

## Research Article

# A Retrospective Observational Study of Psychosocial Determinants and Psychiatric Diagnoses of Mass Shooters in the United States

Nina E. Cerfolio, Ira Glick, Danielle Kamis, and Michael Laurence

*Abstract:* Our aim was to better understand the underlying psychiatric, psychosocial, and psychodynamic aspects of mass shootings in the United States (US). The Mother Jones database of 115 mass shootings from 1982–2019 was used to study retrospectively 55 shooters in the US. After developing a psychiatric assessment questionnaire, psychiatric researchers gathered multiple psychosocial factors and determined diagnoses and treatment by evaluating the clinical evidence obtained by interviewing forensic psychiatrists, who had assessed the assailant, and/or by reviewing psychiatric evaluations conducted during the judicial proceedings. All 35 surviving-assailant cases were selected. Additionally, 20 cases where the assailant died at the time of the shootings were randomly selected from the remaining 80 cases. The majority of assailants (87.5%) had misdiagnosed and incorrectly treated or undiagnosed and untreated psychiatric illness. Most of the assailants also experienced profound estrangement not only from families, friends, and classmates but most importantly from themselves. Being marginalized and interpersonally shunned rendered them more vulnerable to their untreated psychiatric illness and to radicalization online, which fostered their violence. While there are complex reasons that a person is misdiagnosed or not diagnosed, there remains a vital need to decrease the stigma of mental illness to enable those with severe psychiatric illness to be

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## 2 CERFOLIO ET AL.

more respected, less marginalized, and encouraged to receive effective psychotherapeutic and pharmacologic treatments.

*Keywords:* psychodynamics, forensic evaluations, gun violence, mass killings, radicalization

Nations have highlighted mass shootings as one of the gravest threats in the world today. Recently, almost on an epidemic level, there has been a rash of domestic mass shootings. According to the nonprofit Gun Violence Archive (GVA), the United States (US) is on track to have more shootings in 2021 than any year recorded. As of November 24, there were already at least 638 mass shootings in the US in 2021 (GVA, 2021).

Gill et al. (2013) defined *terrorism* as the threat or use of action designed to intimidate the public or government to advance political, religious, or ideological causes. *Mass shootings* did not have an official definition until 2013 when the U.S. government defined *mass killing* as three or more killings during an incident, excluding the death of the assailant (US Code, 2013). The GVA defines mass shootings as having a minimum of four victims shot, either injured or killed, not including any shooter who may also have been killed or injured in the incident.

Yet there is a lack of a universally accepted definition of either *terrorism* or *mass shootings*. Rather, there are multiple definitions of these terms, and they may overlap. For example, mass shootings that have political or ideological causes generally are considered forms of terrorism. Further confounding the literature is that differing studies and databases of mass shootings use different definitions of mass shootings. Although many narrative, qualitative literature reviews exist on

mass shootings and terrorism (Cerfolio, 2020; Gill & Corner, 2017; Silke, 2003; Stone, 2017; Victoroff, 2005), there is a dearth of rigorous systematic, quantitative evidence that explains the role of psychiatric disorders in mass shootings and terrorism (Marazziti & Stahl, 2017; Vad, 2017). Most of the scholarship on mass shootings and terrorism (63%) comes from the political science and international relations field (Horган, 2017; Sheehan, 2014). By contrast, only a small proportion of the research on mass shootings and terrorism (5%) has been conducted by psychiatrists (Sheehan, 2014).

Early research on the relationship between mass shootings and mental illness has been characterized by inconsistent data collection and lack of methodological rigor. Collectively, misconceptions led to false ideas that mental health problems have nothing to do with mass shootings. What these reviews illustrated was the lack of evidence to

suggest that specific forms of mental illness were associated with mass shootings (Corner et al., 2016).

