience composed of other students and/or members of the school staff. 5. The shooter chose victims deliberately on the basis of conflictual relationships; and/or randomly; and/or for their symbolic significance or their status in the school's social system. (pp. 7–8)
Blair and Schweit (2014)	Educational active shooter is defined as follows: 1. An individual actively engaged in killing or attempting to kill people in a confined and populated area. 2. Implicit in this definition is that the subject's criminal actions involve the use of firearms. 3. Definition to include individuals because some incidents involved two or more shooters. Excluded the following types of incidents: a. Though the federal definition includes the word "confined", the FBI excluded this word in its study, as the term confined could omit incidents that occurred outside a building. b. Shootings that resulted from gang or drug violence. c. Pervasive, long-tracked, criminal acts that could also affect the public. d. Other gun-related shootings were not included when those incidents appeared generally not to have put others in peril (e.g., the accidental discharge of a firearm in a school building or a person who chose to publicly commit suicide in a parking lot).

Table A2. *Cont.*

Source	Definition
Gerard et al. (2016)	A school shooting is defined as follows: 1. An attack by someone (regardless of whether or not it was lethal); 2. Against two or more victims; 3. With at least one firearm; 4. On school grounds. (p. 23)
Anderson and Sabia (2016)	A school shooting is defined as follows: 1. An event that takes place on school property; 2. Includes shootings on school buses and in areas outside of the main building, such as school parking lots and athletic fields; 3. A death occurred (homicide, suicide, or accidental); 4. Includes gang-related shootings. (p. 19)
Kalesan et al. (2016)	A school shooting is defined as follows: 1. An incident when a firearm was discharged inside a school building or on school or campus grounds, as documented in publicly reported news; 2. Firearm discharged including school/college parking lot; 3. Separate incidents of school shootings within the same school were considered as individual events. Excluded the following types of incidents: a. Firearm was present, but not discharged; b. Firearm discharge occurred outside or out the bounds of the school campus and NOT within the school campus. (p. 15 of supplemental appendix 1)
Langman (2016)	A school shooting is defined as follows: 1. The attacks occurred in education-related settings; 2. The attacks involved the use of firearms (though other types of violence may have also been employed); 3. The attacks were premeditated; 4. The attacks resulted in at least three victims being killed or wounded. Excluded the following types of incidents: a. Violence that erupted spontaneously at campus parties, sporting events, in parking lots, or other locations was not included; b. Perpetrators who shot themselves or were shot by police were not included in the victim count; c. Incidents resulting from rival gang violence; d. Incidents consisting of intimate partner violence that happened to occur on school property. (p. 2)
Baird et al. (2017)	A school shooting is defined as follows: 1. Shootings that occurred on middle or high school campuses, 2. In episodes that injured or killed two or more students, teachers, or staff members. Importantly, 3. Cases in which the shooter appeared to choose his victims at random; 4. Cases which involved the use of guns. Excluded the following types of incidents: a. Cases in which victims were personally targeted due to interpersonal disputes, domestic violence, drug trafficking, or gang activity; b. Shootings that occurred off of school grounds; c. Shootings perpetrated by individuals not currently enrolled at the targeted school; d. Mass school violence involving knives, bombs, or other weaponry. (p. 264)

