

Pervasive Developmental Disorders and Criminal Behaviour

A Case Control Study

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The prevalence and pattern of criminal behaviour in a population of 313 former child psychiatric in-patients with pervasive developmental disorders were studied. The patients were divided into three subgroups and compared with 933 matched controls from the general population. Age at follow-up was between 25 years and 59 years. An account of convictions in the nationwide Danish Register of Criminality was used as a measure of criminal behaviour. Among 113 cases with childhood autism, .9% had been convicted. In atypical autism ($n = 86$) and Asperger's syndrome ($n = 114$) the percentages were 8.1% and 18.4%, respectively. The corresponding rate of convictions in the comparison groups was 18.9%, 14.7%, and 19.6% respectively. Particular attention is given to arson in Asperger's syndrome ($p = .0009$).

Keywords: *arson; criminal behaviour; pervasive developmental disorders*

In past decades, evidence showing a link between criminality and mental illness has mounted. Most studies have examined rates of criminality among the mentally disordered, or rates of disorder among the criminals (Marzuk, 1996).

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Concerning pervasive developmental disorders (PDD), Howlin (2002) pointed out that health professionals have only recently begun to recognize this association. It is not known how many people with PDD are involved in crime as no systematic research has been conducted in this field.

PDD is a neurodevelopmental disorder of early onset marked by restricted and stereotyped patterns of behaviour and interests, communication, and social disability affecting a person's capacity for understanding other people, intuiting their feelings, and establishing reciprocal relationships (World Health Organization [WHO], 1992), symptoms that theoretically would increase the risk of criminal behaviour.

Wing (1981) described 4 of her series of 34 persons with Asperger's syndrome (AS) as having had a history of bizarre antisocial acts but does not give other details than "one of them injured another boy in the course of his experiments on the properties of chemicals" (p. 116), which she attributed to lack of empathy. She also suggested problematic relations with the opposite sex because of social ineptitude. The person with PDD may have difficulty indicating his or her interest toward another person in a socially acceptable way, which may lead to touching or kissing a stranger, which could result in trouble involving the police.

Larsen and Mouridsen (1997) conducted a 30-year follow-up study of 18 persons with childhood autism ($n = 9$) or Asperger's syndrome ($n = 9$). They found that 1 person with AS had committed a crime. A 24-year-old male was convicted of theft. Furthermore, several case reports have described people with AS involved in violent behaviour (Baron-Cohen, 1988; Mawson, Grounds, & Tantam, 1985; Palermo, 2004). A number of case reports have included descriptions of sexual offenses, with or without violent behaviour (Chesterman & Rutter, 1994; Cooper, Mohamed, & Collacott, 1993; Kohn, Fahum, Ratzoni, & Apter, 1998; Milton, Duggan, Latham, Egan, & Tantam, 2002; Palermo, 2004; Realmuto & Ruble, 1999; Silva, Ferrari, & Leong, 2002). Arson has also been reported in AS (Everall & LeCouteur, 1990; Palermo, 2004; Tantam, 1991; Wolff & Cull, 1986), as well as repeated stealing in relation to collecting behaviours (Chen et al., 2003).

Increased prevalence of AS was found in a special hospital for violent patients in England (Scragg & Shah, 1994). The increased frequency was small in magnitude, 1.5% versus .36% in the normal population. Moreover, in a retrospective study of 126 juvenile delinquents 12% had a definite PDD not otherwise specified and 3% AS (Siponmaa, Kristiansson, Jonson, Nyden, & Gillberg, 2001).

In the current study, results are reported from a study comparing the prevalence and types of crime in a group of 313 people with PDD and 933 controls from the general population using data from the nationwide Danish Criminal Register. Register data offer an opportunity to analyse data from large populations in a historical, prospective way and avoid recall bias.