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## DETERMINANTS AND DIAGNOSES OF U.S. MASS SHOOTERS 3

More recently, research on the psychology of mass shootings has evolved, providing new information on the backgrounds of offenders. Despite the claim of some researchers that mass shooters and terrorists are rarely mentally ill (Atran, 2003; Dvoskin, 2016; McCauley, 2002; Pape, 2005), when studies conducted extensive background investigation and interviews with perpetrators, researchers found a high prevalence of mental illness (Lankford, 2014, 2016). With their extensive resources, the Secret Service conducted interviews with numerous perpetrators and assigned criminal investigators and social science researchers to study the case materials from each incident. Using this additional information, they concluded that at least 61% of school shooters were depressed (Vossekuil et al., 2002). Subsequent research with rampage school shooters between 1974 and 2008 found evidence that more than 90% were mentally ill (Newman & Fox, 2009; Newman et al., 2004). Similarly, the FBI released a report on a study of the pre-attack behaviors of active shooters in the United States between 2008 and 2013 that found that 25% ( $n = 16$ ) of active shooters were diagnosed with mental illness prior to the attack (Silver et al., 2018).

Other studies that noted mental illness in mass shooters included the U.S. Secret Service National Threat Assessment Center, which released a report on mass attacks in public spaces (Alathari et al., 2019). It analyzed 27 mass shootings that occurred in public spaces in the U.S. between January and December 2018, in which three or more persons were killed or injured. The study found that two-thirds of the attackers experienced mental health symptoms; the most common symptoms were depression and psychosis.

In addition, nonpsychiatric studies have noted that the incidence of mental illness is much higher in lone-actors than in group-actors (Corner & Gill, 2015; Corner et al., 2016; Gruenewald et al., 2013).

## METHODS

### OVERALL DESIGN

We designed a retrospective observational study of mass shooters, defined as those who killed four or more people with firearms between 1982 and 2012 or who killed three or more people with firearms between 2013 and 2019. We sought to determine the prevalence of psychiatric diagnosis and various psychosocial variables among those who have committed mass shootings in the U.S. Given the limitations of the small number of studies of perpetra

11:51:03 AM

#### 4 CERFOLIO ET AL.

conducted the first-ever psychiatric, systematic study utilizing a standardized interview, the DSM-5, and a Sheehan MINI (2016) standardized scale. We identified perpetrators of mass killings in the United States and obtained all available psychiatric and psychosocial information. The psychiatric interviewers evaluated the weight and quality of clinical evidence obtained by (1) interviewing forensic psychiatrists, who had assessed the assailant following the crime, and/or (2) reviewing psychiatric court evaluations conducted during the post-crime judicial proceedings to determine the prevalence of psychiatric illness.

We also examined the assailant's background, including identifying whether the assailant was isolated from family, friends, neighbors, and their school; the assailant's history of childhood uprootedness and poor psychosocial support; whether the assailant's perceived grievances were radicalized online, which may have fostered their violence; and whether stigma prevented the assailant from receiving psychiatric care.

#### SUBJECTS

We used the Mother Jones database, which consisted of 115 persons identified as committing a mass shooting in the U.S. between January 1982 and September 2019 (Follman et al., 2012). We recognized at the onset of our study that there is neither a uniform definition of a *mass shooting*, nor a complete list of those who have committed such an offense (Booty et al., 2019). We selected the Mother Jones database as it was the best representation of assailants who survived the crime and were subject to the scrutiny of the legal and psychiatric system. Mass shooting incidents often lack discernable motive and result from perceived grievances, yet they carry a clear intent to inflict a high degree of mass injury in public gatherings, commensurate with known terrorist tactics. The Mother Jones database that we selected sought to inventory every indiscriminate mass shooting during this period and excluded shootings stemming from more conventionally motivated crimes such as armed robbery or gang violence. Although a more complete compilation would be desirable, we considered this

database to be the best available representation of the universe of the assailants whom we sought to study (Donohue & Boulouta, 2019).

In most of the incidents in the database, the perpetrator died either during or shortly after the crime. We first examined every case ( $n = 35$ ) in which the assailant survived and criminal proceedings were instituted. In such cases, counsel for the government and the defendant were obligated to explore symptoms of mental illness as they are

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## DETERMINANTS AND DIAGNOSES OF U.S. MASS SHOOTERS 5

relevant to assessments of guilt. Indeed, in 21 of the 35 cases, the court found sufficient evidence to order a psychiatric evaluation to determine whether the assailant was competent to stand trial or there was sufficient evidence to warrant an insanity verdict.

