



# Neurodevelopmental disorders in young violent offenders: Overlap and background characteristics



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## ABSTRACT

Neurodevelopmental disorders (Attention-Deficit/Hyperactivity Disorder (ADHD), Autism Spectrum Disorder (ASD), tic disorder, intellectual disability (ID)), in prison populations have received increased attention but the focus has generally been on one single condition leaving out the global picture. This study assessed the prevalence and overlap of neurodevelopmental disorders (NDD) in a consecutive cohort (n=270) of young adult male offenders (age 18–25 years), sentenced for “hands-on” violent offences and serving prison time in Swedish prisons. Seventy-one percent of all who met inclusion criteria participated. Comprehensive clinical assessments were carried out including history of early antisocial behavior and maladjustment, self-report questionnaires and an intelligence test. Sixty-three percent of the study group met DSM-IV criteria for childhood ADHD, 43% for ADHD in adulthood, 10% met criteria for an ASD, 6% for Tourette syndrome, and 1% for ID. Twenty-two percent had borderline intellectual functioning. A substantial rate of overlap between the NDDs was found. The combined NDD group had an earlier onset of antisocial behavior, had more aggressive behavior and lower school achievements than the non-NDD group. The results highlight the need for prison and probation services to be attentive of and screen for neurodevelopmental disorders in young violent offenders.

## 1. Introduction

Attention-Deficit/Hyperactivity Disorder (ADHD), Autism Spectrum Disorder (ASD) and tic disorders are neurodevelopmental disorders (NDD) that show heterogeneity of aetiology, clinical phenotype expression and severity in functional impairment (Rutter et al., 2006). Common features of NDD are manifestations of a delay in maturational-influenced psychological features, a course not marked by remission or relapses, and a general tendency for the impairment to lessen with age. There is also often some degree of cognitive impairment, a tendency for overlap among disorders, a strong genetic influence, probable environmental influences, and, a marked male preponderance (Rutter et al., 2006). Long-term follow-up studies of children with NDD show that these conditions persist into adulthood (Barkley et al., 2006; Billstedt et al., 2005; Gillberg and Soderstrom, 2003; Howlin et al., 2014; Karam et al., 2015) in a majority of cases

and carry a high risk of adverse outcomes (e.g. Barkley et al., 2006; Gillberg and Soderstrom, 2003; Howlin et al., 2014; Karam et al., 2015).

Psychiatric morbidity including schizophrenia, depression, personality disorders and substance misuse is higher in prison populations than in the general population (Andersen, 2004; Fazel and Seewald, 2012; Konrad et al., 2012). Psychiatric morbidity related to ADHD has been the focus of studies in criminal offender populations (Young et al., 2015a, 2015b). The focus on ADHD may be explained by the fact that longitudinal outcome studies have shown that ADHD (Rasmussen et al., 2000; Biederman et al., 2006) is associated with a wide range of adverse psychosocial outcomes such as substance use and mental health problems.

Findings suggest that individuals with ADHD are at greater risk of both engaging in and being convicted of a wide range of criminal behaviors (Dalsgaard et al., 2013; Dalteg and Levander, 1998). When

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ADHD is combined with Oppositional Defiant Disorder (ODD) and Conduct Disorder (CD), the risk of developing criminal behavior is increased (Hofvander et al., 2009; Moffitt et al., 2001), though the particular influence of ADHD on delinquency is difficult to disentangle (Grieger and Hosser, 2012). Studies have identified an overrepresentation of ADHD in offender groups (Einarsson et al., 2009; Fazel et al., 2008a; Ginsberg et al., 2012; Semiz et al., 2008; Ståhlberg et al., 2010) with rates between 31–67%, compared to 5–7% in the general population (Faraone et al., 2003).

It has been reported that aggressive and disruptive behavior is overrepresented in children with ASD as compared to typically developing children (Bronsard et al., 2010). A shared neurodevelopmental base for ASD and early-onset persistent antisocial behavior has been proposed (Moffitt et al., 2001). This hypothesis has been supported by clinical studies of children with ASD, where many have CD (De Bruin et al., 2007), and autistic-like traits have been found to be related to CD in large, population-based studies (Lundström et al., 2011). In addition, children with CD have repeatedly been found to have significant socio-communicative and pragmatic language problems (Donno et al., 2010; Gilmour et al., 2004), which suggests that deficits in social communication can lead to antisocial behavior. Early case studies depict persons with ASD who have committed serious violent offences (Baron-Cohen, 1988), and there are several reports from forensic psychiatry and secure hospitals that describe a heightened prevalence of ASD (Siponmaa et al., 2001; Söderström et al., 2005). Results from a follow-up study showed a higher, albeit modest, crime rate in an ASD group compared to the general population (Mordre et al., 2012). In contrast, a number of follow-up studies have indicated that individuals with ASDs are no more likely to engage in violent criminal behavior compared to the general population (Hippler et al., 2010; Robinson et al., 2012) and some studies have indicated that they may actually be less likely (Mouridsen et al., 2008; Lundström et al., 2014; Woodbury-Smith et al., 2006).

