



Known to the system? Criminal history, pre-attack behaviors, and firearms acquisition among mass public shooters with documented warning behaviors

M. Hunter Martaindale^{a,*}, Emily A. Greene-Colozzi^b, Jaclyn Schildkraut^c

^a ALERRT Center, School of Criminal Justice and Criminal Justice, Texas State University, San Marcos, TX, USA

^b School of Criminology and Justice Studies, University of Massachusetts Lowell, Lowell, MA, USA

^c Regional Gun Violence Research Consortium, Rockefeller Institute of Government, Albany, NY, USA

ARTICLE INFO

Keywords:

Mass public shootings
Criminal justice contact
Pre-attack warning behaviors
Firearm acquisition
Violence prevention

ABSTRACT

Prior research has documented that many mass public shooters have prior contact with the criminal justice system and exhibit observable pre-attack warning behaviors, but these patterns are typically reported in aggregate. Using a dataset of 171 mass public shooting incidents in the United States (1999–2024) involving 175 perpetrators with documented pre-attack warning behaviors (e.g., leakage of intent), the present study examines whether perpetrators with and without criminal records differ in demographic characteristics, pre-attack behavioral indicators, and firearm acquisition patterns. Among the 100 perpetrators with known criminal history status, those with criminal records were significantly older and exhibited fewer documented concerning behaviors, with a similar pattern for grievances. Perpetrators without criminal records more frequently obtained firearms through federally licensed dealers, though this difference did not reach conventional significance. These findings suggest that variation in criminal justice contact corresponds to differences in how perpetrators are visible prior to their attacks, with implications for prevention and intervention. Background checks may be more applicable to individuals with disqualifying histories, whereas behavioral indicators may be more informative for those without prior system contact, though neither approach alone fully addresses both.

Mass public shootings in the United States continue to generate widespread public concern and policy debate. The phenomenon is generally understood as an incident in which an offender kills or attempts to kill multiple victims in a public place, excluding violence that is incidental to other criminal activity such as gang conflict or organized terrorism. However, definitions differ in the threshold they impose. Some definitions require a minimum number of fatalities (commonly four; Fox & Levin, 2015; Peterson & Densley, 2021), whereas others, including the present study, count victims by combining fatalities and injuries (Gun Violence Archive, 2026; Schildkraut & Elsass, 2016). Likewise, scholarship has approached these events through their correlates and severity (Cao et al., 2025), their cultural and gendered dimensions (Bridges et al., 2022), and their persistent definitional ambiguity (Sandel & Martaindale, 2022). Because these choices determine which incidents qualify, they shape the composition of the resulting samples and the scope of the inferences those samples can support, a point we return to when interpreting the present findings.

While mass public shootings represent a small share of overall gun violence (Duwe, 2020; Schildkraut & Turanovic, 2022), their concentrated lethality and public nature make them distinct targets for prevention research (Schildkraut & Geller, 2022). Two converging lines of evidence suggest that many of these attacks could, in principle, be prevented before they occur. First, perpetrators routinely exhibit observable pre-attack warning behaviors, including leakage of intent, escalating concerning behaviors, and documented grievances (Meloy et al., 2012; Meloy & O'Toole, 2011; Silver, Horgan, & Gill, 2018). Second, a substantial proportion of these perpetrators have had prior contact with law enforcement or the criminal justice system (National Threat Assessment Center [NTAC], 2023; Silver, Simons, & Craun, 2018).

These findings carry a striking implication: many mass public shooters were visible to formal institutional systems before their attacks. Although existing research has documented important patterns in system contact among mass public shooters, these findings typically are

* Corresponding author at: ALERRT Center, Texas State University, San Marcos, TX 78666, USA.

E-mail address: Hunter.Martaindale@txstate.edu (M.H. Martaindale).

reported in aggregate, with less attention to whether perpetrators who were known to the criminal justice system differ systematically from those who were not. This distinction matters because different perpetrator characteristics imply different prevention mechanisms. For example, a perpetrator with a criminal record who acquires a firearm illegally presents a different policy challenge than one with no criminal record who purchases a firearm legally but exhibits extensive behavioral warning signs.

To address this gap, the present study moves beyond aggregate estimates of system contact to examine whether perpetrators with and without criminal records differ systematically in their behavioral signatures and firearms acquisition patterns. Drawing on a comprehensive dataset of mass public shooters with documented pre-attack warning behaviors (e.g., leakage of intent), we compare these groups across key pre-attack indicators and pathways to firearm access. This approach allows us to assess whether variation in system contact corresponds to meaningful differences in how perpetrators are visible prior to their attacks. In doing so, the study reframes the prevention question from whether perpetrators were known to formal systems to how they were known, and what that distinction implies for intervention.

1. Literature review

1.1. Pre-attack warning behaviors

Research on targeted violence has consistently demonstrated that perpetrators exhibit identifiable warning behaviors prior to their attacks. This line of research grew out of the U.S. Secret Service's Exceptional Case Study Project, which examined the pre-attack thinking and behaviors of individuals who attacked or approached prominent public officials and public figures (Borum et al., 1999; Fein & Vossekuil, 1999). Following the 1999 shooting at Columbine High School, that threat assessment approach was first extended to targeted school violence through the Safe School Initiative (Vossekuil et al., 2004). The pathway to violence model describes progression from grievance through ideation, research, planning, preparation, and attack (Calhoun & Weston, 2003; see also White & Meloy, 2017). Along this pathway, perpetrators frequently communicate their intent through "leakage," defined as the communication of a plan to do harm to a third party (Meloy & O'Toole, 2011). In a study of 115 public mass murderers, 63% shared their intent or plans with others prior to the attack (Silver, Horgan, & Gill, 2018). Comparable patterns have been observed in other studies of mass violence perpetrators (e.g., NTAC, 2023), suggesting that pre-attack warning behaviors are often detectable, at least in retrospect.

Beyond leakage, perpetrators often display congeries of concerning behaviors, including pathway behavior, fixation, identification, novel aggression, energy burst, and last resort actions (Meloy et al., 2012). These behaviors reflect escalating engagement with violent ideation and can manifest in ways that are observable to others in the perpetrator's immediate surroundings. NTAC (2023) has documented these patterns across annual reports covering mass attacks in public spaces, finding that 76% of attackers had demonstrated behaviors that elicited concern from others in their social networks. The FBI's pre-attack behavior study similarly reported that 77% of active shooters spent a week or more planning their attack and that most displayed observable changes in behavior (Silver, Simons, & Craun, 2018). Taken together, this body of work suggests that many perpetrators exhibit behavioral indicators prior to their attacks, though the form, timing, and interpretation of these signals can vary considerably.

These findings have informed the development of structured threat assessment instruments. The TRAP-18 (Meloy & Gill, 2016) and WAVR-21 (White & Meloy, 2016) both incorporate indicators of behavioral escalation alongside background characteristics, reflecting the field's recognition that risk assessment should integrate multiple information domains. Such tools are designed to synthesize behavioral and contextual information to assess risk and guide intervention, rather than

relying on any single indicator in isolation. This emphasis on integrating multiple domains of information is particularly relevant for understanding how behavioral warning signs intersect with other forms of system visibility, including prior contact with the criminal justice system.