For each of these 35 mass shootings, we interviewed forensic psychiatrists/psychologists, who examined the perpetrator following the crime, and/or collected the testimony and reports by psychiatrists/psychologists at trial or in the post-conviction proceedings contained in the court record. In addition, we reviewed available information from the court proceedings, neuropsychological testing, brain CT and PET scans, public records, videotape interviews of assailants by law enforcement, social media videotaped verbal declarations, and postings and writings of the assailants.

In addition to using the data from the 35 assailants who survived, we then randomly selected an additional 20 cases from the remaining 80 incidents where the assailant died. For these 20 cases, no psychiatric evaluation had been conducted and coding of the questionnaire was based upon gathering available news reports of the perpetrator's mental health, background, and behavior, so our data and diagnostic evaluations were less reliable.

## DATA COLLECTION

We developed a uniform, comprehensive, 62-item questionnaire to compile the data collection from multiple sources and record our psychiatric assessments of the assailants, using DSM-5 criteria. A board-certified psychiatrist (NC, DK) completed our questionnaire and determined DSM-5 psychiatric diagnoses. The clinical data was then reviewed by a second board-certified psychiatrist to ensure correct application of the DSM-5 criteria. We noted the origin for each piece of clinical information obtained, including a detailed description of the crime; the assailant's psychiatric and criminal history; DSM-5 psychiatric symptoms before, during, and after the crime; a history of bullying, abuse, and other significant trauma; history of head trauma and substance use; and clinical medical/neurological examinations

and statements by forensic psychiatrists/ psychologists, family members, and friends concerning the assailants' behavior before, during, and after the crime.

For each of the 35 cases in which the assailant survived, one of the study psychiatrists spent on average 30 hours, and in some cases more than 60 hours, assessing clinical information obtained from multiple sources, including reviewing taped video interviews of the assailant by

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## 6 CERFOLIO ET AL.

law enforcement; social media videotape of the assailant talking; writings and photos of the assailant on websites and diaries; and reviewing neuropsychological testing, brain CT and PET scans, and other court documents.

Although there was a massive amount of clinical information gathered from multiple sources for each case, the primary sources used to complete our questionnaire for each of the 35 surviving-assailant domestic mass shooters were interviews with forensic psychiatrists who had assessed the assailant following the crime (4 cases); information from forensic psychiatric/psychological evaluations, all but one of which were conducted during the post-crime judicial proceedings (14 cases); forensic psychiatric/psychological evaluation during post crime judicial proceeding reported in the media (5 cases); and information from media reports of the assailants' medical history, background, and behavior (12 cases).

Although we made every attempt to interview the forensic psychiatrist/psychologist who had originally assessed the assailants who survived, there were reasons beyond our control in some cases that prevented us from doing so, including confidentiality\* concerns, the case was still in litigation, the forensic psychiatrist had retired, and/or the perpetrator had refused psychiatric evaluation. For the 20 deceased assailant cases, there was no forensic psychiatric evaluation conducted, and we relied on public information from the media.

Of course, the diagnosis of mental illness is best determined by a clinical assessment of the assailant. In 26 of the 35 cases in which the assailant survived, our evaluation was based on such clinical psychiatric assessments. Thus, in many of the cases, we were able to exercise our clinical judgment by applying the diagnostic criteria to information collected from interviewing forensic psychiatrists/psychologists and/or reviewing judicial documents of mental health professionals who clinically assessed the perpetrators close in time to the criminal act. When such data was unavailable, we relied on clinical information obtained through the media. These media reports consisted of forensic reports by psychiatrists/psychologists who had interviewed the assailant post crime and the statements of family members, coworkers, friends, and

neighbors who observed the assailant's mental functioning prior to the crime. When the information was insufficient, or the presence of diagnostic criteria was unclear, we did not make a diagnosis.

\* All information obtained from interviewing forensic psychiatrists/psychologists remained confidential: Names of doctors and assailants, and all information gathered was not used in the legal system and was only used to gather information for our scientific study.

