

German Mass Murderers and Their Proximal Warning Behaviors

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The main objective of this study was to analyze mass murder cases committed by adults from a threat assessment perspective, and to identify risk factors and proximal warning behaviors. Therefore, court records of 33 German mass murderers between 2000 and 2012 were systematically evaluated. One major focus was the comparison between psychotic and nonpsychotic offenders. Significant differences were found between the 2 groups regarding their choice of weapons, planning behavior, personal crises, personality aspects, and warning behaviors. Nonpsychotic subjects were significantly more likely to evidence pathway warning behavior and directly threaten their targets before the attack when compared with the psychotic subjects. Effect sizes were medium to large. All offenders showed multiple proximal warning behaviors prior to their attacks. Findings are interpreted in light of previous studies and for the purpose of enhancing threat assessment protocols of such persons of concern.

Public Significance Statement

The study reveals the presence of warning signs in a representative sample of adult German mass murderers and relates the results to the research from the United States. A predisposition to commit an act of deadly violence was noticeable months, years, or even decades in advance in most of the cases, but the specific intent became apparent relatively late in the pathway toward violence, usually within days or weeks before the killings. The work of threat assessment professionals is supported by the study and opportunities for preventing severe violence are identified.

Keywords: mass murder, threat assessment, threat management, warning behaviors, psychosis

Research studies of adult mass murder from a behavioral threat assessment perspective are rare (Meloy et al., 2004). In contrast, there is a plethora of such studies of school shootings.

Following the attack on Columbine High School in 1999, researchers began to analyze the latter phenomenon with greater sensitivity than before (Meloy, Hempel, Mohandie, Shiva, & Gray, 2001; Newman, Fox, Harding, Mehta, & Roth, 2004; O'Toole, 2000). The Safe School Initiative in the U.S. (National Threat Assessment Center, 2018; Vossekul, Fein, Reddy, Borum, & Modzeleski, 2002), for example, found that most school shootings were planned in advance, and most adolescent shooters communicated their intention to third parties, a warning behavior called leakage (Meloy & O'Toole, 2011; O'Toole, 2000). Although leakage was usually a false positive, it was often the entry point in a case for threat assessors, and formed

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the scientific rationale over the next decade for national safer school programs, such as the “Say Something” effort sponsored by parents and supporters of victims killed at Sandy Hook Elementary School in 2012 (www.sandyhookpromise.org; Sandy Hook Promise, 2015). Germany also saw its share of school shootings, such as the ones in Erfurt in 2002 or in Winnenden in 2009. Germany has the dubious distinction of being second only to the United States in actual numbers of school shootings worldwide since the turn of the century. Researchers in Germany have likewise studied the phenomenon through the analysis of primary case files (e.g., Böckler, Seeger, & Heitmeyer, 2010; Böckler, Seeger, Sitzler, & Heitmeyer, 2012; Hoffmann, Roshdi, & Robertz, 2009; Meloy, Hoffmann, Roshdi, & Guldemann, 2014; Roth, Böckler, Stetten, & Zick, 2015).

Adult mass murder studies have also seen an evolution over the past 20 years, from relatively small sample and case studies (Hempel, Meloy, & Richards, 1999; Meloy, 1997; Mullen, 2004) to larger sample studies (Adler, 2000; Lankford, 2015; Stone, 2015; Peter & Bogerts, 2012), to studies comparing ideological and nonideological mass killers (Gill, Horgan, & Deckert, 2014; Gill, Silver, Horgan, Corner, & Bouhana, 2016; Lankford, 2013). Some single case studies with a particular focus on threat assessment were also completed (Hoffmann & Allwinn, 2016; Meloy, Habermeyer, & Guldemann, 2015). More similarities than differences are found across various samples of adult mass murderers.

Some school shootings and mass killings by adults in a public space can also be described by the superordinate terms “amok” or “rampage.” For example, the concept of amok, originating in southeastern Asia, appears to be independent of time (Hoffmann & Allwinn, 2016; Westermeyer, 1982), culture (Adler, 2015; Hempel, Levine, Meloy, & Westermeyer, 2000), and geographical regions (Hempel et al., 1999). On the other hand, cultural aspects (Adler, 2015) and cultural scripts (Helfgott, 2015; Kiilakoski & Oksanen, 2011; Newman et al., 2004; Sumiala & Tikka, 2011) can shape specific details of rampage shootings (Douglas & Olshaker, 1999; Helfgott, 2015), including the perpetrator’s appearance and his chosen modus operandi (Helfgott, 2015; Meloy & Mohandie, 2001; Surette, 2002, 2016).

The advent of the wide public use of the Internet in the 1990s, and the acceleration of social media use a decade later, have left their own mark on mass murder: almost instantaneous knowledge of such events worldwide, leading to the common misperception that they are more frequent than they are; the appearance of a time-limited contagion effect which is independent of geographical limitations (Story, Youssef, Luthans, Barbuto, & Bovaird, 2013); the easily achieved desire on the part of future perpetrators to learn from those who have preceded them (Meloy et al., 2015), while at the same time wanting to attain greater infamy through an increased body count or innovative behaviors; the very recent use of visual media to capture the event and broadcast it soon after or even instantaneously during the shooting via live-streaming, or as it is unfolding; and a real increase in the rate of threats as well as deeds (Coleman, 2004; Helfgott, 2015; Kostinsky, Bixler, & Kettl, 2001). Mass murderers are using their lethal attack seemingly more often as a communicative act, addressing an online-audience to spread their violent thoughts and acts into the world (Meloy & Genzman, 2016). Suicide, or in some cases, “suicide by cop” can be part of the alleged script. Suicide by cop ultimately means being killed by law enforcement. The offender provokes the police (Dewey et al., 2013; Knoll, 2012; Mohandie, Meloy, & Collins, 2009).

Prevalence in Germany and the U.S.

Rampage killings are typically defined in the U.S. as the intended murder of three or more victims within one event and one general location, although definitions have varied (Blair & Schweit, 2014; Dietz, 1986). The current active shooter studies from the FBI focus on “an individual actively engaged in killing or attempting to kill people in a confined and populated area,” rather than just counting the number of dead victims. This definition is comparable with German research studies from Adler (2015), wherein research findings suggest that about 5.67 rampage killings happen in Germany every year. In the decade between 2001 and 2010, 63 rampage killings occurred. The prevalence rate for males who commit mass murder in the German population was therefore 1:6,800,000 per year, an extraordinarily infrequent event which

statistically precludes prediction (Adler, 2015). These shootings in Germany produced 94 deaths and over 291 injuries.

In the U.S., rampage killings in public spaces happen more than once a month. Researchers identified 200 active shooter events between 2000 and 2015 with a rate of 12.5 per year (Blair & Schweit, 2014; Schweit, 2016). The numbers did not include school shootings, gang violence, domestic violence such as familicides, or drug related incidents. The shootings in the U.S. produced 1,274 casualties including the wounded and killed, but excluding the perpetrators. Seventy-nine shooters (39.5%) killed three or more victims at the scene and met the more limited criteria for a mass killing. Eighty shooters (40%) committed suicide through either self-inflicted wounds or “suicide by cop.” Rampage murders in the U.S. account for only 0.1% of homicides, which are invariably one perpetrator and one victim, usually known to each other. There are approximately 30 single victim homicides a day utilizing a firearm as the weapon of choice in the U.S. (FBI UCR, 2015).

Studies from Germany (Adler, 2015) and the U.S. (Blair & Schweit, 2014; Schweit, 2016) show that rampage killings are significantly higher in the U.S. than in Germany. The differences between the U.S. and Germany is partly due to much more restricted gun control in Germany and the wide and easy availability of firearms within the U.S. (Lankford, 2015).