Table A2. *Cont.*

Source	Definition
Pah et al. (2017)	A school shooting is defined as follows: 1. The shooting must involve a firearm being discharged, even if by accident; 2. It must occur on a school campus; 3. It must involve students or school employees, either as perpetrators, bystanders or victims; 4. A student being shot at the school's baseball field after a game is included. Excluded the following types of incidents: a. Gang violence on a playground at night during the summer months would not be included since it violates the last criterion. (p. 1)
Paradice (2017)	A school shooting is defined as follows: 1. A firearm was discharged in an educational institution or on its grounds; 2. Regardless of the number of people wounded or killed. Excluded the following types of incidents: a. Shootings by police (e.g., in response to a crime) or other authorities (e.g., the Kent State University shootings by National Guardsmen); b. Occurred at school board meetings; c. Not reasonably related to anything that would be considered normal educational campus-related activity; d. Did not actually occur on a campus; e. Suicide by administrators; f. Occurred in the middle of the night. (p. 137)
Katsiyannis et al. (2018)	A mass school shooting is defined as follows: 1. A situation in which one or more people intentionally plan and execute the killing or injury; 2. Of four or more people, not including themselves; 3. Using one or more guns; 4. With the killings or injuries taking place on school grounds; 5. During the school day or during a school-sponsored event on school grounds; 6. Perpetrated by adolescents and adults at K-12 schools. Excluded the following types of incidents: a. Organized gang shootings and those that occurred at universities.
Farr (2018)	Rampage school shootings must meet the following criteria: 1. The attacked school was a high, middle, or elementary school; 2. The shooter was a current or former student at the school and under the age of 21; 3. The shooting took place in the school, on the school grounds, or at a school event; 4. The shooter shot at two or more people, at least one of whom was a student, or shot at or into a group or gathering that included at least one student; 5. At least one of the persons shot or shot at was not a specifically targeted victim. (p. 77)
Fridel (2019)	A school shooting is defined as follows: 1. The firing or brandishing of a gun on school property (including inside school buildings, outdoor properties such as sports fields and parking lots, and school buses); 2. During the school day or school-sponsored event (e.g., sporting event, school dance, pep rally, game night, theater performance, etc.); 3. Only shootings that occurred between the 1998/1999 and 2017/2018 school years were considered. Excluded the following types of incidents: a. Incidents that occurred after school hours or on the weekend; b. At private schools; c. At a college or university; d. Cases in which an individual had no intent of harming others (e.g., accidental gunfire, destruction of school property, and/or suicide attempts). (p. 10)

Table A2. *Cont.*

Source	Definition
School Shooting Safety and Preparedness Act, H. R. 4301—Gabbard et al. (2019)	A school shooting is defined as follows: 1. An event or occurrence during which one or more individuals were injured or killed; 2. By a firearm; 3. That occurred in, or on the grounds of a school. 4. Even if before or after school hours; 5. While the victim was traveling to or from a regular session at school; 6. While the victim was attending or traveling to or from an official school-sponsored event. Excludes the following types of incidents: a. Accidental shootings. (p. 3)
Poland and Ferguson (2021)	A school shooting is defined as follows: 1. An event in which a perpetrator utilized a firearm; 2. On school campus; 3. To intentionally execute or injure others; 4. Includes school shootings that have resulted in single and multiple deaths and injuries. (p. 4).
Paez et al. (2021)	Mass school shootings involve the following: 1. One or more students who are actively engaged in killing or attempting to kill three or more victims on school grounds. 2. Students that intended to kill three or more victims, but for some reason failed to do so, are included in the analysis as rampage school shooters. 3. The perpetrator must use at least one firearm, but he/she is not limited to firearms only. 4. Instances also include every instance a gun is displayed, fired, or a bullet hits school property for any reason, regardless of the number of victims, time, day of the week, or reason (e.g., premeditated attack, unintentional, domestic violence, or gang-related) with two or fewer victims. (p. 174)
Reeping et al. (2022)	An active school shooting is defined as the following: 1. Incidents where a firearm was discharged on school property; 2. While school was in session; 3. Authorities determined that the attack was intended to be a mass shooting (which is generally defined as a shooting resulting in four or more victims, not including the shooter(s). 4. Any attempted mass shooting incident in a K-12 school as confirmed by authorities; 5. Where four or more individuals were at risk of being shot. Excluded the following types of incidents: a. Shootings at after-hours events; b. Accidental discharges that caused no injuries to anyone other than the person handling the gun; c. Suicides that occurred privately or posed no threat to other children; d. Gunfire at colleges and universities which affects young adults rather than kids. (pp. 3–4)

Note. This list of school shooting definitions is non-exhaustive. Readers should also consult Sommer et al. (2014) and their list of 35 studies' definitions, some of which overlap with the definitions provided in this table.

Notes

[1] The K-12-SSDD became independent from the CHDS as a collection platform in 2018 after the Uvalde incident. See https://ipvm.com/reports/k-12-school-shooting-database (accessed on 1 February 2023).

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