1.2. Prior systems contact

Alongside the behavioral warning literature, a parallel line of research has documented that many mass public shooters had formal contact with the criminal justice system prior to their attacks. The FBI's study of 63 active shooters (2000–2013) found that 35% of adult shooters had prior adult criminal convictions, and 62% had a documented history of abusive, harassing, or oppressive behaviors that did not result in criminal charges (Silver, Simons, & Craun, 2018). NTAC's (2023) multi-year report covering 173 mass attacks between 2016 and 2020 found that 64% of attackers had a prior criminal history, excluding minor traffic violations, and that roughly three-quarters had some form of prior contact with law enforcement when non-arrest contacts are included. Collectively, these findings suggest that prior contact with the criminal justice system is common among perpetrators of mass violence, though estimates vary considerably with the breadth of the contact measure, case definitions, and data sources.

Less well documented is the nature of that contact. A traffic stop ten years before an attack is categorically different from a domestic violence arrest six months prior, yet most studies report system contact as a binary indicator. This aggregation, while often necessary given available data, may obscure potentially important variation in the type, timing, and severity of prior contact. The role of domestic violence (DV) history has received particular attention, with research suggesting that existing firearm restriction laws for DV offenders could prevent some mass shootings if consistently enforced (Geller et al., 2021; Zeoli & Paruk, 2020). However, empirical assessment is complicated by inconsistent data collection across jurisdictions and high rates of missing information in perpetrator databases (Zeoli et al., 2019).

A critical limitation of existing research is that system contact prevalence is reported as an aggregate rate across all perpetrators, with less attention to potential differences within this population. Yet there are reasons to expect meaningful heterogeneity. Perpetrators who are known to the criminal justice system through arrests or convictions may differ systematically from those whose pre-attack visibility was limited to behavioral channels (concerning behaviors observed by peers, family, or community members). Understanding whether these groups differ in their pre-attack behaviors and firearms acquisition patterns is essential since aggregate prevalence rates may obscure the most policy-relevant variation. This distinction motivates the central question of the present study: whether perpetrators with and without criminal records differ in ways that have implications for prevention.

1.3. Theoretical framework

The present study is guided by the Path to Intended Violence perspective, which holds that targeted violence is not a spontaneous eruption but the endpoint of a discernible behavioral process that moves from a grievance through ideation, planning, and preparation to attack, leaving observable warning behaviors along the way (Calhoun & Weston, 2003; Meloy et al., 2012). A central premise of this perspective is that would-be perpetrators become visible before they act. That visibility, however, can arrive through more than one channel. One channel is behavioral: the concerning behaviors, grievances, and leakage that peers, family, and community members can, in principle, observe and report. A second is formal: arrests, convictions, and other criminal justice contacts through which the system comes to know an individual and which can trigger record-based prevention mechanisms such as background checks. These channels are not mutually exclusive, but they are distinct and correspond to different prevention tools.

Framing pre-attack visibility as a matter of channels motivates the questions this study asks. If perpetrators with and without criminal records were simply more- and less-dangerous versions of a single profile, the two channels would tend to coincide and the distinction by record status would add little. If instead the channels operate partly independently, perpetrators who are not known to the criminal justice system may nonetheless be highly visible behaviorally, and the two groups would differ in how, rather than how much, they signaled their intent before their attacks. The research questions below examine this possibility descriptively, comparing the two groups on behavioral indicators, demographics, and firearms acquisition. Consistent with the study's descriptive aims and sample constraints, we frame them as research questions rather than formal hypothesis tests, and we return to the pathway-to-violence framework in the Discussion when interpreting the pattern of group differences. Because a criminal record accumulates over the life course, any age difference between the groups is expected on largely mechanical grounds (Hirschi & Gottfredson, 1983; Sampson & Laub, 1993) and is interpreted accordingly rather than as a substantive result.

1.4. The current study

Building on the distinction between system contact and behavioral visibility outlined above, the present study examines three research questions:

1. What is the prevalence of prior criminal history and law enforcement contact among mass public shooters, and how sensitive are estimates to missing data?
2. How do perpetrators with and without criminal records differ in pre-attack behavioral indicators and demographics?
3. How do firearms acquisition patterns differ between perpetrators with and without criminal records, particularly regarding background-check-sensitive channels?

These questions are examined within a sample of perpetrators with documented pre-attack warning behaviors, with an emphasis on the distinction between perpetrators with and without criminal records. Our framing is that mass public shooters are not a monolithic group, and that understanding the heterogeneity between those known to the criminal justice system and those visible only through behavioral channels has direct implications for which prevention mechanisms are relevant.

2. Method

2.1. Data and sample

Data for this study were drawn from the Sharing Information to Stop Mass Shootings (SISMS) database (Schildkraut et al., 2026), a pair of linked datasets developed as part of an ongoing research program on mass public shootings. For the purposes of this study, mass public shootings were defined as targeted acts of violence occurring in public or populated settings, involving one or more perpetrators and multiple victims (fatalities and/or injuries) within a single 24-h period (Schildkraut & Elsass, 2016). Incidents were included when victims and locations were selected at random or for symbolic purposes and excluded when associated with gang-related activity or organized terrorist action (Schildkraut & Elsass, 2016). This definition is consistent with prior research and allows for comparability across studies examining mass public shootings.

One dataset contains event-level information for 171 mass public shooting incidents occurring in the United States between 1999 and 2024, including date, location, fatality and injury counts, and event characteristics. A second dataset contains more than 270 coded variables for each of the 175 perpetrators involved in these events, capturing demographics, criminal history, system contacts, pre-attack behaviors,

leakage, concerning behaviors, grievances, firearms acquisition, and attack resolution. The datasets were linked via a shared event identifier, allowing for the integration of event-level and perpetrator-level information in the analyses.

Data collection followed a structured coding protocol drawing from investigative records, court documents, media reports, and, where available, law enforcement case files. The dataset draws on a large corpus of source material, including more than 153,000 pages of official records and related documentation obtained primarily through public records requests to law enforcement agencies, courts, and other entities tasked with investigating or responding to the attacks. All variables were coded using a standardized protocol, with coding conducted by trained research assistants and independently reviewed by project investigators to ensure accuracy and consistency.

Consistent with prior work (e.g., Greene-Colozzi, 2022), the analytic sample was restricted to cases with documented evidence of pre-attack warning behaviors, including leakage, defined as the communication of intent to do harm to a third party. This restriction resulted in a subset of incidents for which behavioral indicators could be systematically coded, rather than a full census of all mass public shooting cases. The final analytic sample included 175 perpetrators across 171 incidents, reflecting a small number of cases involving multiple perpetrators. Pre-attack warning behaviors are therefore present by design for all perpetrators in the dataset, and leakage is not included as an analytic variable. As a result, all behavioral indicator comparisons are conditional on the presence of some documented warning behavior, and findings should be interpreted accordingly.