Characteristics and Risk Factors and Behavior of Concern

The studies, although limited to date, reveal interesting characteristics of the offenses and offenders. Perpetrators are almost always men and reflect the ethnic composition within society at large (Gill, Silver, Horgan, & Corner, 2017; Hempel et al., 1999; Lankford, 2015; Silver, Simons, & Craun, 2018). The average educational attainment is relatively low (Gill et al., 2017; Hempel et al., 1999). The unemployment rate seems to be higher compared with the general population. In addition, there are fewer partnerships and more single men (Gill et al., 2017; Hempel et al., 1999; Silver et al., 2018). Recent mass murder studies indicate a higher previous criminal conviction rate among the perpetrators (Gill et al., 2017; Silver et al., 2018).

Rampage shootings by adults were mostly planned (Gill et al., 2017; Hoffmann & Döhlitzsch, 2015) and the perpetrators often seem to be preoccupied with weapons (Hempel et al., 1999; Stone, 2015). Many mass murderers consume drugs or alcohol before their attack (Gill et al., 2017). In early samples of adult mass murderers, the occurrence of psychotic mental illnesses was much more frequent when compared with adolescent mass murderers (Meloy et al., 2004). Frequency of psychosis in adult mass murderers at the time of the event appears to vary between 20% and 40% (Adler, Marx, Apel, Wolfersdorf, & Hajak, 2006; Hempel et al., 1999; Hoffmann & Döhlitzsch, 2015; Stone, 2015). Psychotic offenders are also more likely to target strangers (Adler, Lehmann, Räder, & Schünemann, 1993; Hempel et al., 1999; Peter & Bogerts, 2012), have a greater lethality risk since they kill more victims (Dietz, 1986; Hempel et al., 1999), and regularly express a paranoid mindset (Hempel et al., 1999; Knoll & Meloy, 2014; Stone, 2015). Approximately half of mass murderers studied were suicidal and killed or tried to kill themselves immediately after the attack (Gill et al., 2017; Hempel et al., 1999; Hoffmann & Döhlitzsch, 2015). Suicide is clearly more frequent than in some other forms of targeted violence, such as public figure attackers (Hoffmann, Meloy, Guldman, & Ermer, 2011; Meloy & Amman, 2016).

The U. S. Department of Justice and the Federal Bureau of Investigation published a recent study of preattack behaviors of active shooters in the U.S. between 2000 and 2013 (Silver et al., 2018). Over 63 active shooter cases were analyzed. The definition for an active shooter was “an individual actively engaged in killing or attempting to kill people in a confined and populated area” (Blair & Schweit, 2014). An implicit criterion was the use of firearms. Shootings that resulted from gang or drug violence or organized crime were excluded. The majority of the shooters spent more than a week planning their attack (77%). Nearly half of them (47%) spent a week or longer actually preparing for the attack. These results are comparable with those of other studies (e.g., Gill et al., 2017). Psychiatric diagnoses were available for 25%, but only 3% were diagnosed with a psychotic disorder. Multiple stressors (3.6 in average) were evident, mostly mental health problems (62%), financial strains (49%),

or job issues (35%). Only 2% ($n = 1$) seem to have had no stressors during the 12 months before the shooting. The active shooters displayed concerning behaviors like leakage of violent intent, anger, or physical aggression. Inappropriate firearm behavior—interest in or use of firearms that appears unusual given the active shooter's background and experience with firearms—was shown by one in five shooters (21%). In nearly two thirds of the cases (64%) at least one of the victims was specifically targeted by the shooter. The weapons were mostly purchased legally (40%). In hindsight, knowing that they ended up carrying out an attack, concerning behavior in the 12 months leading to the attack could be identified for the majority of the shooters (64%). The question whether or not this behavior could have been identified as concerning before the attack remains to be answered. Nearly half of the shooters displayed suicidal ideation or engaged in suicide-related behaviors at some point prior to the attack (48%).

Method

We identified relevant cases for this study in Germany in two steps. First, a media database search for the identification of potential adult mass murder cases was carried out. In a second step, the full case files for all identified attacks were requested. Of the 60 cases identified, 43 case files (72%) were sent to us by the public prosecution departments throughout Germany. Cases for the study were selected based upon the following criteria:

1. the attack was carried out between January 1, 2000 and December 31, 2012, and
2. at least partially happened in public space.
3. The perpetrator was older than 24 years.
4. The perpetrator had tried to kill more than one person.
5. Killings in the context of organized crime, or attacks carried out by members of terrorist organizations, as well as attacks committed using only vehicles were excluded.

Unlike other studies, we focused not only on successful rampages but also intended mass murders. The intention of killing more than one person was decisive for us, and not just the

outcome of an attack. Out of the 43 cases, 10 did not meet the above criteria and were therefore excluded from the final sample. The final dataset of 33 cases was statistically analyzed to identify potential risk factors, warning behaviors and other characteristics of German rampage killers using SPSS 21 (IBM Corporation, 2012) with $\alpha = .05$ unless otherwise indicated. Common statistical significance tests were performed to determine the group differences. To test the central tendency in non-normally distributed, at least ordinaly scaled data, the Mann & Whitney (1947) *U* test was applied. The Fisher and Yates (1948) exact test was used for significance testing on dichotomous variables because, unlike the chi-square test, no particular sample size is required and the Fisher's exact test can also be used for small samples.

All cases were analyzed by the first author with the same codebook consisting of 235 variables. A prior interdisciplinary study analyzing interrater reliability showed good results (Göbel et al., 2016). Most of the variables showed kappa values over .60 ($n = 209$). Some variables ($n = 26$) had kappa values under .60 but remained in the codebook due to their substantial relevance for the research project. The codebook was divided into 11 sections: basic information ($n = 13$), demographics ($n = 15$), the violent act ($n = 85$), warning behaviors ($n = 21$), criminal record ($n = 28$), psychiatric record ($n = 12$), personality traits ($n = 9$), radicalization ($n = 6$), affinity for violence and weapons ($n = 10$), family ($n = 17$), and social risk and protective factors ($n = 13$).

Quality of Data and Missing Data

The court files used to assess each case differed in the quantity and quality of material provided. The number of pages per case ranged from 400 to 6,000. All of the court files contained witness statements. Psychological reports ($n = 18, 55.5\%$), court rulings ($n = 21, 63.6\%$), investigation reports ($n = 28, 85.8\%$), or personal documents such as letters, manifestos, or suicide notes ($n = 21, 63.6\%$) were mostly available. Due to the variations in quality and quantity of data per case, the full dataset contains 22.4% missing data. Table 1 shows the missing data for each section.

Table 1
Missing Data Per Section

Section	Number of items	Percentage of missing data
1) Basic information	13	.00
2) Demographics	15	5.86
3) The violent act	85	18.57
4) Warning behaviors	21	8.26
5) Criminal record	28	43.64
6) Psychiatric record	12	34.85
7) Personality traits	9	20.88
8) Radicalization	6	15.76
9) Affinity for violence and weapons	10	13.03
10) Family	17	38.32
11) Social risk and protective factors	13	38.86

Warning Behaviors

One major focus was the evaluation of the eight warning behaviors described in the warning behavior typology (Hoffmann et al., 2011; Meloy, Hoffmann, Guldemann, & James, 2012) within our sample of psychotic and nonpsychotic offenders. The typology captures proximal behavioral or psychological patterns which may constitute change and evidence accelerating risk. The original studies reviewed in detail the previous research which attempted to identify these acute and dynamic variables among attackers and assassins of celebrities, politicians, and other public figures, psychiatric patients, adolescent mass murderers and school shooters, adult mass murderers, spousal homicide perpetrators, workplace violence attackers, and federal judicial threateners and attackers (Meloy et al., 2012, 2014). It is a rationally derived typology consisting of the following warning behaviors:

- *Pathway warning behavior*: any behavior that is part of research, planning, preparation, or implementation of an attack (Calhoun & Weston, 2003; Fein & Vossekuil, 1998a, 1998b, 1999).
- *Fixation warning behavior*: any behavior that indicates an increasingly pathological preoccupation with a person or a cause (Mullen et al., 2009). It is measured by: (a) increasing perseverance on the person or cause; (b) increasingly strident opinion; (c) increasingly negative characterization of the object of fixation; (d) impact on the

family or other associates of the object of fixation, if present and aware; and (e) angry emotional undertone. It is typically accompanied by social and/or occupational deterioration.