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## DETERMINANTS AND DIAGNOSES OF U.S. MASS SHOOTERS 7

Prevalence of Untreated Psychiatric Disorders Among Mass Shooters Who Survived the Crime, Excluding Unknowns (n=32)

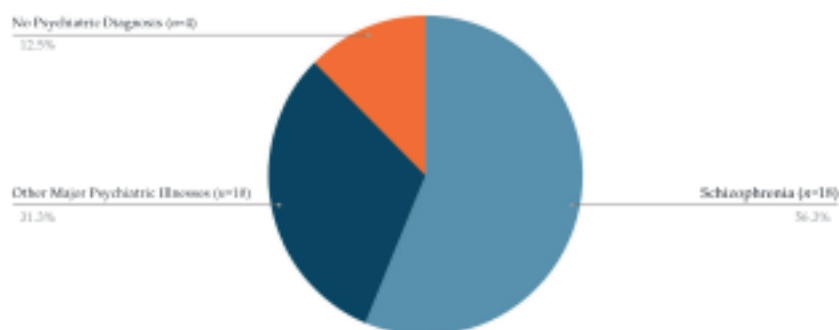


FIGURE 1:

To ensure we correctly determined potential psychiatric diagnoses, and to minimize interviewer bias, we had each psychiatrist, after she collected and analyzed all the clinical information from multiple sources on each case, complete a Mini International Neuropsychiatric Interview, English Version 7.0.2 (Sheehan, 2016). The MINI is a short, structured diagnostic interview that assesses the 17 most common mental disorders. This task was based on the available clinical information as direct interview of the assailant was not possible.

## RESULTS

Of the 35 cases in which the assailant survived and criminal proceedings were instituted, there was insufficient information to make a diagnosis in 3 cases. Of the remaining 32 cases in which we had sufficient information, we determined that 87.5% had the following psychiatric diagnosis: 18 assailants (56%) had schizophrenia, while 10 assailants (31%) had other psychiatric diagnoses: 3 had bipolar I disorder, 2 had

delusional disorders (persecutory), 2 had personality disorders (1 paranoid, 1 borderline), 2 had substance-related disorders without other psychiatric diagnosis, and 1 had posttraumatic stress disorder (PTSD).

Figure 1 depicts our findings concerning psychiatric disorders among the 32 surviving assailants for whom we have sufficient information. Of the 87.5% of perpetrators of mass shootings who survived and were diagnosed with major psychiatric illness, none were treated appropriately with medication at the time of the crime (Glick et al., 2021). Four

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**DETERMINANTS AND DIAGNOSES OF U.S. MASS SHOOTERS 9**

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**10 CERFOLIO ET AL.**

assailants (12.5%) had no psychiatric diagnosis that we could discern. The percentage of those suffering from a psychiatric illness may be higher, as in many cases the available clinical information suggested a



mental illness diagnosis. For example, one assailant was court-ordered to be psychiatrically hospitalized for being found incompetent due to psychosis, but there was no more clinical information provided in the court record. So in this case, we were unable to gather the required clinical information to definitively verify that he met diagnostic criteria.

Table 1 shows the case information for each incident of mass shooting by the assailants who survived. All were male, except for one case in which the assailant was female. The primary and secondary sources are listed for each case in which we gathered information from multiple sources to determine the presence of a DSM-5 psychiatric diagnosis.

As depicted in Table 1, case 517 involved a 42-year-old male who, after writing a will at work, opened fire and killed seven coworkers. He was found by police sitting calmly but his thoughts were disorganized. Despite everyone speaking English, he stated entirely out of context that he did not speak German. He did not understand why his company had to comply with the garnishment of his salary due to a tax lien. According to an interviewed forensic psychiatrist, the assailant heard an archangel's voice during the shootings: "to prevent the Holocaust by taking six of the architects of the Holocaust." According to the assailant's court records, he had a long history of auditory and visual hallucinations, but he kept the problem to himself due to fear of being "locked up." Although two prosecutorial experts stated that he was "faking a mental illness for an insanity defense," two defense experts opined that the assailant was psychotic without understanding the wrongfulness of his violence. According to the interviewed forensic psychiatrist and media reports, the assailant had a long history of apathy and social downward drift with poor interpersonal functioning and difficulty maintaining work/relationships. We confirmed the diagnosis of the interviewed forensic psychiatrist, as the DSM-5 criteria for schizophrenia were met and the Sheehan diagnostic scale confirmed psychosis.