The data set aims to capture all qualifying events within the study period; as such, the resulting sample approximates a near-census of the target population as defined (i.e., mass public shooters with documented pre-attack warning behaviors). Nonetheless, inferential statistics (*p*-values and confidence intervals) are reported throughout the study. Following Berk et al. (1995), the observed cases are treated as realizations of an underlying data-generating process rather than as a fixed population. Inferential tests therefore quantify what these data suggest about the processes that generate such events, rather than sampling variability from a larger population.

2.2. Measures

The study examined measures capturing prior system involvement, pre-attack behavioral indicators, firearm acquisition patterns, and relevant covariates. Unless otherwise noted, all variables were coded using a presence-based approach in which indicators were coded as present when documentation existed and were otherwise treated as missing. As a result, count and composite measures reflect the number of documented instances rather than the total number of behaviors or conditions present.

2.3. System contact variables

To capture variation in prior system involvement, the study examined three indicators of system contact relevant to criminal justice visibility prior to the attack.

Law enforcement contact. This binary indicator captures any documented contact with law enforcement prior to the attack. Documented contacts ranged from traffic violations and underage drinking to felony assault and domestic violence arrests. Among the 175 perpetrators, 121 had known law enforcement contact status (69.1% coverage), with 112 coded as having prior contact and 9 coded as having no documented prior contact.

Criminal history. This binary indicator captures any documented adult criminal history, defined as convictions or equivalent case outcomes (e.g., diversion, probation). This variable serves as the primary grouping variable for the analyses. Coverage was lower than law enforcement contact: 100 perpetrators had known status (57.1%

coverage), with 52 coded as having a criminal history and 48 coded as having none. The near-even split (52:48) provides substantially better statistical power for group comparisons than law enforcement contact (112:9). The criminal history variable is conceptually distinct from the disqualifying conditions described below, which capture legally relevant restrictions on firearm possession. Some perpetrators classified as having no adult criminal record nonetheless had documented conditions that could affect firearms eligibility, including juvenile offenses ($n = 6$) and drug-related offenses ($n = 4$). These conditions do not constitute an adult criminal record in most jurisdictions but may still prohibit firearms possession under federal or state law. Accordingly, the “no criminal record” group is defined by the absence of documented adult criminal history involvement, not by the absence of all legally relevant history.

Domestic violence history. This indicator captures any documented history of domestic violence. Among the 175 perpetrators, 42 (24.0%) had documented DV history. For analytic purposes, cases without documentation were treated as having no DV history. Accordingly, the reported prevalence should be interpreted as a floor estimate, as some proportion of the undocumented cases likely had DV histories that were not captured in available records.

Any system contact. A composite binary indicator was coded 1 if a perpetrator had either documented prior law enforcement contact or a documented adult criminal history. It was coded 0 when both component indicators were documented as absent, or when one was documented as absent and the other was missing, and was treated as missing only when both component indicators were missing. Known status was therefore available for 133 perpetrators (76.0% coverage), of whom 113 (85.0%) had documented system contact through at least one channel.

2.4. Pre-attack behavioral indicators

To assess pre-attack behavioral patterns, the study included a set of indicators capturing concerning behaviors exhibited prior to the attack.

Concerning behaviors. Twenty-five binary indicators capture concerning behaviors, including killing-related behaviors, drug use, suicidal ideation, isolation, and fixation. A count variable was constructed by summing the number of documented concerning behaviors per perpetrator ($M = 6.62$, $SD = 3.59$, range = 1–18; KR-20 = 0.73). Accordingly, the count reflects the number of documented behaviors rather than the total number of behaviors present. A binary indicator was coded 1 if three or more concerning behaviors were present (88.7% of perpetrators with known data).

Grievances. Eighteen binary indicators capture specific grievances, including rejection, ideology, and strains related to school, work, and interpersonal relationships. A count variable summed the number of documented grievances ($M = 4.78$, $SD = 2.78$, range = 1–14; KR-20 = 0.64). As with concerning behaviors, this count reflects the number of documented grievances rather than the total number present.

Disqualifying conditions. Ten binary indicators capture legally disqualifying conditions for firearms possession, including federal and state felony convictions, misdemeanor convictions, and mental health adjudications. A composite measure was then coded 1 if any documented condition was present (59 perpetrators, 33.7%) and 0 otherwise. Accordingly, this measure reflects documented disqualifying conditions rather than the full prevalence of legally relevant restrictions.

2.5. Firearms acquisition

To assess how perpetrators obtained firearms, the study included a measure capturing primary firearms acquisition source. This variable was originally coded into eight categories: FFL purchase (federal firearms licensee), private citizen purchase, gift, access in home, straw purchase, theft, ghost gun or 3D printed, and other. For group comparisons, this variable was dichotomized into background-check-sensitive (FFL purchases) and non-background-check-sensitive (all other sources). Among the 76 perpetrators with known criminal history

status and primary firearms source, 46 (60.5%) obtained their primary firearm through an FFL purchase. This categorization reflects whether acquisition would typically involve a formal background check at the point of sale.

2.6. Covariates

Perpetrator age ($M = 32.9$, $SD = 15.3$) and sex (94.9% male) were included as demographic variables in the analyses. Additional descriptive statistics also report race (62.3% White, 18.3% Black, 8.6% Hispanic, 10.8% other or unknown) and event year (range = 1999–2024). Incident resolution type was included as a covariate in the missingness analysis.

2.7. Analytic strategy

To address the research questions, the analytic strategy proceeded in four stages.

Stage 1: Prevalence with Bounds

Base rates for system contact variables were estimated with Wilson score 95% confidence intervals. Sensitivity analysis under bounding assumptions, in which all missing cases were alternatively coded as no contact and as contact, provided informative lower and upper bounds on the true prevalence.

Stage 2: Group Comparison

Perpetrators with and without criminal records were compared on demographics, behavioral indicators, and attack characteristics. Continuous variables were compared using Wilcoxon rank-sum tests with Cohen's d effect sizes, where negative values indicate higher scores in the no-record group. Binary variables were compared using Fisher's exact tests with Cramer's V and odds ratios. Because the profile analysis comprised seven group comparisons, we report which differences survive a Bonferroni-adjusted threshold ($\alpha = 0.05/7 = 0.007$) in addition to the conventional 0.05 threshold. As a multivariable robustness check, we additionally estimated a logistic regression predicting criminal record status from age, sex, and the concerning-behavior and grievance counts, with heteroskedasticity-robust (HC1) standard errors, to assess whether the bivariate differences persist when the predictors are modeled jointly.

Stage 3: Cascade Analysis

A cascade analysis traced the sequence from criminal history through disqualifying conditions to primary firearms source, stratified by criminal history group. This analysis identified specific points at which regulatory mechanisms may not fully account for observed acquisition pathways.

Stage 4: Missingness Analysis

Logistic regression models predicted the probability that law enforcement contact and criminal history were missing as a function of event year, fatalities, resolution type, and perpetrator age. Given the sample sizes ($n = 52$ vs. 48), the study had 80% power to detect effects of $d = 0.57$ or larger at $\alpha = 0.05$ (two-tailed), meaning smaller effects may go undetected. All analyses were conducted in R (version 4.5.3).