- *Identification warning behavior*: is characterized by one or more of five characteristics: pseudocommando behavior (Dietz, 1986), evidence of a warrior mentality (Hempel et al., 1999), a close association with weapons or other military or law enforcement paraphernalia, wanting to imitate and often surmount previous attackers or assassins, or believing oneself to be an agent to advance a particular cause or belief system (Meloy et al., 2015).
- *Novel aggression warning behavior*: an act of violence which appears unrelated to any pathway warning behavior which is committed for the first time. Such behaviors may be utilized to test the ability (de Becker, 1997) of the subject to actually do the violent act, and may be a measure of response tendency, the motivation to act on the environment (Hull, 1952), or a behavioral tryout (MacCulloch, Snowden, Wood, & Mills, 1983).
- *Energy burst warning behavior*: an increase in the frequency or variety of any noted activities related to the target, even if the activities themselves are relatively innocuous, usually in the hours, days, or weeks before the attack (Odgers et al., 2009).
- *Leakage warning behavior*: the communication to a third party of an intent to do harm to a target through an attack (Meloy & O'Toole, 2011).
- *Last resort warning behavior*: evidence of a "violent action imperative" or "time imperative" (Mohandie & Duffy, 1999); increasing desperation or distress through declaration in word or deed, forcing the individual into a position of last resort. There is no alternative other than violence, and the consequences are justified (de Becker, 1997).
- *Directly communicated threat warning behavior*: the communication of a direct threat to the target or law enforcement beforehand. A threat is a written or oral communication that implicitly or explicitly states a wish or intent to damage, injure, or

kill the target, or individuals symbolically or actually associated with the target.

Results

Demographic Characteristics

Virtually all of the 33 mass murders were committed by a single offender (97%). Only one act was carried out by a couple, but the female was excluded from our sample because she did not meet the minimum age criterion of being at least 25-years-old. Thirty-one perpetrators (93.9%) were male with ages ranging from 26 to 78 years. The mean age was 46.82 years ($SD = 12.68$); 19 offenders (57.6%) were between 30 and 50 years of age.

Two thirds of the mass murderers (66.7%) were German citizens and 33.3% were non-natives that had immigrated between 1965 and 1996. Nearly half of the offenders (45.5%) were unmarried, 12 were married (36.4%), and six were divorced (18.2%).

The level of education varied broadly and covered the full range of educational qualifications achievable in Germany. Information about the educational career was available for 26 perpetrators. Five (19.2%) did not have any school education, nine (34.6%) had a lower level of education (main school/lower secondary education), seven finished middle school, and five (19.2%) graduated high school. Nearly half of the mass murderers (48.5%) were unemployed at the time of the attack. Four (12.1%) were unemployed and three (9.1%) were retired. Nearly a third of the offenders were employed or at least marginally employed at the time of the attack.

Two of the perpetrators were adopted. At the time of the attack, nearly half of the perpetrators (49.5%) had children. Eighteen (54.5%) lived alone, the remaining 45.5% mainly shared a household with their intimate partners or spouses. The vast majority had a permanent residence, but three offenders (9.1%) were homeless.

Circumstances of the Offense

Nearly half of the attacks (45.5%) were carried out in more than one location. In these cases, most of the perpetrators moved from a building to a public space (12 out of 15). The

perpetrators were in almost every case unmasked (97%). However, seven offenders (21.2%) were described as having a peculiar appearance during the attack, for example, wearing clothes that seemed odd regarding color or combination of clothes, or did not fit the season of the year.

Victims

A total of 121 persons were either killed or injured by the 33 offenders, ranging from one to 19 victims within one act of violence. Thirty-five individuals died ($M = 1.06$; $SD = 1.03$) and 86 people were injured ($M = 2.60$; $SD = 2.99$). Twelve attacks (36.4%) had no deaths, 11 led to one death, six offenses claimed two deaths, and four cases led to three deaths. The range of injuries was 0–16 across the attacks. In one case, an explosion in an apartment building caused 16 injuries.

Planning

For a better understanding of the development of the offenses, we analyzed the period of planning for the attacks, starting from the first idea until the beginning of the mass murder. Some attacks were planned well in advance, and others occurred rather spontaneously. In 31 cases, the files provided us with enough detailed information to be able to assess the time period for planning and preparation behavior. Sixteen (51.6%) perpetrators planned their attack for weeks, months, or even years. In four cases (12.9%), the offenders decided to commit the violent act within 24 hr of the offense. More than one third (35.5%) committed their rampage without any evidence of planning. Table 2 gives an overview of planning behavior in our sample.

When information was available, a more in-depth analysis of the longer planned mass murders (see Table 3) reveals the time frame, starting with the first ideas, communicated to third

Table 2
Planned Versus Unplanned Mass Murders (N = 31)

Planning behavior	%
Longer planned (>24 hr)	51.6%
Shortly planned (<24 hr)	12.9%
Unplanned	35.5%

Table 3
Pathway Behavior: Beginning of Violent Ideation and Earliest Planning and/or Preparation for the Attack (N = 16)

Time period	Beginning with violent ideation (N = 15)		Earliest evidence of planning and preparation (N = 16)	
	n	%	n	%
1–7 days	0	0	5	31.3
1–2 weeks	1	6.7	4	25.0
2–4 weeks	1	6.7	5	31.3
1–3 months	1	6.7	1	6.3
3–6 months	1	6.7	0	0
6–12 months	5	33.3	1	6.3
More than 1 year	6	40	0	0

parties in most cases (leakage), until the first pathway behaviors. In six cases, more than 1 year passed between the earliest signs of ideation with a murderous act and the first signs of planning and preparation (Calhoun & Weston, 2016, 2003). The final decision to commit the act mostly evolved within a few weeks before the attack. Most perpetrators ($n = 14$, 87.5%) showed the earliest evidence of planning and preparation between 1 day and 4 weeks before their act of violence.

Examples for the earliest signs of violent ideation are thinking about attacking or killing someone, or the paranoid fear that one's own life is in danger, combined with thoughts about self-defense. Possible evidence of planning and preparation were, for example, carrying a weapon, developing a plan of where to attack, or writing a suicide note.

Psychotic Versus Nonpsychotic Mass Murderers

In our sample, 36.7% ($N = 11$) of the German mass murderers were psychotic, 63.3% ($N = 19$) were nonpsychotic, and three perpetrators could not be reliably classified as either, and were therefore excluded from the comparison. The classification as “psychotic” was made after the complete review of the file. In several cases, the person was diagnosed with a schizophrenic disease during his or her lifetime or after his or her death by court experts. Previous psychological assessments and a detailed

review of all testimonies also allowed to classify the cases based on psychotic symptoms. The psychotic perpetrators were in an acute psychotic episode during their crime based on the case material. Independently, these perpetrators also had psychotic episodes in their past. Among the nonpsychotic perpetrators, there was no evidence of a past or present psychotic episode or disease.

The gender distribution between the psychotic and nonpsychotic perpetrators was unremarkable; each group contained one female. Psychotic perpetrators ($M = 44.64$, $SD = 13.46$) were slightly younger than the nonpsychotic perpetrators ($M = 48.37$, $SD = 13.04$), although the difference was not significant. The marital status differed significantly ($\Phi = .59$, $p = .002$) with a large effect size: Psychotic perpetrators were mostly single ($n = 9$), while nonpsychotic individuals were often married ($n = 15$). In addition, most of the nonpsychotic offenders had children (68.4%), whereas fewer psychotic subjects had children (18%); the difference was significant with a large effect size ($p = .021$, $\Phi = .484$).

