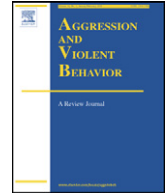




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# Aggression and Violent Behavior



## Neurodevelopmental and psychosocial risk factors in serial killers and mass murderers



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### ARTICLE INFO

**Article history:**

Received 11 July 2013

Received in revised form 20 February 2014

Accepted 8 April 2014

Available online 18 April 2014

**Keywords:**

Autistic Spectrum Disorder

Serial killer

Mass murder

Brain injury

Psychosocial stressors

### ABSTRACT

Multiple and serial murders are rare events that have a very profound societal impact. We have conducted a systematic review, following PRISMA guidelines, of both the peer reviewed literature and of journalistic and legal sources regarding mass and serial killings. Our findings tentatively indicate that these extreme forms of violence may be a result of a highly complex interaction of biological, psychological and sociological factors and that, potentially, a significant proportion of mass or serial killers may have had neurodevelopmental disorders such as autism spectrum disorder or head injury. Research into multiple and serial murders is in its infancy: there is a lack of rigorous studies and most of the literature is anecdotal and speculative. Specific future study of the potential role of neurodevelopmental disorders in multiple and serial murders is warranted and, due to the rarity of these events, innovative research techniques may be required.

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"I am relieved to see this verdict. The temptation for people to fob him off as a madman has now gone." Survivor of Anders Breivik shooting in Norway.

## 1. Introduction

The question as to why anyone would wish to kill large numbers of their fellow human beings is unanswered and debates around predisposing and precipitating factors continue. We have systematically reviewed the literature regarding mass and serial killing. These are rare events and, consequently, the peer reviewed literature is sparse and leads to conflicting findings. A systematic review is warranted for two reasons: first, despite their rarity, these events have a profound impact on societies, second, a clearer understanding of the antecedents of these events may help elucidate the mechanisms of extreme violence, potentially leading to preventative strategies.

Murder is the killing of one person by another person with "malice aforethought"; there may or may not be premeditation. Generally, a person who murders restricts his or her act to one victim. A mass murderer, however, kills three or more victims over a short period of time — typically hours but sometimes over days (<http://www.encyclopedia.com/doc/1G2-3407200189.html>). In contrast, serial killers murder their victims separately and over a period of time, with a cooling-off period between murders. Traditionally, a serial killer is defined as an individual who has killed three or more people (Holmes & Holmes, 2010). Serial killing may continue for years until the perpetrator is caught or turns himself/herself in to the authorities (<http://www.encyclopedia.com/doc/1G2-3407200189.html>).

### 1.1. Prevalence of multiple homicide

Attempts to estimate the numbers of serial murder victims have varied greatly (Quinet, 2007). This may have resulted from several factors (Jenkins, 2005): when apprehended, serial killers may overestimate the number of their victims (Fox & Levin, 2005; Quinet, 2007); gaining access to serial killers in order to conduct research interviews is difficult (Silvio, McCloskey, & Ramos-Grenier, 2006) and incidence and prevalence of serial murder is difficult to determine, since accurate statistics are not kept (Brantley & Kosky, 2005; Myers, Reccoppa, Burton, & McElroy, 1993; Schlesinger, 1998). A further challenge is that there is no single, generally accepted definition for serial homicide (Ferguson, White, Cherry, Lorenz, & Bhimani, 2003). Caution is needed when looking at longer-term homicide trend figures, primarily because they are based on the year in which offenses are recorded by the police rather than the year in which the incidents took place. Also, where several people are killed by the same principal suspect, the number of homicides counted may be the total number of persons killed rather than the number of incidents. For example, the victims of the Cumbrian shootings on 2nd June 2010 are counted as 12 homicides rather than one incident in the 2010/11UK data (Smith et al., 2012). It is not, therefore, possible to trace with a sufficient degree of precision or accuracy recent or long-term trends in the prevalence and incidence of serial murder (Egger, 1984; Jenkins, 2005; Kiger, 1990). The true rate of occurrence is not known for any country at any time. Therefore, it is not yet possible to study temporal trends or to make international comparisons (Dietz, 1986; Duwe, 2004; LaFree, 1999a, chap. 7, 1999b; Salfati, 2001). There are also differences in legal definitions of crime between countries (Vetere & Newman, 1977). Serial killing cannot therefore be predicted with any confidence (Brittain, 1970; Meloy, 2000). Trying to elucidate the prevalence of serial killing is also made difficult because of cases where we are not aware the murders have taken place, cases in which murders are known to have taken place but no connection has been made between them and/or cases where the perpetrator is still at large.

