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## Aggression and Violent Behavior



## Neuropsychological profiles and descriptive classifications of mass murderers

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### ABSTRACT

As mass murders become more prominent throughout the United States, the ability to predict and prevent these crimes becomes imperative. Research indicates that mass murderers experience increased incidence of psychosocial stressors, psychiatric issues, and head trauma. However, few scientific studies of mass murderers exist, and no prior study has examined the associations between neurocognitive abilities and mass murder. We examined demographic, neurologic, psychiatric, substance use, criminal, and neurocognitive characteristics of mass murderers and compared mass murderers to single victim murderers on these characteristics. Additionally, we proposed a sub-classification of mass murderers based on the degree of relationship with their victims, and explored group differences in the aforementioned characteristics. Results suggested that mass murderers exhibit low average abilities across cognitive domains. Mass murder was associated with higher levels of premeditation and better cognitive abilities than single victim murder. Subgroups of mass murderers were distinguishable based on demographic and psychiatric variables, but exhibited similar cognitive profiles. Our findings suggest that mass murderers may possess the cognitive ability to engage in preventative or rehabilitative efforts, and that subtyping based on the degree of victim relationship may be important in this group of offenders.

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## 1. Introduction

### 1.1. Prevalence and definition of mass murder

Conflicting information exists regarding the prevalence of mass murder in the United States. Some sources claim that mass murder increased astronomically in the second half of the 1900s (The age of mass murder, 1991; Hickey, 2012). However, other sources propose that media coverage falsely conveys an increase in mass murders (Knoll, 2012; Why are mass shootings on the rise?, 2007). In fact, Duwe examined 909 mass murders throughout the twentieth century and found that mass murder rates remained steady throughout the 1900s (Duwe, 2004). Regardless of whether or not the prevalence of

mass murder is increasing, mass murder tactics have shifted towards more prominent crimes since the 1970s. For example, there are currently higher rates of public mass shootings compared to the early twentieth century (Duwe, 2004). As mass murder becomes more prominent, systematic study of mass murderers becomes more imperative to help inform our understanding of the possible causes of mass murder and how to prevent these devastating crimes.

Unfortunately, a limited number of scientific studies on mass murder exist, and, most often, studies of mass murders utilize samples from publicly available databases, media sources, and/or compilations of case studies (Meloy, 2004). As a result, scientific studies that directly collect data from mass murderers, as opposed to compiling data from other sources, are needed. With regard to which offenses are classified as mass murder, many researchers define it as the killing of 3 or more victims in a single incident (Allely, Minnis, Thompson, Wilson, & Gillberg, 2014; Dietz, 1986; Hempel & Richards, 1999; Meloy et al., 2004; Meloy, Hempel, Mohandie, Shiva, & Gray, 2001; Petee, Padgett, & York, 1997), while some researchers claim an event qualifies as mass murder if there are 2 or more victims in a single incident (Lester, Stack, Schmidtke, Schaller, & Müller, 2005; Liem & Reichelmann, 2014;

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**Table 1**  
Demographics, neurologic, psychiatric, substance use, and criminal characteristics of mass murderers, single victim murderers, and the FBI comparison data.