Most psychotic (81.8%) and nonpsychotic subjects (63.2%) were unemployed. The occupational difference was nonsignificant between both groups ($\Phi = .196$, $p = .419$). The educational level for both groups was similar and nonsignificant regarding school, $U(13,10) = 70$, $p = .784$; and vocational education, $U(13,10) = 48.5$, $p = .288$.

Attack Characteristics

Attack characteristics are listed in Table 4. The two groups only differed significantly regarding the planning of the violent act ($p = .006$, $\Phi = .544$), with a large effect size. The majority of the nonpsychotic subjects planned their act in advance (63%), while only one in 10 psychotic subjects did so.

Weapons

Seven attacks were committed with more than one weapon, with the number of weapons ranging from two to nine ($M = 3.71$). Twelve perpetrators (40%, $N = 30$) carried at least one additional weapon with them which they did not use during the attack. There was no significant difference between the psychotic and nonpsychotic offenders regarding the two factors “use

Table 4
Attack Characteristics of Nonpsychotic and Psychotic Offenders

Attack characteristics	Nonpsychotic offenders	<i>N</i>	Psychotic offenders	<i>N</i>
More than one location	37%	19	64%	11
Occurred in public	53%	19	73%	11
Public building	53%	19	64%	11
Private building	37%	19	27%	11
At the workplace	11%	19	0%	11
Offender was masked	5%	19	0%	11
Peculiar appearance	16%	19	27%	11
Act was planned in advance*	63%	19	9%	10

* $p < .05$.

of multiple weapons” and “carrying more weapons than used.” In total, 16 perpetrators (53.3%) carried and used only one weapon, 14 (46.7%) used more than one weapon and/or carried more weapons with them without ever using them. The psychotic and nonpsychotic offenders differed regarding their choice of weapon (see Table 5). Psychotic offenders chose cutting and stabbing weapons ($\Phi = .489$, $p = .015$), whereas nonpsychotic offenders more frequently chose firearms ($\Phi = .489$, $p = .015$). Explosives and other kinds of weapons were rarely chosen, and did not significantly differ between the two groups ($p = 1.0$).

Another difference appeared regarding the time of the weapon purchase, but information was only available for 15 of the nonpsychotic and seven of the psychotic offenders (see Table 6). In more than one quarter of all cases, no information was available (26.67%, $n = 8$). Two (13%) of the nonpsychotic and three (42.9%) of the psychotic mass murderers purchased their weapon within 24 hr of their attack, but this was not a statistically significant difference ($p = .274$). Within 6 months of the offense, two nonpsychotic (13.34%) and one psychotic offender (14.29%) obtained their later

murder weapon. Most weapons were procured by nonpsychotic offenders ($n = 11$; 73.34%) over half a year before the act. For three psychotic offenders (42.86%), the time of arms procurement was more than six months prior.

Here are two examples of different time frames in which the offenders organized their weapons:

A 34-year-old psychotic offender took an ax in a hardware store, started screaming and running around and attacked two strangers. He was subsequently retained by witnesses without resistance until police arrived. The offender was diagnosed with paranoid schizophrenia. There were no planning and preparation warning behaviors in advance.

A 52-year-old nonpsychotic offender entered a restaurant with his girlfriend in 2011. He had taken his girlfriend hostage the day before. He was armed with a pistol, a pump action shotgun, a carbine, and a machete. In the restaurant, he first read a speech and then started firing at people with his pistol. One person was killed and another person was injured. The perpetrator had made the final decision to commit the offense during the last 12 hours before the act. He had previously experienced a series of crises

Table 5
Weapons Used by Nonpsychotic and Psychotic Rampage Offenders

Weapons used	Nonpsychotic offenders	<i>N</i>	Psychotic offenders	<i>N</i>
Firearms*	84%	19	36%	11
Cutting and stabbing weapons*	16%	19	64%	11
Explosives	11%	19	9%	11
Other weapons	13%	16	14%	7

* $p < .05$.

Table 6
Time of the Weapon Purchase Before the Act

Weapon purchase	Nonpsychotic offenders		Psychotic offenders		Total	
	<i>n</i>	%	<i>n</i>	%	<i>N</i>	%
Immediate	2	9.09	3	13.64	5	22.73
<1 week	1	4.55	0	.00	1	4.55
<1 month	0	.00	1	4.55	1	4.55
<6 months	1	4.55	0	.00	1	4.55
>6 months	11	50.00	3	13.64	14	63.64
	15	68.18	7	31.82	22	100

and also had suicidal intentions for some time. He had purchased the pistol in the 1990s and received the carbine in 2000 in exchange for drugs. The shotgun was acquired abroad, the exact time remains unknown. Since the 1970s, the shooter had been criminally convicted several times, mostly for drug offenses. Overall, he had spent more than 15 years in prison.

Victims

A total of 112 persons were either killed or injured by the 19 nonpsychotic and the 11 psychotic offenders, ranging from one to 19 victims within one attack. Twenty-seven individuals were killed ($M = 1.42$; $SD = 1.02$) by nonpsychotic and six by psychotic mass murderers ($M = 0.55$; $SD = 0.82$). Forty-five individuals were injured by nonpsychotic ($M = 2.37$; $SD = 3.88$) and 34 by psychotic attackers ($M = 3.09$; $SD = 2.26$).

Rampages committed by psychotic mass murderers caused fewer fatalities than those committed by nonpsychotic mass murderers, $U(19,11) = 52.5$, $p = .023$, $r = .429$, with a medium effect size. The number of injured victims, $U(19,11) = 138.5$, $p = .132$, and the total number of victims, injured as well as dead, did not differ between the two groups, $U(19,11) = 109$, $p = .843$, and are presented in Table 7.

The Offender–Victim Relationship

The relationship between the offenders and the victims revealed differences between the two groups (see Table 8): Psychotic offenders typically attacked people unknown to them in a public space, $U(18,11) = 174$, $p = .000$, $r = .634$, whereas the nonpsychotic offenders usually had some sort of actual relationship with

their victims, $U(18,11) = 48.0$, $p = .021$, $r = .470$. None of the psychotic offenders in our sample killed a (former) intimate partner, differing significantly from the nonpsychotic offenders, $U(19,11) = 55.5$, $p = .033$, $r = .487$.

The acts were also distinguished regarding prior selection of the victims. Most nonpsychotic offenders ($n = 17$, 89.47%) targeted at least one specific victim on purpose. On the other hand, only one of the 10 psychotic offenders attacked a specifically selected victim ($n = 1$, 9.1%). The groups differed significantly ($\Phi = .79$, $p = .000$).

Intoxication During the Attack

One third of the offenders ($n = 11$; 33%) were intoxicated during the mass murder, without an observable difference between the groups of psychotic and nonpsychotic perpetrators ($n = 4$ vs. $n = 7$); $U(19,11) = 107$, $p = .933$. Alcohol was the biggest contributor to intoxications ($n = 9$), whereas medications ($n = 3$), cannabinoids ($n = 2$), and drugs ($n = 1$) played a mirror role. Four offenders combined two different substances (e.g., alcohol and cannabinoids).