3. Results

3.1. Prevalence of prior system contact

Table 1 presents the prevalence of prior system contact. Among perpetrators with known law enforcement contact status ($N = 121$, 69.1% coverage), 92.6% (95% CI [86.5, 96.0]) had documented prior contact. Among those with known criminal history status ($N = 100$, 57.1% coverage), 52.0% (95% CI [42.3, 61.5]) had a documented criminal record. Domestic violence history was documented for 42 perpetrators (24.0% of the full sample); this figure is a floor estimate, as the remaining 133 cases had unknown rather than confirmed absent DV status.

Table 1
Prevalence of prior system contact among mass public shooters.

Variable	N	n	%	95% CI	Coverage %
Law enforcement contact	121	112	92.6	[86.5, 96.0]	69.1
Criminal history	100	52	52.0	[42.3, 61.5]	57.1
Domestic violence history (floor)	175	42	24.0	[18.3, 30.8]	100.0
Any system contact	133	113	85.0	[77.9, 90.0]	76.0

These prevalence estimates can be situated against prior studies, although the available benchmarks differ in what they measure. The 52% criminal history rate falls between the two most direct comparisons: the FBI reported that 35% of adult active shooters had prior adult convictions (Silver, Simons, & Craun, 2018), and NTAC (2023) reported that 64% of attackers had a prior criminal history excluding minor traffic violations. The nearly 93% law enforcement contact rate is broader than either of those measures, capturing any documented contact with law enforcement prior to the shooting; the closest available benchmark is NTAC's (2023) finding that roughly three-quarters of attackers had some form of prior contact with law enforcement when non-arrest contacts are included. Two considerations qualify even that comparison. First, the present rate is computed among the 121 perpetrators with known contact status, and sensitivity analyses under bounding assumptions placed the true prevalence between 67.1% (all missing coded as no contact) and 95.3% (all missing coded as contact). Second, the present sample is restricted to perpetrators with documented pre-attack warning behaviors, whereas neither the FBI nor the NTAC sample was conditioned on warning behaviors; perpetrators who exhibited documented leakage may be more visible to formal systems in general, which would elevate observed contact rates relative to unconditioned samples. Accordingly, these figures should be read as context rather than as a like-for-like benchmark.

While law enforcement contact (92.6%) had a high base rate, the near-ceiling rate limits its utility as a discriminating variable. The 112:9 split for law enforcement contact leaves limited variation for group comparisons. By contrast, the 52:48 split for criminal history provides the statistical foundation for the group comparison that follows.

3.2. Group differences: perpetrators with and without criminal records

The central analysis compares perpetrators with documented criminal records ($n = 52$) to those without ($n = 48$) across demographics, behavioral indicators, and attack characteristics. Table 2 presents the results related to demographic and behavioral differences. Three Wilcoxon rank-sum comparisons reached the conventional 0.05 threshold, of which two (age and concerning behaviors) also survived Bonferroni correction for multiple comparisons. Perpetrators with criminal records were significantly older ($M = 37.0$) than those without ($M = 27.9$, $p = .005$, $d = 0.63$, 95% CI [0.23, 1.03]). Perpetrators without criminal records exhibited significantly more documented concerning behaviors ($M = 8.54$) than those with records ($M = 6.67$, $p = .006$, $d = -0.52$, 95%

Table 2
Continuous variable comparisons by criminal record status.

Variable	Record <i>M (SD)</i>	No Record <i>M (SD)</i>	<i>p</i>	<i>d</i> [95% CI]
Age	37.02 (16.61)	27.92 (11.71)	0.005	0.63 [0.23, 1.03]
Concerning behaviors	6.67 (3.79)	8.54 (3.38)	0.006	-0.52 [-0.92, -0.12]
Grievances	4.98 (2.91)	6.12 (2.94)	0.049	-0.39 [-0.79, 0.00]
Fatalities	4.27 (4.70)	7.04 (9.39)	0.126	-0.38 [-0.77, 0.02]

Note. p -values are uncorrected. Under a Bonferroni correction for the seven profile comparisons ($\alpha = 0.007$), the age and concerning-behavior differences remain significant; the grievance difference does not.

CI [-0.92, -0.12]). Perpetrators without records also had more documented grievances ($M = 6.12$) than those with records ($M = 4.98$, $p = .049$, $d = -0.39$, 95% CI [-0.79, 0.00]). This grievance difference was significant at the uncorrected threshold but did not survive Bonferroni correction for multiple comparisons. Fatalities were higher among perpetrators without criminal records ($M = 7.04$) than those with records ($M = 4.27$), though the difference was not statistically significant ($p = .126$, $d = -0.38$, 95% CI [-0.77, 0.02]).

The direction of the behavioral indicators merits comment. Perpetrators without criminal records, who had no formal entry point into the criminal justice system, exhibited *more* documented pre-attack warning behaviors, not fewer. This pattern is not consistent with a simple “visibility” explanation in which system contact and behavioral indicators are positively correlated. Instead, it suggests two distinct groupings: one characterized by formal system involvement and the other by behavioral escalation visible primarily through informal channels.

Results for binary variable comparisons are presented in Table 3. Fisher's exact tests indicated no significant differences in sex distribution (98.1% vs. 93.8% male, $p = .348$), rate of three or more concerning behaviors (90.2% vs. 95.8%, $p = .438$), or documented DV history (32.7% vs. 20.8%, $p = .260$).

3.2.1. Age-stratified comparisons

Given the substantial age difference between groups ($d = 0.63$), we conducted age-stratified Wilcoxon rank-sum comparisons to test whether behavioral differences persist after accounting for age. Using a median split at age 30, younger perpetrators (age 30 or below; $n = 52$, of whom 20 had criminal records and 32 did not) showed the same directional pattern: those without records had more concerning behaviors ($M = 9.38$ vs. 8.10, $d = -0.33$, $p = .253$) and grievances ($M = 6.84$ vs. 6.15, $d = -0.23$, $p = .466$). Among older perpetrators (above 30; $n = 48$, of whom 32 had records and 16 did not), a similar pattern was observed: those without records had more concerning behaviors ($M = 6.88$ vs. 5.74, $d = -0.41$, $p = .198$) and grievances ($M = 4.69$ vs. 4.25, $d = -0.18$, $p = .473$). Neither comparison reached significance within age strata, which is consistent with the reduced sample sizes. The consistency of direction across strata suggests that the behavioral difference is not entirely an artifact of the age difference, though the possibility that age partially contributes to the pattern cannot be ruled out.

3.2.2. Multivariable robustness check

To assess whether the bivariate group differences persist when the predictors are considered jointly, we estimated a multivariable logistic regression predicting criminal record status from age, sex, and the concerning-behavior and grievance counts (complete cases; $N = 99$, 51 with records and 48 without; HC1 robust standard errors). Age was the only statistically significant independent predictor (OR = 1.04, 95% CI [1.00, 1.07], $p = .033$): each additional year of age was associated with higher odds of a criminal record, an expected pattern given that a criminal record accrues over the life course. Once age and the remaining predictors were held constant, the bivariate concerning-behavior difference attenuated to non-significance (OR = 0.91, 95% CI [0.77, 1.08], $p = .275$), as did grievances (OR = 0.99, 95% CI [0.81, 1.22], $p = .960$) and sex (OR = 4.18, 95% CI [0.34, 51.17], $p = .263$).