Despite the lack of knowledge about prevalence of mass and serial killings, there has been considerable speculation about the role of

various psychosocial and biological factors in the etiology of these events and research findings offer conflicting evidence. For example, in a retrospective study of the forensic psychiatric evaluations of 57 adolescent offenders accused of a homicide, 64% had developmental problems. Yet, use of multiple and excessive violence was not related to having developmental problems (Hagelstam & Häkkänen, 2006). Söderström (2005) also found that childhood-onset neuropsychiatric disorders were common among violent offenders. Most frequent were disruptive behavior disorders, such as ADHD and conduct disorder, but a substantial minority had ASDs, tic disorders and mental retardation/learning disabilities (Söderström, 2005).

We consider some of these psychosocial and neurodevelopmental risk factors below. Silva, Leong, and Ferrari (2004) suggest the presence of an association between ASD and serial homicidal behavior which has also been suggested by others (e.g., Fitzgerald, 2001). This has led us to explore the phenomenon of serial and mass killings in relation to these risk factors in a unique systematic review of the literature. To examine ASD as a risk factor is particularly timely given the recent shooting cases of Adam Lanza, James Holmes, and Anders Breivik, all of whom have been considered to have autistic features (<http://www.zerohedge.com/news/2012-12-15/newtown-shooter-had-asperger-syndrome-and-some-us-gun-facts>; <http://www.dailymail.co.uk/news/article-2156530/Anders-Behring-Breivik-rare-forms-Aspergers-Tourette-s-syndromes-says-Norways-leading-psychiatrist.html>). Fitzgerald (2010) has suggested that Autistic Psychopathy may underlie the motivation of some of these serial killers. He suggests a new diagnosis Criminal Autistic Psychopathy, a subcategory of Asperger's syndrome.

In addition to ASD, we also explored head injury as it has been shown that this is more prevalent in serial killers, with one study suggesting that one in four serial killers had suffered either a head injury or (more rarely) a condition affected the brain — such as meningitis during their early years (Stone, 2009). However, this has rarely been investigated in the peer reviewed literature and it typically only explored using samples of single homicide cases. Certainly the combined effects of psychosocial stressors, head injury, and ASD have never previously been examined in a systematic review.

After an extensive review, we found very little mention of Attention Deficit Hyperactivity Disorder (ADHD) in the literature and biographies of killers (Stone, 2009). Once notable exception to this was an autobiography of serial killer Richard Ramirez who had ADHD as a child (Carlo, 1996).

### 1.2. Autism spectrum disorders (ASDs)

Various follow-up studies suggest that people with ASDs are no more likely to commit violent crime than the general population, and may even be less likely (Mouridsen, Rich, Isager, & Nedergaard, 2008; Woodbury-Smith, Clare, Holland, & Kearns, 2006). In a study of penal register data regarding Hans Asperger's original group of 177 patients, the rate and nature of crimes committed by these individuals were no different from the general population. In the case records spanning 22 years and 33 convictions, there were only three cases of bodily injury, one case of robbery and one case of violent and threatening behavior (Hippler, Viding, Klicpera, & Happé, 2010). Despite this, media and academic reporting of violent crime committed by offenders with ASDs has served to generate a speculative association between ASDs and offending behavior (Allen et al., 2008; Mukaddes & Topcu, 2006; Murphy, 2010) and some studies, including research with mentally abnormal offenders incarcerated in special hospitals, suggest that the prevalence of ASD may be greater than that of the general population (Scragg & Shah, 1994). The question of whether or not there is a link between ASD and extreme violence is still unanswered because empirical research investigating offenders with ASDs is relatively rare (Browning & Caulfield, 2011; Dein & Woodbury-Smith, 2010) and largely consists of case reports and surveys of criminal groups (Baron-Cohen, 1988;

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