Homicide-Suicide

Among the 30 offenders, 15 (50%) attempted or succeeded in taking to their own lives (see Table 9). Nine perpetrators (30%) were successful and six survived their suicide attempt. Eleven (57.9%) nonpsychotic and four psychotic offenders (36.4%) tried to kill themselves. The suicidal behavior was statistically nonsignificant between both groups ($p = .449$). Seven out of 11 (63.6%) suicides attempted by nonpsychotic and two out of four (50%) sui-

Table 7
Comparison of Victims Between Nonpsychotic and Psychotic Rampage Killers

Victims	Nonpsychotic offenders		Psychotic offenders	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Injured	2.37	3.88	3.09	2.26
Dead *	1.42	1.02	.55	.82
Victims in total (dead & injured)	3.79	3.88	3.64	2.06

* $p < .05$.

Table 8
Offender–Victim Relationship in Nonpsychotic and Psychotic Offenders

Offender–victim relationship	Nonpsychotic offenders (<i>N</i> = 19)			Psychotic offenders (<i>N</i> = 11)			Total
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	
Strangers*	.78	.94	14	3.18	2.32	35	49
Professional relationship (Former) intimate*	.21	.63	4	.27	.90	3	7
Relatives	.53	.61	10	.00	.00	0	10
Acquaintance*	.53	.23	1	.00	.00	0	1
Total	1.44	1.69	26	.18	.60	2	28
			55			40	95 ^a

^a 17 persons could not be assigned to one of the categories.

* $p < .05$.

cides attempted by psychotic offenders were successful, albeit the difference between the two groups regarding the relation of successful and nonsuccessful suicides was nonsignificant ($p = 1.0$).

Among the 15 suicidal offenders were four offenders (25%) who tried to provoke the police to kill them. This kind of behavior is referred to as “suicide by cop” (Mohandie et al., 2009). Two out of these four offenders died at the hands of policemen because they posed an immediate threat to others; the remaining two were not killed, but arrested. Two of the four offenders were psychotic, and two were nonpsychotic; one perpetrator in each group was killed by an armed officer.

A slight correlation occurred regarding the relationship between victim and offender: the number of suicide attempts and successful suicides was more frequent for closer relationships like relatives or intimate partners (77.8%) than in cases without an intimate relationship or family connection with the victims (37.5%). The difference was nonsignificant ($\Phi = .359$, $p = .057$). Liem (2010)

mentioned that the most common homicide-suicide forms are within close relationships like spousal murder-suicide, filicide-suicide, and familicide-suicide, and less frequent for extrafamilial homicide-suicide.

Criminal Records and History of Mental Illness

Fourteen perpetrators had a criminal record before their intended mass killing. Psychotic ($n = 2$, 20%) and nonpsychotic offenders ($n = 12$, 66.7%) differed significantly in their criminal records ($\Phi = .447$, $p = .046$) with a medium effect size. Nonpsychotic perpetrators were more often known to the police. Prior offenses were most likely to be physical assaults, followed by property crimes and minor acts like road traffic offenses, drug offenses, and resistance to state violence.

A history of mental illness and mental records were also known for both groups. Seven (63.6%) psychotic offenders and seven (36.8%) nonpsychotic offenders had seen a psychologist or psychiatrist at some point in the past. In many nonpsychotic cases ($n = 9$, 47.4%), no information was available. Three psychotic (42.8%) and four nonpsychotic attackers (57.1%) had abandoned their treatment by themselves without recommendation of the medical personnel. According to their mental health records, two psychotic and two nonpsychotic perpetrators had made a serious suicide attempt at some point before their violent act.

Warning Behaviors

Warning behaviors (Hoffmann & Roshdi, 2015; Meloy et al., 2012) were analyzed for the

Table 9
Suicides and Suicide Attempts Between Psychotic and Nonpsychotic Offenders Immediately After Their Attack

Suicide	Nonpsychotic offenders (<i>N</i> = 19)		Psychotic offenders (<i>N</i> = 11)	
	<i>n</i>	%	<i>n</i>	%
Suicide attempt	4	21.1%	2	18.2%
Successful suicide	7	36.8%	2	18.2%
Total	11	57.9%	4	36.4%

groups of psychotic ($N = 11$) and nonpsychotic ($N = 19$) offenders. In every case, at least one warning behavior was detectable; on average, 5.18 ($SD = 2.85$) and 6.11 ($SD = 2.61$) warning behaviors per case were present in the psychotic and nonpsychotic mass murderers, respectively, and the difference was nonsignificant ($p = .109$). The number of warning behaviors in a single case ranged from two to eight in both groups. Figure 1 shows the distribution of warning behaviors in the sample.

Two warning behavior patterns differed significantly between the psychotic and nonpsychotic mass murderers: *Pathway warning behavior* was more frequent among the nonpsychotic mass murderers ($\Phi = .40, p = .006$). *Direct death threat warning behavior* was much more frequent in the nonpsychotic mass murderers as well ($\Phi = .501, p = .018$). The warning behavior “direct threat” was slightly altered to “direct death threat” compared with the original work (Meloy et al., 2012). The

effect sizes were medium and large, respectively. Direct death threats were uttered by nonpsychotic (71.6%, $n = 12$) as well as by psychotic perpetrators (18.2%, $n = 2$), resulting in a significant difference with a large effect size ($\Phi = .501, p = .018$). In 11 out of 12 nonpsychotic cases the perpetrator repeatedly communicated direct death threats, whereas psychotic perpetrators communicated death threats only once ($\Phi = .580, p = .001$).

Below are examples of psychotic and nonpsychotic offenders’ direct death threats and leakage.

A psychotic subject spoke with a friend about his daily routine. He mentioned that he had cleared his balcony from the snow with a knife and said that “you can’t know who is going to attack you.” Meanwhile, he insulted passers-by, saying “Go to hell, soon you’ll all be in for it, you’ll see what comes of it, you all just don’t want to get your hands dirty.” He also threw a big bread knife out of the open window while

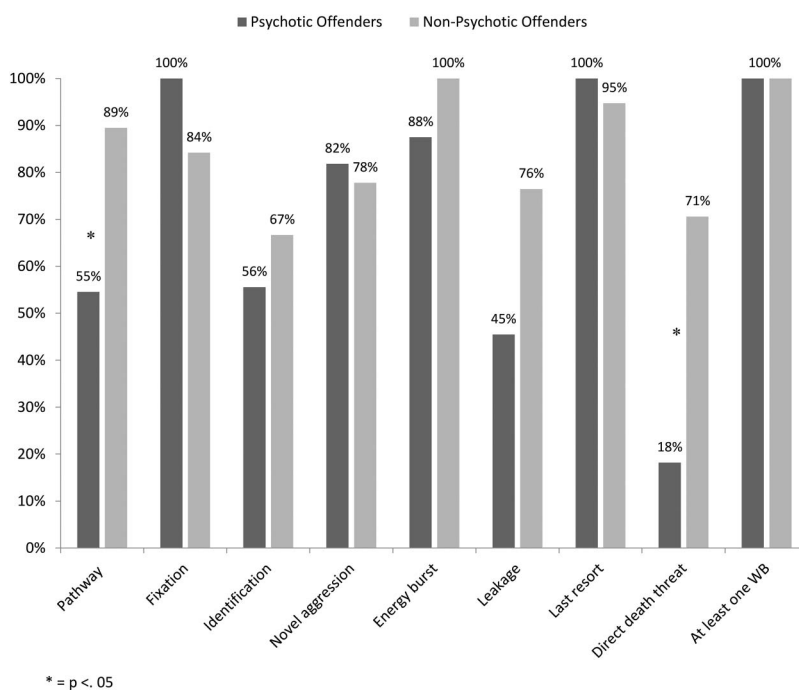


Figure 1. Warning behaviors of psychotic and nonpsychotic German rampage killers. Annotation: The warning behavior “direct threat” was slightly altered to “direct death threat” in the context of the research work compared with the original work (Meloy et al., 2012). The frequency of direct threats within the present study is therefore underestimated because of the higher specification.

listening to metal music. In his delusion, he thought that the devil or evil had taken the shape of passing birds, so he tried to blind them using the reflection of the sun in the blade of the knife before throwing it, because he was convinced that they were trying to attack him. He then descended into the delusion that the devil had now taken the shape of one of the people passing by his balcony. Shortly before 2 p.m. on the day of the attack (which happened at 2:20 p.m.), witnesses saw the offender walking up and down the street, leaving a confused impression, while uttering "At some point, you'll all be in for it."