Participants and Method

The study included children with variants of PDD consecutively seen as in-patients at the University Clinics of Child Psychiatry of Copenhagen and Aarhus during the 25-year period 1960 to 1984. Together the two clinics provided services to all of Denmark. At that time most children with supposed autism or other extensive developmental disorders were admitted as in-patients. The patients were born in the period 1945 to 1980 and have been rediagnosed in 1985 in accordance with contemporary diagnostic criteria—mostly ICD-9 (WHO, 1978). All who could be assigned to one of the chosen group: infantile autism ($n = 118$), autistic-like conditions ($n = 89$), disintegrative psychosis ($n = 13$), and borderline childhood psychosis ($n = 121$) were identified and make up 341 patients. See Mouridsen, Rich, and Isager (1993) and Isager, Mouridsen, and Rich (1999) for further details of initial selection criteria and how the ICD-9 concepts of childhood psychoses and borderline condition relate to contemporary ICD-10 (WHO, 1992) categories of PPD, childhood autism ($n = 113$), atypical autism ($n = 86$), and AS ($n = 114$), which are used in the current study.

Excluded from the analyses presented here are 13 persons who had a disintegrative disorder, and 15 persons who had died, disappeared, or emigrated from Denmark before the closing date of the study. The remaining 313 persons make up the case group in the current study.

A control group was drawn from the Danish Central Persons Register. This register provides total population data as it has current and historic data on all people born and/or living in Denmark. Wherever possible, each child with PDD was matched with three control children by sex, time of birth (the controls were born the same day or the day before or after the case), place of birth (region), and social group. This group of children makes up the control group in our study and includes 933 persons.

All participants were screened through the nationwide Danish Criminal Register, using the citizen's identity number, which ensures a definitive identification. The criminal register has complete lifetime information on all criminal proceedings in Denmark, that is, all arrests and convictions—crimes and misdemeanours against the penal code and some acts outside the penal code. The register is updated daily and is considered to be the most thorough, comprehensive, and accurate criminal register in the Western world (Wolfgang, 1977).

Findings reported here are based on court convictions for infractions of all breaches of the law. We decided to use convictions rather than arrest data because they require proof of guilt and are a more conservative measure of criminality. All offenses were included and classified into 13 categories: violent offenses (all offenses involving interpersonal aggression or a threat thereof), robbery, possession of weapons, sexual offenses, arson, thefts of all kind, violations of drug law, vandalism, fraud, offenses against property, receiving stolen goods, violations of traffic law, and finally a category called "other offenses." The closing date of the study was February 15, 2005.

Table 1
Characteristics of Cases at Assessment in Childhood
and Age at Follow-Up

	Childhood Autism	Atypical Autism	Asperger's Syndrome
Number	113	86	114
Age (years)			
<i>M (SD)</i>	4.9 (2.4)	8.5 (4.0)	9.1 (3.1)
Gender			
Boy	82	56	97
Girl	31	30	17
Intelligence			
< 50	49	19	0
50–69	30	15	15
> 69	33	51	99
Unknown	1	1	
Age at follow-up (years)			
<i>M (SD)</i>	40.3 (7.6)	43.7 (7.2)	43.0 (9.0)
Range (years)	25–55	26–59	26–58

Statistics

The statistical analysis program Statistix 8 (2003) was used for data handling and analysis. Comparisons between groups were based on two-sample *t* test for continuously scaled data and chi-square test or Fisher's exact test for dichotomous (present, absent) data. A probability level of .05 (two-tailed) was used to indicate significant differences between groups.

Results

Table 1 shows the age, gender, and intelligence at assessment in childhood for the case population and age at follow-up.

Prevalence of Criminality by Diagnostic Group

Details about prevalence, gender, and types of criminality are presented in Tables 2 and 3. Each person is counted once when given a conviction. A person with more than one conviction might have committed different crimes and might thus count in more than one group.

Altogether 29 from the PDD group (9%) and 168 (18%) from the comparison group had been convicted (29/313 vs. 168/933, $p = .0002$).