	Group			FBI vs. MM	SM vs. MM
	FBI MM (n = 976)	MM (n = 23)	SM (n = 103)	Test Statistic	Test Statistic
<i>Demographics</i>	Mean (SD)	Mean (SD)	Mean (SD)	W Statistic	W Statistic
Age	33.71 (12.53)	32.78 (9.19)	33.94 (12.55)	10,790.50	1187.50
Years education	–	10.31 (2.31)	10.38 (2.46)	–	1384.50
Male gender <sup>a</sup>	N (%)	N (%)	N (%)	Fisher's Exact p	Fisher's Exact p
Race <sup>b</sup>	902 (92.6)	21 (91.3)	86 (83.5)	0.69	0.52
Caucasian	519 (53.5)	6 (26.1)	25 (24.3)	0.02*	0.48
African American	315 (32.6)	14 (60.9)	65 (63.1)		
Hispanic	69 (7.2)	2 (8.7)	12 (11.7)		
Asian	46 (4.8)	0 (0.0)	1 (1.0)		
Other	16 (1.7)	1 (4.3)	0 (0.0)		
Some Employment	N (%)	N (%)	N (%)	X <sup>2</sup> Statistic	X <sup>2</sup> Statistic
	–	15 (65.2)	63 (61.2)	–	0.02
<i>Neurologic History</i>	N (%)	N (%)	N (%)	Fisher's Exact p	Fisher's Exact p
History of head trauma	–	21 (91.3)	87 (84.5)	–	0.52
History of seizures	–	1 (4.3)	14 (13.6)	–	0.30
On antiepileptic drugs	–	1 (4.3)	11 (10.7)	–	0.21
<i>Neurodevelopmental History</i>	N (%)	N (%)	N (%)	X <sup>2</sup> Statistic	X <sup>2</sup> Statistic
History of special education	–	9 (39.1)	63 (61.2)	–	2.88 <sup>+</sup>
Met criteria for learning disorder	–	7 (30.4)	55 (53.4)	–	3.10 <sup>+</sup>
	N (%)	N (%)	N (%)	Fisher's Exact p	Fisher's Exact p
History of ADHD diagnosis	–	1 (4.3)	14 (13.6)	–	0.30
Met criteria for intellectual disability	–	2 (8.7)	19 (18.4)	–	0.36
<i>Psychiatric History</i>	N (%)	N (%)	N (%)	Fisher's Exact p	Fisher's Exact p
Psychotic disorder	–	4 (17.4)	20 (19.4)	–	> 0.99
Anxiety disorder	–	0 (0.0)	1 (0.01)	–	– <sup>c</sup>
	N (%)	N (%)	N (%)	X <sup>2</sup> Statistic	X <sup>2</sup> Statistic
Mood disorder	–	7 (30.4)	25 (24.3)	–	0.12
History of conduct/behavior disorder	–	10 (43.5)	35 (34.0)	–	0.38
Personality disorder	–	11 (47.8)	32 (31.1)	–	1.66
Antisocial personality disorder	–	8 (34.8)	23 (22.3)	–	0.97
Previous psychiatric treatment	–	14 (60.9)	54 (52.4)	–	0.25
	N (%)	N (%)	N (%)	X <sup>2</sup> Statistic	X <sup>2</sup> Statistic
<i>History of abuse</i>	–	12 (52.2)	40 (38.8)	–	0.88
Physical	–	7 (30.4)	20 (19.4)	–	0.78
	N (%)	N (%)	N (%)	Fisher's Exact p	Fisher's Exact p
Sexual	–	2 (8.7)	9 (8.7)	–	>0.99
Both	–	3 (13.0)	11 (10.7)	–	0.72
<i>Substance Use</i>	N (%)	N (%)	N (%)	X <sup>2</sup> Statistic	X <sup>2</sup> Statistic
Lifetime history of alcohol use	–	19 (82.6)	77 (74.8)	–	0.28
Lifetime history of drug use	–	20 (87.0)	77 (74.8)	–	0.97
Cannabis	–	19 (82.6)	67 (65.0)	–	1.93
Cocaine	–	8 (34.8)	39 (37.9)	–	0.001
Hallucinogens	–	8 (34.8)	27 (26.2)	–	0.33
	N (%)	N (%)	N (%)	Fisher's Exact p	Fisher's Exact p
Heroin	–	0 (0.0)	20 (19.4)	–	– <sup>c</sup>
Amphetamines	–	3 (13.0)	8 (7.8)	–	0.42
Inhalants	–	3 (13.0)	7 (6.8)	–	0.39
Barbiturates	–	0 (0.0)	3 (2.9)	–	– <sup>c</sup>
	–	6 (26.1)	27 (26.2)	X <sup>2</sup> Statistic	X <sup>2</sup> Statistic
Used drugs during offense	–	7 (30.4)	29 (28.2)	–	0.02
Used alcohol during offense	–	7 (30.4)	29 (28.2)	–	<0.01
<i>Criminal Characteristics</i>	N (%)	N (%)	N (%)	X <sup>2</sup> Statistic	X <sup>2</sup> Statistic
Criminal history	–	14 (60.9)	55 (53.4)	–	0.18
History of violence	–	10 (43.5)	44 (42.7)	–	< 0.01
History of juvenile crime	–	10 (43.5)	30 (29.1)	–	1.19
Premeditation of crime	–	13 (56.5)	24 (23.3)	–	8.47**
Criminal classification	N (%)	N (%)	N (%)	Fisher's Exact p	Fisher's Exact p
Criminal enterprise	–	5 (21.7)	40 (38.8)	–	–
Personal cause	–	17 (73.9)	58 (56.3)	–	0.23
Sexual homicide	–	1 (4.3)	5 (4.9)	–	–
<i>Homicide weapon</i>	N (%)	N (%)	N (%)	X <sup>2</sup> Statistic	X <sup>2</sup> Statistic
Firearm	–	21 (91.3)	77 (74.8)	–	2.01
Knife	–	9 (39.1)	37 (35.9)	–	<0.01
Strangulation/Suffocation	–	7 (30.4)	28 (27.2)	–	<0.01
Other	–	6 (26.1)	13 (12.6)	–	1.71
	–	7 (30.4)	28 (27.2)	–	<0.01***

Note: FBI MM, FBI Mass Murderers; MM, Mass Murderers; SM, Single Victim Murderers.

<sup>a</sup> Completed by n = 974 FBI MM.

<sup>b</sup> Completed by n = 965 FBI MM.

<sup>c</sup> No MM fell into this category, so group comparison was not done.

<sup>+</sup> p < 0.10.

\* p < 0.05.

\*\* p < 0.01.

\*\*\* p < 0.001.

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