A nonpsychotic subject was fined for possessing a firearm without a permit. During a court hearing he interrupted the judge repeatedly, *inter alia* saying "This whole thing is a show trial." He then requested the judge to state his name. The present attorney stated the judge's name, whereupon the defendant turned toward the door and shouted "I'll shoot you down" at the judge. Then he pointed to the prosecuting attorney's representative and declared "And you too". He then left the courtroom. On another occasion, this offender came into dispute with a gas station clerk about a returnable bottle she didn't accept. He then poured soda on some of the items on the counter, making them unusable. When the clerk wanted to call the police, he told her that if she did that, he would find out where she lived. She called the police nonetheless. To a police officer he said "We'll see each other again, and this time it'll be over notch and bead sights." When this subject and his exgirlfriend were at a restaurant where she had paid for his drinks and food, he asked her if he could take a shower at her place sometime. She said no and he responded that if she didn't not want to be his girlfriend, she would be his enemy. To which she replied "Are you trying to threaten me or shoot me? Then shoot me in the back when I cross the street." He replied "Not in the back," whereupon she asked "So you want to look me in the eyes?" which he affirmed. She then gave him 20 € for gas at his request.

Both groups showed *leakage* behavior: 76.5% of the nonpsychotic ($n = 13$) and 45.5% of the psychotic individuals ($n = 5$) without significant difference ($p = .125$). The leakage behavior was shown repeatedly by all five psychotic offenders and by 12 nonpsychotic of-

fenders. As an example, a psychotic perpetrator told relatives that "If someone attacks me, I will get even with them. And if I get killed, it doesn't matter, you only die once." He told family members that he was being harassed on the phone and that he was once called to the company car park. He also believed that "the Pole" [a colleague of Polish origin] was after him and in possession of a weapon, which made him feel threatened by him.

Another psychotic offender didn't care about his mother, but repeatedly went to see her over the years to get money from her, which he mainly used for drugs. He successfully blackmailed her by threatening to do "something that she would read about in the paper" if she didn't give him the money. After she once refused to do so, he crushed the tires and broke the windows of strangers' cars. He is said to have stated to his mother that he would derail trains if she refused to fulfill his demands.

A nonpsychotic perpetrator repeatedly threatened employees of his small business. A former employee described the process as follows: The offender would regularly drink alcohol in the mornings, and when something would bother him, he would become verbally abusive. He would then yell and throw tantrums and repeat over and over again that he was going to kill everyone and anyone, and that there would only be one bloodline left in his family. Such incidents had happened so frequently that the employees never actually took them seriously.

Psychological Characteristics

The two groups differed significantly on the variables "feels offended easily" ($\Phi = .618$, $p = .035$), "fantasies about revenge after subjectively experiencing injustice" ($\Phi = .500$, $p = .031$), and "persecutory delusion" ($\Phi = .786$, $p = .000$; see Table 10). The nonpsychotic perpetrators felt offended much more easily and had more fantasies about revenge. Psychotic delusions were mostly persecutory and did not occur, by definition, in the nonpsychotic perpetrators.

Fascination With Violence, Weapons, and Previous Attempted Homicide

Fascination with violence and weapons was found in both groups (see Table 11). Most non-

Table 10
Psychological Characteristics of Psychotic and Nonpsychotic Offenders

Psychological characteristics	Psychotic offenders		Nonpsychotic offenders	
	%	<i>N</i>	%	<i>N</i>
Feels offended easily*	17%	6	80%	10
Injustice collector	50%	6	60%	15
Fantasies about revenge after subjectively experiencing injustice*	13%	8	60%	15
Persecutory delusion**	73%	11	0%	18
Low impulse control	88%	8	61%	18
Self-conscious in social life	40%	10	17%	18
Contact with a criminal milieu	13%	8	44%	16
Denigration of a specific group of people	57%	7	53%	15

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

psychotic subjects were trained in the use of handguns and rifles ($n = 14$; 93.3%) which is not common in Germany, and nearly one third of psychotic offenders ($n = 3$; 27.3%) were adept in the use of firearms as well. The difference between groups was significant with a large effect size ($\Phi = .606$, $p = .009$). The consumption of violent media, such as first-person shooter games, and wearing military or warrior related clothing on a daily basis were infrequent in both groups.

Especially relevant to prevention is the finding that 31% of nonpsychotic ($n = 4$) and 13% of psychotic offenders ($n = 1$) had at least tried to kill somebody before their rampage. This information was available for 21 cases; nine

case files provided almost no information about the past of the offenders.

Critical Life Events and Experiences in Childhood and Adolescence Until Age 16

The following findings refer to the first 16 years in the lives of the future perpetrators. Incidents that were labeled as “*difficult childhood*” were defined by the death of a parent or both parents, the termination of contact with one or both parents, being placed into custody or foster care at least once, physical and/or sexual abuse, and/or substance abuse by one or both parents or foster parents. Aggregating early negative or traumatic experiences and un-

Table 11
Fascination With Violence and Weapons in Nonpsychotic and Psychotic Offenders

Affinity towards violence and weapons	Nonpsychotic offenders		Psychotic offenders	
	%	<i>N</i>	%	<i>N</i>
Weapons				
Experienced with using firearms*	93%	15	60%	8
Carries arms in public	21%	19	36%	11
Collector of weapons	42%	19	45%	11
Idealizes weapons	26%	19	18%	11
Leisure time and clothing				
Leisure time: spends a lot of time consuming violent media	14%	14	13%	8
Leisure time: first-person shooter games	7%	15	0%	9
Clothing: wearing black clothes nearly all the time	7%	14	0%	9
Clothing: wearing military, uniform style or militant clothes most of the time	5%	19	0%	9
Clothing: otherwise noticeable clothing	13%	15	0%	8
Former potential deadly violence				
Tried to kill another individual in the past	31%	13	13%	8

* $p < .05$.

stable family and broken home situations, it was found that nearly half of the nonpsychotic ($n = 9$, 47.4%) and slightly more than half of the psychotic individuals ($n = 6$, 54.5%) experienced a difficult childhood. Six nonpsychotic perpetrators (31.6%) experienced contact termination with a parent and five experienced the death of one or both parents. Five of the psychotic offenders experienced contact termination (45.5%) and in one case, one parent died within the first 16 years of the perpetrator's life. The two groups did not differ significantly from another ($p = .35$). Four nonpsychotic perpetrators and one psychotic were placed into a foster family or foster home before the age of 16. The experiences with foster care were statistically similar ($p = .32$). Parental substance abuse was prevalent in two cases, and both of these future perpetrators became psychotic. One psychotic subject had both parents addicted to drugs.

Crises and Stressors Within 1 Year Prior to the Attack

The occurrence of crises and stressors within 12 months prior to the violent offenses are shown in Table 12. More than two thirds ($n = 14$, 73.7%) of nonpsychotic and 45.5% ($n = 5$) of psychotic offenders experienced at least one of the following crises or stressors: a rejection of a desired romantic relationship, dissatisfaction with the quality of the relationship to a significant other, social withdrawal, financial difficulties, or disciplinary measures at the workplace. Rejection of a desired romantic relationship is the only factor which differed between groups, and was only relevant for the nonpsychotic individuals ($\Phi = .468$, $p = .027$).