Similar to the above case, many perpetrators as illustrated in Table 1—503, 504, 507, 508, 510, 513, 514, 516, 518, 520, 522, 526, 529, 533, 534, and 535—had perceived grievances, typically for their inability to function in society and/or maintain a job often due to many factors, including underlying psychiatric illness. They felt deeply humiliated by their marginalization and were often drawn to grievance cultures or ideologies that identify an enemy responsible for their humiliation. For white supremacists, the enemy includes people of color, Jews, and the liberals who allegedly promote them. Many of our perpetrators who

nicated with them on various websites. Organizing with others online gave these perpetrators, who often felt psychologically impotent due to lost status, a sense of purpose and significance.

Although each mass shooting is unique and complex, one case highlights key ideas. Despite being psychotic, many of the shooters we studied possessed enough cognitive functioning to permit them to plan their violent acts methodically. Case 512 in Table 1 is of a 15-year-old male shooter who was psychotic, but still could plan and execute violent acts, because parts of his cognitive functioning were relatively unaffected by his underlying psychopathology. Saying he was commanded by “a voice to ‘kill,’” this assailant began a school shooting spree leaving two students dead and scores wounded. Before killing another student, the assailant warned a friend to stay away, suggesting that he had some control over whom he chose to kill, but such control did not diminish the debilitating, distorted cognition of his undiagnosed schizophrenia. Afraid of being stigmatized, his family had concealed his psychotic symptoms from a treating psychologist. In custody, he remained compliant with antipsychotic medication with resolution of his psychosis, completed his GED and BA degrees, and became the prison’s electrician.

Throughout the study, we made the diagnosis of psychiatric illness conservatively. Where we made the diagnosis of schizophrenia, psychotic symptoms included command auditory hallucinations to “kill, burn or destroy,” messages from God or demons, paranoid delusions that “the government and CIA were trying to kill them,” the delusion that “Black men were raping White women to start a race war,” and that immigrants “had invaded and taken over the world and had to be killed.” Similarly, negative symptoms and poor functioning were prevalent; many of the assailants were unable to maintain employment, housing, or social relationships.

We found that none of the perpetrators of mass shootings whom we diagnosed with psychiatric illness were receiving appropriate medication. Of the 18 surviving assailants with schizophrenia, no assailant was on antipsychotic medication for the treatment of schizophrenia prior to the crime. Of the 10 surviving assailants with other psychiatric illnesses, no assailant was on antipsychotic and/or appropriate medication. Similarly, none of the deceased perpetrators of mass shooting whom we diagnosed with schizophrenia ( $n = 8$  cases) were medicated at the time of the crime.

Of the 20 cases in which the assailant died, in 5 cases there was insufficient information to render a diagnosis. Of the remaining 15 cases, 8 (53%) had schizophrenia, while 7 (47%) did not have schizophrenia.

was evidence of psychosis in many of these assailants, but we did not have sufficient clinical information to determine a psychiatric diagnosis. In 1 of these 7 cases where we reviewed an autopsy report, our best clinical judgment based on the neuropathology report of his brain and other clinical information was to identify a combination of diagnoses, including (1) temporal lobe epilepsy, (2) paranoid personality disorder, (3) neurocognitive disorder secondary to neuropathological changes including *corpora amylacea* (glucose polymer aggregates that appear in neurodegenerative conditions), and (4) an alcohol substance-related disorder.

Many of these shooters experienced estrangement not only from others but most importantly from themselves. Being interpersonally shunned rendered these assailants less able to understand their true sense of self; they became more vulnerable to their untreated psychosis and radicalization online that fostered their violence. Their frequent history of childhood abuse and uprootedness contributed to their sense of worthlessness; they felt that they had no place in the world and nothing to give to the world.