The relationship between tic disorder and/or Tourette syndrome (TS) and criminality is even more unclear. Comings has already pointed out in the early 1990s the association between TS and CD and stated that CD can be a manifestation of a TS gene and can be severe despite only mild tics (Comings, 1990). Nevertheless, there are, at least to our knowledge, hardly any studies on TS in criminal offenders that have been carried out. In a comprehensive review of all cases that were tried in US courts between 1983 and 2003 and in which TS was somewhat implicated, the authors conclude that TS is rarely associated with criminal behavior (Jankovic et al., 2006), but patients with TS who have behavioral comorbidities are at risk of being involved with the legal system (Mordre et al., 2012).

Intellectual disability is also a neurodevelopmental disability reflecting underlying central nervous system dysfunction. The impact of intellectual function, particularly IQ, on crime has been debated over the last decades (Guay et al., 2005) and the prevalence of individuals with intellectual disability has been of particular interest. In a systematic review, Fazel et al. (2008b) found a prevalence of 0.5–1.5% of prisoners with intellectual disability, which is close to the prevalence rate expected in the general population (Maulik et al., 2011). Prevalence studies of borderline IQ, defined as an IQ score in the range of 70–85, have reported that about one fourth of prison populations have this condition (Herrington, 2009; Søndena et al., 2008).

The NDDs present high comorbidity rates with each other (Pagliaroli et al., 2015; Thapar and Cooper, 2016) and the need for recognition and management of NDD more broadly across criminal justice settings, including probation services has been highlighted (Young et al., 2015a). Still, studies on NDD among violent offenders have focused on specific NDD leaving out the comorbidity between NDD. Further, studies of NDD in prison populations have often used screening tools rather than gold-standard diagnostic measures to define those with and without NDD (e.g. Fazio et al., 2012; Moore

et al., 2016) which might have had an impact on the prevalence rates (Young et al., 2015b).

Early psychosocial adversities and maladjustment have been linked to an increased risk of aggressive antisocial behaviors, and a previous report from the current sample (Wallinius et al., 2016), replicated these findings. A large body of literature have emphasized the combination of NDDs, especially ADHD, early maladjustment and childhood onset of criminal behavior, as important when trying to delineate the pathway to persistent aggressive and antisocial behavior (e.g. Moffitt, 1993; Sibley et al., 2011). However, few studies have explored a larger spectrum of NDDs in these respects. Studies in background characteristics in young violent offenders with NDD might also help professionals in school and social settings to detect these young men at risk at an early stage.

The aim of the current study is to map the prevalence and clinical characteristics of NDD among young adult male violent offenders in prison, investigated by structured interviews and clinical assessments, and to identify the overlap between them. A secondary aim is to compare young violent offenders with and without NDDs regarding childhood adversities, school age adjustment and criminal history.

## 2. Methods

### 2.1. Procedure

The study cohort consists of all male offenders in emerging adulthood (18–25 years of age) who served time between March 2010 to July 2012 at any of nine correctional facilities in the Western region of the Swedish Prison and Probation Service. They were all sentenced for violent offences including “hands-on” sexual abuse which requires physical contact between the perpetrator and the victim but excluding for example child pornography. The region has the full range of prisons, from high-security to open facilities, and serves approximately one fifth of the total national cohort. As there is only one small, specialized women's prison in the defined area, female offenders were not included in the study. Exclusion criteria were not being able to communicate in the Swedish language (needing an interpreter), or staying at the current prison for less than 4 weeks (in order to practically arrange the participation). To assess the representativeness of the included group, information regarding age and type of crime was provided for individuals who were excluded or chose not to participate in the study.

Participants were consecutively assessed according to the protocol, including self-rating questionnaires, semi-structured diagnostic instruments, and neuropsychological assessments. The clinical assessments were performed by an experienced clinical psychologist who had special training in the instruments used and were conducted during one 6–7 h day. Questionnaires were handed out by the site coordinator at the prison prior to the clinical assessments and collected by the psychologist at the day of examination. The psychologist had read all file information, including prison health care journals, detailed reports on previous living circumstances and criminal history, and incidents during ongoing sanction, available from the Swedish Prison and Probation Service. Participants who showed signs of an autism spectrum disorder were later offered a specialized clinical, semi-structured diagnostic interview (Wing et al., 2002) or observational assessment (Lord et al., 2000).

Out of a total of 421 inmates, 23 (5%) were excluded due to poor language skills and 19 inmates (5%) due to placements of insufficient duration. Of the remaining 379 inmates, 109 (29%) declined participation in the study, leaving a final study group of 270 participants (71% of all who met inclusion criteria). Fifteen (14%) among the non-consenters had been sentenced for sexual violent crimes, and 94 (86%) for non-sexual violent crimes. Those excluded due to insufficient skills in Swedish differed from the offenders by a higher rate of sexual index crimes ( $n=12$ ; 52%). Otherwise, no statistically significant differences

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