Institutional Visibility

A person was considered institutionally visible if an institution had reported any kind of behavior or communication of the future offender that indicated a danger to the self or others, aggressiveness, or behavior regarded as "insane." Regarding institutional visibility (see Table 13), the following categories were considered: (a) educational institutions (schools and youth centers); (b) psychological or medical institutions; (c) former or current employers; (d) executive and judicial authorities (police, legal system, military). The mean institutional visibility ranging from zero to four categories for nonpsychotic offenders was 1.47 ($SD = .772$) and 2.09 for psychotic offenders ($SD = .94$); $U(19,11) = 142$, $p = .112$. Only one offender who was nonpsychotic was unknown to any institution before the rampage. The visibility to psychological or medical institutions was significantly higher for psychotic perpetrators ($\Phi = .451$, $p = .023$). All other categories did not differ significantly between the two groups.

Summary of Findings

The present study is an explorative and phenomenological analysis regarding rampage killings and intended killings by adults in Germany during a time period of 12 years. The adult killers were mostly male (93.9%). The age range was between 26 and 78 years ($M = 46.82$, $SD = 12.68$). Nearly half of the perpetrators were unmarried (45.5%) and lived alone (54.5%). In most of the cases, they lived in a permanent residence (90.9%). Two thirds did

Table 12
Crises and Stressors Within 12 Months Prior to the Attack

Crises and stressors within 12 months	Nonpsychotic offenders		Psychotic offenders	
	%	<i>N</i>	%	<i>N</i>
rejection of a desired romantic relationship ($N = 25$)*	43.8	16	.0	9
dissatisfaction with the quality of the relationship to a significant other ($N = 16$)	50.0	10	16.7	6
social withdrawal ($N = 16$)	18.2	11	20.0	5
financial difficulties ($N = 21$)	57.1	14	57.1	7
disciplinary measures at the workplace ($N = 24$)	7.7	13	10.0	10
At least one of the crises ($N = 30$)	73.7	19	45.5	11

* $p < .05$.

Table 13
Institutional Visibility of Nonpsychotic and Psychotic Offenders

Institution category	Nonpsychotic offenders (<i>N</i> = 19)		Psychotic offenders (<i>N</i> = 11)	
	%	<i>n</i>	%	<i>n</i>
Educational	16%	3	45%	5
Psychological-medical*	26%	5	73%	8
Work-related	21%	4	18%	2
Executive and judicative	89%	16	64%	7
Intitutional visibility	95%	19	100%	11

* $p < .05$.

complete vocational training or university studies; however, about half (48.5%) did not have a job at the time of their violent act and had financial difficulties (42.4%). They did not reach their occupational goals, and almost half of the killers (30–50%) had no occupational education, similar to other studies in Germany (Peter & Bogerts, 2012). They often had a criminal record (45%, $n = 15$), frequently more than one offense, and were imprisoned. Only a few cases had a carefree childhood as far as we know. Tentative appraisal suggests that at least half of the perpetrators had a potentially traumatic or desolate childhood and youth. The spectrum of victims was diverse. It ranged from intimate partners, colleagues at the workplace, to lawyers or medical practitioners. The geography of rampage killings in Germany are evenly divided between one, and more than one, crime scene in a public space. Half of them (51.6%) are planned over weeks, months, or even years. Murderous deeds with less than 24-hr lead time (12.9%) or unplanned deeds (35.5%) are much less common. In most of the cases, the subject had a primary or personal grievance at the beginning. The thoughts to commit a violent act then became funnel-like and more precise. At the outset of the continuum, or pathway, was the idea, followed by leakage—communication to a third party—and then closer to the deed, planning and preparatory behavior (Borum, Fein, Vossekuil, & Berglund, 1999). Shortly before the act, perceived grievances and life crises increased significantly. The specific time, place, and method emerged in many cases without meticulous planning. A predisposition to commit an act of

deadly violence was noticeable months, years, or even decades earlier in most of the cases, but the specific intent became apparent relatively late in the pathway toward violence, usually within days or weeks before the killings. In nearly three out of four cases, only one weapon was used in the crime, usually firearms. Sometimes more than one weapon was carried without being used. The perpetrators were in possession of the weapon they would use for years. On average, one person was killed by the murderer and three were wounded. In a third of the cases, no one was killed at the scene despite clear intent to do so. In contrast to the crime statistic in Germany for all murders, the victims within our sample are more often without any prior relationship to the perpetrator (Adler et al., 1993; Bundeskriminalamt, 2018). About half of the perpetrators were under the influence of substances during their act, which is a higher rate compared to other studies (Adler et al., 1993; Gill et al., 2017; Hempel et al., 1999). A suicidal motive was relevant for half of the sample.

Discussion

A differential case analysis revealed two different groups of mass murderers, psychotic and nonpsychotic offenders. Deciding whether and, if so, how many groups could reasonably be formed was possible after a complete review of all cases. A division into psychotic and nonpsychotic individuals was imposed by the case material. Especially the violent acts differed clearly.

Acts by individuals with psychosis were mostly unplanned and committed with cutting or stabbing weapons against strangers. The psychotic mass murders had contact with mental health professionals early on, and were known to act suspiciously before their crime. In contrast, nonpsychotic individuals planned their acts for a long time and used firearms. Therefore, their crime was more lethal compared to the psychotic offenders, and in line with other German sample studies (Adler et al., 1993).

In an early study of mass murder by Hempel, Meloy, and Richards (1999), psychotic were more lethal than nonpsychotic mass murderers. The reason for our contrasting results may be that in this study the nonpsychotic mass murderers used firearms, and the individuals with

psychosis generally did not. Firearms pose a greater lethality risk than cutting instruments.

The number of civilian firearms per 100 residents (*Small Arms Survey*, 2011) is estimated to be much higher in the U.S. ($n = 89$) than in Germany ($n = 30$). According to the latest estimates (*Small Arms Survey*, 2018), this difference (U.S., 120.5; Germany 19.6) has increased even further. Accessibility of firearms increases lethality risk. In the context of severe targeted violence by adolescents, most scholars agree that identification with other perpetrators or actions plays a special role (Meloy, Mohandie, Knoll, & Hoffmann, 2015). However, this does not seem to be the case for our sample of German adult mass murderers. Identification with other attackers or assassins, either historical or contemporary, fictional or not, is extremely rare in our sample of adult German mass murderers. However, other features of the identification warning behavior are observable. The perpetrators show a clear fascination with weapons and militaria and show a striking warrior mentality (e.g., collect weapons, carry arms in public or idealize weapons).

Both groups, psychotic and nonpsychotic offenders, contained high rates of so-called injustice collectors. In addition to their fixation on perceived injustices, they displayed deadly revenge fantasies. The aspect of injustice collection is common within adolescent and adult mass murderers (Gill et al., 2017; Mullen, 2004; O'Toole, 2000, 2014, 2015). This study validates former research of mass shootings regarding the importance of injustice collection, perceived as actual events—albeit often magnified if not delusional—and incubated in the mind of the perpetrator. A retaliatory mentality is not new: For example, the Biblical admonition of “sow the wind, reap the whirlwind” (Hosea, 8:7), and the primitive impulse of *lex talionis*, the law of talion, an eye for an eye. However, O'Toole described dangerous injustice collectors as follows: [they] “have at least one incident in their past when they reacted to a real or perceived injustice in a manner that was (1) disproportionate to the original event and (2) aggressive” (O'Toole, 2015, p. 98).

This injustice collection, whether delusional or not, is often buttressed by a rejection sensitivity, which in turn is often an aspect of pathological narcissism and clinical paranoia that pervades these cases (Hempel et al., 1999;

Knoll & Meloy, 2014; Meloy et al., 2004). The personal grievance, apparent in this study and most others (Hempel et al., 1999; Silver et al., 2018), composed of the elements of loss, humiliation, anger, and blame, becomes fertile soil for a perceived injustice which can be added to others, and accumulated over time, often months or years.