Table 3
Binary variable comparisons by criminal record status.

Variable	% Record	% No Record	<i>p</i>	OR [95% CI]	<i>V</i>
Male	98.1	93.8	0.348	3.36 [0.26, 181.74]	0.110
3+ concerning behaviors	90.2	95.8	0.438	0.40 [0.04, 2.62]	0.110
DV history (floor estimate)	32.7	20.8	0.260	1.83 [0.68, 5.14]	0.133

The model accounted for a modest share of the variance (McFadden pseudo- $R^2 = 0.10$). This pattern indicates that age is the dominant axis distinguishing the two groups and that the behavioral differences observed bivariately are partly entangled with age, reinforcing the age-related caution noted in the age-stratified analysis. Because the association between age and a criminal record is partly mechanical (older individuals have had more time to accumulate formal contacts), the logistic model is best read as a robustness check on, rather than a replacement for the bivariate comparisons.

3.3. Firearms acquisition cascade

The cascade analysis traces firearms acquisition patterns by criminal record status among the 76 perpetrators with known criminal history and primary firearms source data. The analysis follows the sequence from criminal history through disqualifying conditions to primary firearms source. Fig. 1 presents the results.

Among perpetrators without criminal records ($n = 41$), the dominant acquisition route was FFL purchase (70.7%), followed by access in the home (17.1%), ghost gun or 3D printing (4.9%), gift (2.4%), and theft (4.9%). Among perpetrators with criminal records ($n = 35$), FFL purchase remained the most common source (48.6%) but was supplemented by theft (20.0%), straw purchase (11.4%), access in the home (11.4%), and private citizen purchase (8.6%).

The difference in FFL purchase rates (70.7% vs. 48.6%) was not statistically significant (Fisher's exact $p = .062$, OR = 0.40, 95% CI [0.14, 1.11]). Perpetrators with criminal records were nearly twice as likely to obtain firearms through non-FFL channels than those without criminal records. Coverage of primary firearms source data was higher for the no-record group (85.4%) than the record group (67.3%), an 18-percentage-point gap that could bias this comparison if missingness is related to acquisition method.

3.3.1. Disqualifying conditions and firearms acquisition

Among the 52 perpetrators with criminal records, 30 (57.7%) had a documented disqualifying condition for firearms possession. The most common disqualifying conditions were state felony convictions ($n = 12$), juvenile offenses ($n = 7$), drug-related offenses ($n = 4$), domestic violence protective orders ($n = 3$), federal felony convictions ($n = 3$),

mental health adjudications ($n = 2$), domestic violence convictions ($n = 2$), and state misdemeanor convictions ($n = 1$).

Among these 30 perpetrators with disqualifying conditions, 19 had available data on primary firearms source. Of these 19, five (26.3%) obtained their primary firearm through a federally licensed dealer, five (26.3%) through theft, four (21.1%) through a straw purchase, three (15.8%) through a private citizen purchase, and two (10.5%) through home access. The presence of FFL purchases among individuals with documented disqualifying conditions indicates that some individuals classified as prohibited at the time of the attack nonetheless obtained firearms through background-check-sensitive channels. However, the temporal sequence between disqualifying conditions and firearm acquisition cannot be determined with the available data.

Among the 48 perpetrators without criminal records, disqualifying conditions were nonetheless documented for some cases: drug-related offenses ($n = 4$), juvenile offenses ($n = 6$), and mental health adjudications ($n = 1$). These represent conditions that do not appear in criminal history databases but may still prohibit firearms possession under federal or state law. The presence of these conditions among perpetrators classified as having no criminal record underscores the distinction between criminal justice involvement and firearms eligibility.

3.4. Missingness analysis

Logistic regression models predicting the probability of missing data indicated that fatality count was the primary predictor of missingness for both law enforcement contact and criminal history. Higher-fatality events were significantly less likely to have missing system contact data (law enforcement contact: OR = 0.82, $p = .008$; criminal history: OR = 0.84, $p < .001$). Event year, resolution type, and perpetrator age were not significant predictors. This pattern suggests that missingness may be related to case salience, as higher-fatality events are more likely to have complete background records.

These findings should be interpreted in the context of this pattern of missingness. Since criminal history coverage (57%) is lower than law enforcement contact coverage (69%), and missingness is associated with case documentation, the 100 perpetrators with known criminal history status may overrepresent higher-profile cases. If lower-profile cases (which are more likely to be missing criminal history data) differ

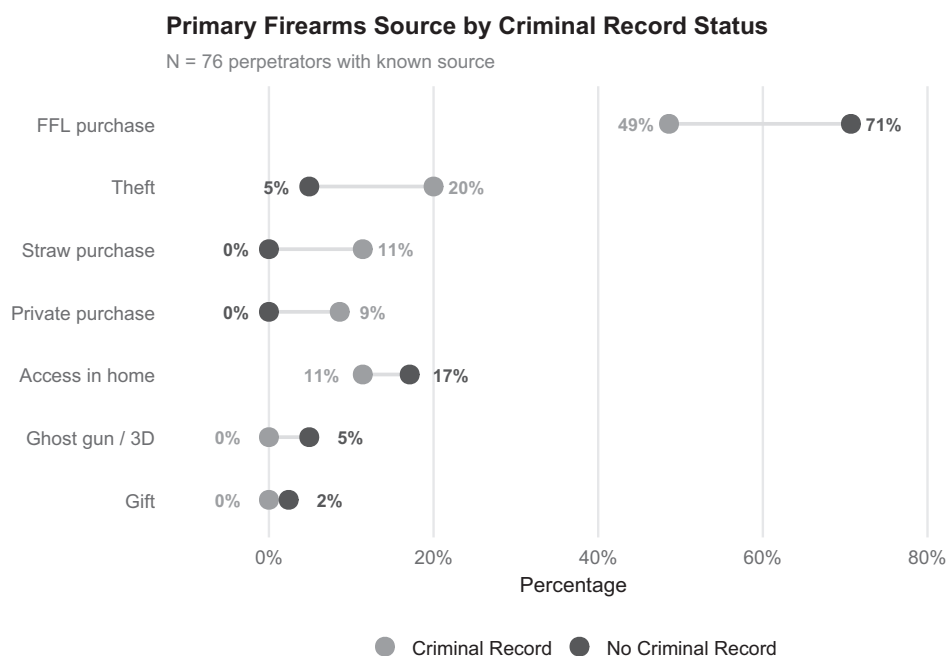


Fig. 1. Primary firearms acquisition source by criminal record status.
Note. FFL = Federal Firearms Licensee.

systematically from those in our analytic sample, the observed group differences could be attenuated or strengthened in the full population.