## DISCUSSION

The novelty of our study was in having a standardized process of board-certified psychiatrists who assessed the weight and quality of evidence. Rather than accepting diagnoses from forensic psychiatrists and/or court records, our team independently reviewed the clinical data gathered from multiple sources to apply the DSM-5 criteria to diagnose mental illness. To validate our psychiatric diagnoses, we had a second board-certified psychiatrist ensure the correct application of DSM-5 criteria. Then our psychiatric diagnoses were verified with the Sheehan MINI scale for psychotic disorder. As a result of this exhaustive review of the data, we found that often mental illness had been either undiagnosed or misdiagnosed.

We also examined psychosocial information including age; gender; ethnicity; childhood sexual, physical, and emotional abuse; previous psychiatric illness and treatment; suicidal ideation and/or attempts; history of being bullied; significant trauma (being fired from job, the death of a family member/caretaker, childhood uprootedness); criminal history; military training and/or service; and radicalization.

Our finding of the high prevalence of undiagnosed psychiatric illness in perpetrators of mass shootings is *not* meant to stigmatize those who suffer from mental illness. Rather, it is intended to bring more awareness

of the possibility of the under-diagnosis of mental disorders in perpetrators of violence so they can be accurately psychiatrically diagnosed. In fact, most individuals who suffer from schizophrenia and are appropriately treated with antipsychotic medication are *not* more violent and *do not* commit violent crimes more frequently than the rest of the population (Appelbaum, 2020; Buchanan et al., 2019). Typically, most violent behavior by those who suffer from schizophrenia occurs before treatment is initiated (Buchanan et al., 2019). Other studies have also found that the initial and long-term treatment of schizophrenia with antipsychotic medication most likely decreases violence (Glick et al., 2019; Hall et al., 2019).

Nevertheless, we found that most perpetrators of mass shooting suffered from misdiagnosed or undiagnosed and unmedicated schizophrenia. Without losing sight of the larger perspective that most who are violent are not mentally ill, and most of the mentally ill are not violent, our message is that the public must be made aware that *some* untreated or mistreated psychiatric patients do pose an increased risk of violence (Friedman, 2006).

Some limitations of our research include that our study was retrospective with a limited sample size of 55; we lacked a control group; there may exist psychological differences between those perpetrators of mass shootings who survive and those who do not, especially as many died by suicide; several databases would have lessened the potential for bias from the one utilized; our psychiatrists were unable to interview the mass shooters.

Many factors account for the under-diagnosis of psychiatric illness among perpetrators of mass shootings. Most of the perpetrators we studied did not have contact with a psychiatrist and shared characteristics with those least likely to visit a physician: young, male, and/or struggling financially (Lankford, 2014; O'Hara & Caswell, 2013). Many of our perpetrators did not seek psychiatric care due to stigma against mental illness. Prior to their violence, even the few times our perpetrators with mental illness did engage with a health care provider, they were misdiagnosed. Many of our perpetrators who claimed to be supported by radical ideologies may have even been more likely to be silenced by stigma against receiving psychiatric care (Lankford, 2016; Maris et al., 2000). Post-crime, they often refused psychiatric evaluation, as they wanted their grievance to be brought to public attention and felt that being psychiatrically diagnosed would diminish their "message" from being heard.

It is vital to clarify that we are *not* stating that psychiatric illness causes mass shootings. Rather our findings suggest that there is a complex interaction between biological, psychological, and sociological

## 14 CERFOLIO ET AL.

factors and an association—not a causal relationship—between mass shooting and *undiagnosed, untreated* psychiatric illness. The psychiatric illnesses that we found included schizophrenia, mood disorder, delusional disorder, severe personality disorders, substance-related disorders, and PTSD.

More in-depth, scientifically sound analysis based on comparative studies of mass shooting using standardized testing and clinical interviews is needed. While there are complex reasons that a person is not diagnosed, becoming aware of the possibility of under-diagnosis of mental disorders in these vulnerable perpetrators is crucial. This awareness of under-diagnosis could help them get the needed psychiatric support that they deserve and potentially prevent lethal attacks. There remains a vital need to decrease the stigma of mental illness to enable those with severe mental disorders to be more respected and less marginalized in order to receive effective treatment.

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