Special attention was paid to the perpetrator–victim relationship. The victims of the psychotic were mostly unknown. Nonpsychotic mass murders, on the other hand, were more likely to attack people they were related to within a formal or informal relationship. Among the victims of the nonpsychotic offenders were frequently found former intimate partners. In line with other studies (e.g., Liem, 2010; Liem & Oberwittler, 2012), this study also validates a positive correlation between the closeness of the perpetrator's victim relationship and the perpetrator's suicide rate. In addition, the personal crises differed between the two groups within the last 12 months. Romantic rejections were experienced by almost half of the nonpsychotic offenders, whereas not one psychotic offender had experienced a romantic rejection during the year before the act. With a focus on the warning behavior of both groups, direct death threats in nonpsychotic people were detectable in more than two thirds of the cases, and were significantly more frequently expressed when compared with their psychotic counterparts. In the end, these results validate the so-called intimacy effect. The intimacy effect suggests that the closeness of a relationship correlates with the seriousness of a direct death threat (Jenkins, 2008). Knoll and Hatters-Friedman (2015, p. 1256) summarized the intimacy effect when they wrote “Direct threats are more likely to predict violence the more intimate the relationship is.” Our findings show that even if direct threats of death do not result in an attack on the target, others may be at risk and threat management is very important. For example, a nonpsychotic regularly threatened his exgirlfriend with death, but then killed his current partner after the same conflict patterns were repeated.

We compared our study with the most recent FBI study of the preincident behaviors of targeted attackers in the U.S. (Silver et al., 2018). Case selection criteria were different, but comparisons are noteworthy. Most of the acts were

planned in advance by both German (64.5%) and U.S. (100%) offenders. The proportion of people with delusional disorders differs significantly. In the German sample 36.67% ($n = 11$) were psychotic, whereas the U.S. sample contained only 4.76% ($n = 3$). However, the two studies applied different criteria to identify delusional disorders. Silver et al. (2018) relied on official diagnoses by medical or mental health professionals, whereas the present study also included information based on qualitative analysis of the case files by mental health clinicians, even if a disorder was never officially diagnosed. More than half of the offenders in both studies leaked their intention to harm somebody to a third party. German mass murderers show leakage warning behavior in 64% and American active shooters in 56% of the cases. Although the recorded stressors differed between the U.S. and the German study, both groups showed a considerable number of stressors within the 12 months before the attack. Regarding threats, German mass murderers made direct death threats in half of the cases (50%), whereas U.S. active shooters did so in a third of the case (35%)—but direct threats were more likely in nonpsychotic or relational based targeting in both studies. All of the U.S. and almost all of the German (96.7%) perpetrators showed conspicuous and concerning behavior before their act. However, the present study evaluated the conspicuous behavior directly visible for institutions. Neighbors or acquaintances who had noticed abnormalities but had not made this known to an institution (e.g., police) were not included. In the U.S. study, the vast majority of those who noticed concerning behavior talked to the person directly (Silver et al., 2018), but no one in the U.S. study reported leakage to law enforcement.

Prevention of Adult Mass Murder

Leakage behavior and other warning behaviors offer the chance for the prevention of targeted violence. The intent to commit a violent act is communicated to third parties, and can initiate case management. Both psychotic (45.5%) and nonpsychotic (76.5%) mass murderers showed leakage warning behavior. As mentioned in previous studies (Meloy et al., 2012), direct death threats are a warning behavior, and along with leakage warning behavior often open a case with the authorities, although

leakage is much more common. Direct death threats—no matter to whom on the pathway to violence—are a clear signal that should not be ignored. In threat management, it is common sense that the more frequently people express homicidal threats, the greater is the ultimate risk of serious, targeted violence (Warren, Mullen, & McEwan, 2014). Our results underline this insight. When warning signs occur, threat management professionals should start examining whether other warning behaviors are present. As we see, oftentimes more than one warning behavior is shown. In our sample, more than five warning behaviors were shown by psychotic and more than six by nonpsychotic mass murderers. Although in this study there was no comparison group to indicate which warning behaviors can be used as correlates or predictors of violence, other studies have demonstrated this relationship (Challacombe & Lucas, 2018; Meloy et al., 2014, 2019). The most validated warning behaviors as correlates or predictors of risk are pathway, identification, and last resort.

Mental health professionals can assess if the person has a mental illness or if he or she is psychotic. Positive symptoms, for example, delusions, can increase the risk of violent behavior (Douglas, Guy, & Hart, 2009; Witt, Van Dorn, & Fazel, 2013). The content of the delusion and potential violent thoughts give important information about the risk. Therefore, teaching of the warning behaviors in hospitals and mental health institutions should be implemented. Personal grievances and situational crises are detectable and when ameliorated, can help prevent a violent act. In addition, the private sphere can be supported. Family, relatives, and friends, if available, can be informed about the illness, notably about psychotic illnesses and which signals suggest a psychotic phase and how professional help can be contacted. The integration of family members with a supportive attitude can stabilize the person of concern. Additionally, the subject can be taught to recognize and classify symptoms and signals. Undoubtedly, a trustful relationship between patient and physician, psychiatrist, or psychologist are essential.

The possibility to quickly access firearms, such as unsecured firearms in the home, increases the lethality of a possible attack. This insight is even more true for psychotic people. The analysis of the offenses showed that in the case of a psychotic shock, the immediately

available weapon is grabbed. Therefore, stricter gun control laws should be considered (Knoll, 2012; Lee, Lee, & Ng, 2007).

Almost every adult German mass murderer raised in advance serious concerns in several institutions, and very often individuals who had been in contact with the offender were deeply worried. Nonetheless, public services, universities, companies, hospitals, and mental health institutions are not always aware of potential warning signs. *Multiple proximal warning behaviors were present in every case.* Local threat assessment networks therefore may be the key for preventing mass murder. Often adult mass murderers are known in their surroundings and appear early on because of a variety of suspicious and noticeable behaviors which produced concerns. Institutional visibility exists. Nonetheless, often the institutions are not connected to each other, nor are experts consulted for effective threat management of the case. Networks between mental health professionals, police and threat assessment professionals are necessary. Collaborations between the health system and law enforcement are critical, such as the Los Angeles Police Department Threat Management Unit and the Fixated Threat Assessment Centres in the United Kingdom and Australia (Meloy & Hoffmann, 2014).

Intended mass murders in the public space are extremely rare and cannot be predicted. Instead, persons of concern can be threat managed if such warning behaviors are apparent. Threat assessment and management works to prevent, but not predict, targeted violent acts (Meloy, 2015). Threat assessment and management as an emerging scientific discipline and an operational method can promote the public safety and welfare, while also ensuring help for those who pose a danger, often to both themselves and others.

Limitations

The current study has no control group and exclusively focuses on cases from Germany. For a more comprehensive understanding, comparing the results with a control group would be helpful.

Weapon availability and weapon laws differ between countries. This may limit the transferability of the results.

Psychotic offenders have been examined closely in this study as they present the largest coherent group among perpetrators with mental illness. Other mental illnesses or psychological conditions have not been taken into consideration, although other dynamics associated to mental illness are conceivable and likely. Therefore, studies with a larger sample and a sufficient amount of data, especially regarding the medical history of perpetrators, are called for.

The dataset is based on the analysis of court files. Qualitative interviews with perpetrators who survived their attacks could contribute to the understanding of the phenomenon.

In this study, we examined mass murderous acts between 2000 and 2012. Considering the technological advancement in this time span, for example, the development of Social Media, some behaviors and dynamics may have changed or will change, not only regarding perpetrators but also investigation practices. Nonetheless, the authors assume a stability of the overall dynamics and warning behaviors.

Additionally, such studies can only analyze behaviors that have become known to the authorities following investigation. Changes in threat management practice may produce other results in the future.

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