4. Discussion

The present study provides evidence that, among mass public shooters with documented pre-attack warning behaviors, those with and without criminal records differ in behavioral signatures and firearms acquisition patterns. While prior research has documented high rates of both system contact and pre-attack warning behaviors, these patterns are typically examined in aggregate, obscuring potentially important variation across perpetrators. By distinguishing between perpetrators with and without criminal records, the present analysis identifies systematic differences in how individuals are visible prior to their attacks and how they access firearms. Three findings merit particular attention: (1) the two groups differ significantly in age and pre-attack behavioral indicators, (2) these group differences have direct implications for which prevention mechanisms are relevant, and (3) prevalence estimates with explicit uncertainty characterization provide context for prior work.

4.1. Group differences among mass public shooters

The central contribution of this study is the identification of systematic differences between perpetrators with and without criminal records among the 100 mass public shooters with known criminal history status. The “system-known” group is characterized by older perpetrators ($M_{\text{age}} = 37.0$ years) with documented criminal records but fewer pre-attack concerning behaviors ($M = 6.67$) and grievances ($M = 4.98$). These perpetrators obtained firearms through FFL dealers at a lower rate (48.6%) than those without records (70.7%), though this difference did not reach conventional significance ($p = .062$) and requires replication. The “behaviorally-visible” group is characterized by younger perpetrators ($M_{\text{age}} = 27.9$ years) without criminal records but significantly more documented concerning behaviors ($M = 8.54$), with a similar but weaker pattern for grievances ($M = 6.12$). These perpetrators predominantly acquired firearms through legal FFL purchase. For clarity, these labels describe average group differences derived from bivariate comparisons on a single binary variable, rather than empirically derived typologies from methods such as latent class analysis. Individual perpetrators within each group vary substantially, and the distributions of behavioral indicators overlap.

The reversed direction of the behavioral indicators warrants attention. If prior system contact and behavioral warning signs were positively associated, as a simple “high-visibility” narrative might suggest, one would expect perpetrators with criminal records to also exhibit more concerning behaviors. The opposite pattern is observed: those without criminal records showed significantly more documented warning behaviors. This pattern is not consistent with a simple “visibility” explanation. One post-hoc interpretation is that criminal justice involvement and behavioral escalation may represent alternative rather than additive dimensions of pre-attack visibility, though this interpretation requires further investigation and should be treated as hypothesis-generating rather than confirmatory.

An important question is whether the behavioral differences are an artifact of the substantial age difference between groups. Age-stratified comparisons (median split at 30) showed that within both younger and older perpetrators, those without criminal records had higher concerning behavior counts and grievance counts in the same direction as the overall pattern, though neither comparison reached significance within strata due to reduced sample sizes. Although the behavioral difference is directionally consistent across age strata, the reduced cell sizes (as small as $n = 16$) preclude strong conclusions. Consistent direction in underpowered subgroups is expected even under the null, and the age confound therefore cannot be ruled out.

This finding helps reframe the prevention challenge. Prior research

has documented high aggregate rates of both system contact and behavioral indicators among mass public shooters, leading to a narrative that these perpetrators were “not invisible” to formal systems. Our findings suggest that, while this narrative is accurate in aggregate, it obscures the most policy-relevant variation. The question is not whether perpetrators were visible, but *through which channel(s)* they were visible, because the answer determines which prevention mechanism(s) apply.

4.2. Implications for prevention mechanisms

These group differences have direct implications for the two primary prevention mechanisms currently available. Background checks and firearms prohibitions are designed to prevent firearms acquisition by individuals with disqualifying criminal histories. These mechanisms are most relevant to the “system-known” group, in which 57.7% of perpetrators had documented disqualifying conditions. The cascade analysis, though based on a small subsample ($n = 19$) and therefore preliminary, suggests that some individuals with documented disqualifying conditions nonetheless obtained firearms through FFL dealers (26.3%, 95% CI [11.8, 48.8]). We emphasize, however, that the data cannot establish whether these purchases preceded or followed the disqualifying event (see Limitations). Because a firearm lawfully purchased before a disqualifying event does not represent a background-check failure, this temporal ambiguity materially limits the inferential weight this particular finding can bear, and we accordingly treat it as exploratory.

The presence of FFL purchases among individuals with documented disqualifying conditions is notable because it indicates that, in these cases, formal prohibition did not prevent acquisition through a background-check-sensitive channel. Several distinct regulatory breakdowns could produce this pattern, each pointing to a different intervention point; we detail these possibilities and their policy implications below, after first considering the non-FFL channels through which most such individuals acquired firearms.

At the same time, the majority of individuals with disqualifying conditions who had known acquisition data obtained firearms through non-FFL channels, including theft, straw purchases, and private transactions. These pathways do not require a background check at the point of transfer in many jurisdictions. This finding is consistent with prior research documenting the importance of secondary and informal markets in firearm access. This pattern highlights a separate limitation of point-of-sale regulation: even when background check systems function as intended, prohibited individuals may still obtain firearms through alternative pathways that do not require a background check in many jurisdictions.

The wide confidence interval underscores the need for replication with larger samples before drawing firm policy conclusions. As noted in the Results, the finding could reflect incomplete National Incident Background Check System (NICS) record submission, legal purchase prior to disqualification, or gaps in post-disqualification firearms relinquishment enforcement. If replicated, each explanation would point to a different policy response, including improving the completeness and timeliness of record submission to NICS (Smart et al., 2023; Zeoli & Paruk, 2020), strengthening state-level relinquishment laws and compliance mechanisms, or expanding prohibited-person auditing systems. The Fix NICS Act of 2017 (Pub. L. No. 115–141, 2018) (2018) established incentives for improved record submission, but compliance remains uneven across states, and systematic relinquishment enforcement remains the exception rather than the rule (Zeoli et al., 2019; Zeoli & Paruk, 2020).

Background checks are largely irrelevant to the “behaviorally-visible” group, in which perpetrators had no criminal records that would trigger a firearms prohibition. For these perpetrators, the primary prevention mechanism is behavioral threat assessment, which relies on identifying and managing individuals who exhibit concerning behaviors before they escalate to violence (Calhoun & Weston, 2003; Meloy & Gill, 2016). The finding that these perpetrators exhibited *more* documented

concerning behaviors than those with criminal records suggests that behavioral signals were present prior to the attack. The challenge is whether those signals were recognized, reported, and acted upon in real time.

In fact, because every perpetrator in this sample had documented pre-attack warning behaviors, the relevant failure in these cases was not an absence of signal but a breakdown in the chain that connects a signal to a protective response: recognition, reporting, and action. This observation also qualifies the two-mechanism framing. Although background checks and behavioral threat assessment map onto the two groups in the ways described above, the warning behaviors that define this sample were present across both groups. That makes behavioral detection and reporting a cross-cutting intervention lever, potentially relevant even to perpetrators who were simultaneously known to the criminal justice system, whereas a prevention system relying on formal records alone would not reach the “behaviorally-visible” group at all.