Among the 113 cases with childhood autism only one male person (.9%) had been convicted. For the 339 control cases the respective numbers were 64/339 (18.9%)

Table 2
Comparison of Individuals With Atypical Autistic Disorder and Control Participants, With Regard to Prevalence and Types of Criminal Behaviour

	Case (<i>n</i> = 86)	Control (<i>n</i> = 252)	<i>p</i>
Number with criminal record (%)	7 (8.1)	37 (14.7)	.14
Male/female	4/3	29/8	
Total number of convictions	179	266	
Range	0–123	0–88	
Mean number of convictions	2.1	1.1	.38
Violent crimes	2 (2.3)	4 (1.6)	1.00
Robbery	2 (2.3)	1 (.4)	.16
Possession of weapons	2 (2.3)	2 (.8)	.58
Sexual offending	0 (.0)	2 (.8)	.62
Arson	2 (2.3)	1 (.4)	.16
Thefts of all kinds	4 (4.7)	7 (2.8)	.48
Violations of drug law	2 (2.3)	3 (1.2)	.61
Vandalism	1 (1.2)	2 (.8)	1.00
Fraud	1 (1.2)	5 (2.0)	.70
Offenses against property	2 (2.3)	4 (1.6)	1.00
Receiving stolen goods	1 (1.2)	3 (1.2)	1.00
Violations of traffic law	1 (1.2)	29 (11.5)	.003
Other offenses	0 (.0)	7 (2.8)	.20

($p < .0001$). The convicted male had a mild mental retardation. The control cases with convictions comprised 56 males and 8 females.

The atypical autistic group also had a lower prevalence rate of convictions than the comparison group (7/86 [8.1%] vs. 37/252 [14.7%], $p = .14$). The mean ages at first conviction for the atypical and comparison group were 24.5 ($SD = 6.8$; range = 17.4–35.1) years and 33.6 ($SD = 10.0$, range = 16.6–53.2) years, respectively. Two-sample t test: $t = 2.31$, $df = 42$, $p = .03$ (equal variances). All the convicted had IQs in the normal range (IQ > 70).

The Asperger group is similar to the control group as regards rate of convictions (21/114 [18.4%] vs. 67/342 [19.6%], $p = .89$), and mean ages at first conviction = 32.2 ($SD = 10.0$, range = 16.9–46.0) years and 32.8 ($SD = 9.5$, range = 17.9–51.4) years. Two-sample t test: $t = .23$, $df = 86$, $p = .81$ (equal variances). Two of the convicted persons had mild mental retardation. The remaining 19 convicted persons had IQs in the normal range or higher.

Gender, IQ, and Crime

Gender was related to crime in the control sample (149/699 vs. 19/234, $\chi^2 = 20.68$, $p < .0001$), but not in the case sample (23/235 vs. 6/78, $p = .66$); that is males and

Table 3
Comparison of Individuals With Asperger's Syndrome and
Control Participants, With Respect to Prevalence and
Types of Criminal Behaviour

	Case (<i>n</i> = 114)	Control (<i>n</i> = 342)	<i>p</i>
Number with criminal record (%)	21 (18.4)	67 (19.6)	.89
Male/female	18/3	64/3	
Total number of convictions	116	443	
Range	0–34	0–123	
Mean number of convictions	1.0	1.3	.73
Violent crimes	2 (1.8)	8 (2.3)	1.00
Robbery	2 (1.8)	3 (.9)	.60
Possession of weapons	3 (2.6)	3 (.9)	.34
Sexual offending	4 (3.5)	3 (.9)	.07
Arson	5 (4.4)	0 (.0)	.0009
Thefts of all kinds	8 (7.0)	12 (3.5)	.18
Violations of drug law	2 (1.8)	8 (2.3)	1.00
Vandalism	2 (1.8)	4 (1.2)	1.00
Fraud	3 (2.6)	5 (1.5)	.69
Offenses against property	3 (2.6)	5 (1.5)	1.00
Receiving stolen goods	1 (.9)	4 (1.2)	1.00
Violations of traffic law	6 (5.3)	53 (15.5)	.006
Other offenses	4 (3.5)	18 (5.3)	.62

females with PDD had similar risk for being convicted. The males from the comparison sample had much higher rates of convictions than females.

Low IQ ($IQ < 70$) in the PDD group was not related to the risk for being convicted (3/29 vs. 125/282, $p = .0005$).

Types of Offending

One person in the childhood autism group had been convicted. He was age 33 years at the time of follow-up and had four convictions for violent crimes. He was sentenced to compulsory psychiatric care. Four from the atypical group and seven from the AS group were also sentenced to compulsory psychiatric care. This was also the case for one person from the comparison sample (12/313 vs. 1/933, $p < .0001$).