Neither mechanism alone fully addresses both groups. This is the central policy implication of the present study: a singular focus on either background checks or behavioral threat assessment will necessarily miss a substantial proportion of potential mass public shooters. This division reflects the distinct pathways through which perpetrators become visible prior to their attacks. Comprehensive prevention requires both mechanisms operating in parallel, ideally connected through multidisciplinary threat assessment teams that can integrate information from both criminal justice records and behavioral observation (NTAC, 2019, 2021).

4.3. Prevalence estimates in context

As a secondary contribution, the study provides prevalence estimates with explicit uncertainty characterization. Among perpetrators with known status, 92.6% had prior law enforcement contact and 52.0% had a criminal record. Sensitivity analyses placed the true law enforcement contact prevalence between 67% and 95%. Even under the most conservative assumption, two-thirds of perpetrators had documented law enforcement contact, a rate broadly consistent with NTAC's (2023) finding that roughly three-quarters of mass attackers had some form of prior contact with law enforcement.

The high base rate of law enforcement contact is informative primarily as context for why law enforcement contact is not an effective discriminating variable. As a result, law enforcement contact provides limited leverage for distinguishing between perpetrators with different pre-attack characteristics. Accordingly, the shift to criminal history as the primary analytic outcome (52,48 split) reflects the need for sufficient variation to support meaningful group comparisons.

4.4. Limitations

Several limitations warrant acknowledgment. First, and most fundamentally, the database was constructed from cases with documented pre-attack warning behaviors (e.g., leakage), meaning perpetrators without any documented warning signs are excluded by design. This sample selection constraint has direct implications for the central finding. If perpetrators without criminal records are included in the database in part because they had extensive behavioral documentation, then the observed differences in concerning behaviors may partly reflect selection into the sample rather than a true population-level difference. As such, the behavioral comparison between groups should be interpreted as applying only to perpetrators with documented warning signs, not necessarily to the full population of mass public shooters.

Second, criminal history data coverage was 57%, meaning the group comparison is based on the subset of perpetrators with known criminal history status. Missingness analysis indicated that higher-fatality events were more likely to have complete system contact data, suggesting that the analytic sample may overrepresent more severe or high-profile cases. If lower-fatality events differ systematically from higher-fatality

events in ways that correlate with both criminal history status and behavioral indicators, the observed group differences may be biased. Although the bounding analysis partially addresses this uncertainty for prevalence estimates, no analogous bounds are available for group comparisons. This limitation is particularly important given that the central findings are based on a comparison of 52 versus 48 cases.

Third, the database does not capture the temporal proximity of system contact to the attack. A criminal record from a decade prior carries different prevention implications than a recent arrest. Without information on timing, it is not possible to distinguish between distal and proximate forms of system contact. This limitation constrains interpretation of the role of criminal history in prevention, as the relevance of system contact likely depends on its proximity to the attack.

Fourth, as described in the Measures section, all binary indicators in the data are coded as present when documented and treated as absent otherwise. This uniform approach likely underestimates true prevalence across all domains, but the consequences are most pronounced for disqualifying conditions, where only 59 of 175 perpetrators had any item coded. The estimated 26.3% FFL purchase rate among those with documented disqualifying conditions is based on only 19 cases with available firearms source data and should be interpreted as preliminary. Additionally, because the database does not record when disqualifying conditions were established, it is not possible to determine whether FFL purchases occurred before or after disqualification. This temporal ambiguity limits interpretation of the cascade finding, as it cannot distinguish between background check failures and legal purchases that preceded the disqualifying event.

Finally, we emphasize that “prior system contact” does not imply a missed intervention opportunity. A traffic stop, a welfare check, or even an arrest may not have presented a realistic opportunity for violence prevention. These findings describe the existence and nature of system visibility rather than its preventive potential. Whether information about these perpetrators was available to relevant actors in real time, or whether it could have been connected across institutional boundaries, are questions these data cannot answer. Accordingly, the extent to which earlier intervention was feasible in specific cases remains uncertain.

4.5. Future directions

Several priorities follow from these findings and their limitations. First, the group differences reported here should be tested in samples that are not conditioned on documented warning behaviors. Because the present sample includes only perpetrators with such behaviors, a comparison against an unconditioned sample of mass public shooters is the most direct way to determine how far the behavioral contrast reflects the underlying population rather than selection into the database. Second, the prominent role of age in the findings, reinforced by the multivariable analysis, indicates that future work should collect and model the temporal proximity of both system contact and disqualifying events to the attack, which would allow the cascade question, whether prohibited persons acquired firearms before or after becoming prohibited, to be answered directly.

Third, as larger databases of mass public shooters mature, empirically derived typologies (e.g., latent class or latent profile analysis) could test whether the descriptive “system-known” and “behaviorally-visible” contrasts drawn here correspond to distinct latent classes, and multivariable predictive models estimated with adequate power could quantify the joint contribution of behavioral and criminal-history indicators. Finally, because the perpetrators studied here were all known through at least one visibility channel, research that follows cases forward from the point of a documented warning behavior, examining whether and how that signal was reported and acted upon, would speak to the recognition-reporting-action chain that these retrospective data can describe but cannot evaluate.

5. Conclusion

Mass public shooters with documented pre-attack warning behaviors are not a monolithic group. Among the 100 perpetrators with known criminal history status, those with and without criminal records differed significantly in age and pre-attack behavioral indicators, with suggestive differences in firearms acquisition patterns. The “system-known” group, characterized by older perpetrators with criminal records and fewer behavioral warning signs, is more directly addressable through background checks and firearms prohibitions. The “behaviorally-visible” group, characterized by younger perpetrators without records but more extensive behavioral escalation, is more directly addressed through behavioral threat assessment. Comprehensive prevention of mass public shootings demands that both mechanisms operate in parallel, because neither alone reaches both populations of potential perpetrators. These findings underscore the importance of aligning prevention strategies with the specific pathways through which individuals become visible prior to their attacks. We stress, finally, that these conclusions describe mass public shooters with documented pre-attack warning behaviors specifically and should not be generalized to all mass public shooters. The “system-known” and “behaviorally-visible” contrasts are descriptive group differences observed on a single dimension, not validated typologies, and the acquisition findings in particular await replication in larger samples with temporal detail before they can support firm policy conclusions.

Declaration of generative AI and AI-assisted technologies in the manuscript preparation process

During the preparation of this work, the authors used Claude (Anthropic) to assist with editing text. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the published article.

CRediT authorship contribution statement

M. Hunter Martaindale: Writing – review & editing, Writing – original draft, Formal analysis, Data curation. **Emily A. Greene-Colozzi:** Writing – review & editing, Writing – original draft, Data curation. **Jaclyn Schildkraut:** Writing – review & editing, Writing – original draft, Data curation, Conceptualization.

Funding

This research was partially supported by the U.S. Department of Homeland Security under Funding Opportunity Number DHS-24-TTP-132-00-99. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Department of Homeland Security. The funder had no role in the study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The data analyzed in this study are available from the corresponding author upon reasonable request.

References

- Berk, R. A., Western, B., & Weiss, R. E. (1995). Statistical inference for apparent populations. *Sociological Methodology*, 25, 421–458. <https://doi.org/10.2307/271073>
- Borum, R., Fein, R., Vossekuil, B., & Berglund, J. (1999). Threat assessment: Defining an approach for evaluating risk of targeted violence. *Behavioral Sciences & the Law*, 17(3), 323–337.
- Bridges, T., Tober, T. L., & Brazzell, M. (2022). Mass shootings and American masculinity. In *All-American massacre: The tragic role of American culture and society in mass shootings*. Temple University Press.
- Calhoun, T., & Weston, S. (2003). *Contemporary threat management*. Specialized Training Services.
- Cao, L., Mei, X., & Li, Y. (2025). Correlates of severity of mass public shootings in the United States, 1966–2022. *Journal of Applied Security Research*, 20(1), 92–114. <https://doi.org/10.1080/19361610.2024.2314405>
- Duwe, G. (2020). Patterns and prevalence of lethal mass violence. *Criminology & Public Policy*, 19(1), 17–35. <https://doi.org/10.1111/1745-9133.12478>
- Fein, R. A., & Vossekuil, B. (1999). Assassination in the United States: An operational study of recent assassins, attackers, and near-lethal approachers. *Journal of Forensic Sciences*, 44(2), 321–333.
- Fix NICS Act of 2017. (2018). *Pub. L. No. 115–141, Div. S, Tit. VI, 132 Stat. 1133*.
- Fox, J. A., & Levin, J. (2015). *Extreme killing: Understanding serial and mass murder* (3rd ed.). Sage.
- Geller, L. B., Booty, M., & Crifasi, C. K. (2021). The role of domestic violence in fatal mass shootings in the United States, 2014–2019. *Injury Epidemiology*, 8, 38. <https://doi.org/10.1186/s40621-021-00330-0>
- Greene-Colozzi, E. (2022). *Mitigating the harm of public mass shooting incidents through situational crime prevention* (Doctoral dissertation, The Graduate Center, City University of New York https://academicworks.cuny.edu/gc_etds/4949/).
- Gun Violence Archive. (2026). General methodology. Retrieved from <https://www.gunviolencearchive.org/methodology>.
- Hirschi, T., & Gottfredson, M. (1993). Age and the explanation of crime. *American Journal of Sociology*, 89(3), 552–584. <https://doi.org/10.1086/227905>
- Meloy, J. R., & Gill, P. (2016). The lone-actor terrorist and the TRAP-18. *Journal of Threat Assessment and Management*, 3(1), 37–52. <https://doi.org/10.1037/tam0000061>
- Meloy, J. R., Hoffmann, J., Guldinann, A., & James, D. (2012). The role of warning behaviors in threat assessment: An exploration and suggested typology. *Behavioral Sciences & the Law*, 30(3), 256–279. <https://doi.org/10.1002/bsl.999>
- Meloy, J. R., & O'Toole, M. E. (2011). The concept of leakage in threat assessment. *Behavioral Sciences & the Law*, 29(4), 513–527. <https://doi.org/10.1002/bsl.986>
- National Threat Assessment Center. (2019). *Protecting America's schools: A U.S. Secret service analysis of targeted school violence*. U.S. Secret Service, Department of Homeland Security. <https://www.secretservice.gov/sites/default/files/2020-04/ProtectingAmericasSchools.pdf>.
- National Threat Assessment Center. (2021). In U.S. Department of Homeland Security (Ed.), *Averted targeted school violence: A U.S. Secret Service analysis of plots against schools*. U.S. Secret Service. <https://www.secretservice.gov/sites/default/files/reperts/2021-03/USSS%20Averting%20Targeted%20School%20Violence.2021.03.pdf>.
- National Threat Assessment Center. (2023). In United States Secret Service (Ed.), *Mass attacks in public spaces: 2016–2020*. <https://www.secretservice.gov/media/1327/download?inline=true>.
- Peterson, J., & Densley, J. (2021). *The violence project: How to stop a mass shooting epidemic*. Abrams Press.
- Sampson, R. J., & Laub, J. H. (1993). *Crime in the making: Pathways and turning points through life*. Harvard University Press.
- Sandel, W. L., & Martaindale, M. H. (2022). What are we talking about? Definitional confusion within mass and active shooting research. *Journal of Mass Violence Research*, 1(2), 4–16. <https://doi.org/10.53076/jmvr47829>
- Schildkraut, J., & Elsass, H. J. (2016). *Mass shootings: Media, myths, and realities*. Praeger.
- Schildkraut, J., & Geller, L. B. (2022). Mass shootings in the United States: Prevalence, policy, and a way forward. *The Annals of the American Academy of Political and Social Science*, 704(1), 181–203. <https://doi.org/10.1177/00027162231164484>
- Schildkraut, J., Greene-Colozzi, E. A., & Martaindale, M. H. (2026). Introducing Sharing Information to Stop Mass Shootings (SISMS): A short report on a behavioral and event-level dataset for the study of mass public shootings. *American Journal of Criminal Justice*. <https://doi.org/10.1007/s12103-026-09921-3>
- Schildkraut, J., & Turanovic, J. J. (2022). A new wave of mass shootings? Exploring the potential impact of COVID-19. *Homicide Studies*, 26(4), 362–378. <https://doi.org/10.1177/10887679221101605>
- Silver, J., Horgan, J., & Gill, P. (2018). Foreshadowing targeted violence: Assessing leakage of intent by public mass murderers. *Aggression and Violent Behavior*, 38, 94–100. <https://doi.org/10.1016/j.avb.2017.12.002>
- Silver, J., Simons, A., & Craun, S. (2018). *A study of the pre-attack behaviors of active shooters in the United States between 2000 and 2013*. Federal Bureau of Investigation, U.S. Department of Justice.
- Smart, R., Morral, A. R., Smucker, S., Cherney, S., Schell, T. L., Peterson, S., ... Gresenz, C. R. (2023). *The science of gun policy: A critical synthesis of research evidence on the effects of gun policies in the United States*, 3rd ed. RAND Corporation
- Vossekuil, B., Fein, R. A., Reddy, M., Borum, R., & Modzeleski, W. (2004). In U.S. Secret Service, & U.S. Department of Education (Eds.), *The final report and findings of the safe school initiative: Implications for the prevention of school attacks in the United States*.
- White, S., & Meloy, J. R. (2017). *Threat assessments 101: Understanding the red flags of workplace violence* [Webinar]. <https://vimeo.com/234743780>.

- White, S. G., & Meloy, J. R. (2016). *WAVR-21: A structured professional judgment guide for workplace assessment of violence risk* (3rd ed.). Specialized Training Services.
- Zeoli, A. M., Frattaroli, S., Roskam, K., & Herrera, A. K. (2019). Removing firearms from those prohibited from possession by domestic violence restraining orders: A survey and analysis of state laws. *Trauma, Violence & Abuse*, 20(1), 114–125. <https://doi.org/10.1177/1524838017692384>
- Zeoli, A. M., & Paruk, J. K. (2020). Potential to prevent mass shootings through domestic violence firearm restrictions. *Criminology & Public Policy*, 19(1), 129–145. <https://doi.org/10.1111/1745-9133.12475>