As can be observed in Table 2 and Table 3, the offenders with atypical autism and AS were convicted for all kinds of offenses. There is no specific pattern of crime by diagnostic group. However, violations of traffic law were less often a feature of autistic individuals. With the exceptions of violations of traffic law, sexual offenses, fraud, and other offenses, the autistic-like cases were more frequently registered because of violations of all types of law. However, the differences only reach statistical significance for violations of traffic law, with cases being less law breaking than controls.

With the exception of receiving stolen goods, violations of traffic law, violent crimes, and other offenses, the AS cases were more frequently registered because of violations of all types of law. However, the difference is only statistically significant for the category violations of traffic law (6/114 vs. 53/342, $p = .006$) and arson (5/114 vs. 0/342, $p = .0009$). This category included four males and one female. All cases of arson were intentional. Three of five persons convicted for arson had no other convictions. The two remaining individuals also had convictions because of indecent exposure and other types of crime. The few people with a high number of convictions were all involved in substance abuse-related criminal behaviour.

Discussion

Several recent large-scale studies have documented that there is a relationship between mental disorders and criminality (Marzuk, 1996). This type of research is important because it alerts us to a group of people whose pattern of disability means that they have special needs and may be particularly vulnerable. As far as PDD is concerned no prior published study has compared its findings with rates among controls in the general population. However, when Ghaziuddin, Tsai, and Ghaziuddin (1991) reviewed the literature on violence and AS they concluded that only a minority (2.3%) of those who suffer from the syndrome would commit an act violent enough to cause them serious trouble.

Several typical clinical features of PDD may predispose people to criminal acts (Howlin, 1997). Others may lead people with autism into criminal acts because of social naïveté. Antisocial behaviours may be related to a lack of understanding or misinterpretation of social cues (Palermo, 2004). Aggressive behaviour may arise from a disruption of routines or stress from change in daily circumstances (Baron-Cohen, 1988; Mawson et al., 1985). Finally, criminal behaviours may rise from obsessions and circumscribed special interests (Chen et al., 2003; Wing, 1986). On the other hand, because of the very rigid way in which many people with PDD tend to keep to rules and regulations, they may well be more law abiding than the population generally.

As far as we know this is the first study to describe criminal behaviour in a large group of individuals with PDD. However, prior to discussing the implication of our findings it is necessary to consider methodological aspects of the study that may have influenced the results.

We studied large groups of autistic individuals, and cases were matched to controls on a number of important demographic variables, and the fact that the case and comparison group were studied in exactly the same manner increases the validity of our data. The long observation period provides a picture of the long-term course of the two groups with respect to criminal behaviour, and as the age at follow-up was between 25 and 59 years most participants in the current study have passed through the risk periods for criminality. It is a major advantage of the current study that bias

in recalling life events was avoided as all data were collected routinely, independently of the current study, and relies on official records of convictions. Furthermore, using register data gives a complete follow-up on all cases without the attrition that limits studies, especially in studies dealing with psychiatric populations, and we believe the current findings accurately represent the risk of crime presented by persons with PDD in this cohort.

Like many other long-term studies we had limits due to change in diagnostic practice over time, from ICD-9 diagnoses (WHO, 1978) to ICD-10 diagnoses (WHO, 1992) with more explicitly defined criteria. In particular, we cannot be sure that all of our "borderline" respondents meet the ICD-10 criteria of AS.

In the current study encompassing 313 people with PDD and 933 controls from the general population, we found that there were considerable differences in criminal behaviour between subgroups of people with PDD. Criminal behaviour was very uncommon in childhood autism (0.9%) compared to the comparison group (18.9%). In atypical autism, 8.1% had been convicted compared to 14.7% in the comparison sample. In the AS group the prevalence was not different from the comparison group: 18.5% versus 19.6%, respectively.

Hodgins (1992) found that low IQ constituted a risk factor for criminal behaviour. However, in agreement with the observation of Wolff (1992) this was not the case in our study. The low prevalence of crime in the childhood autism group may be due to the more protected environments of these individuals and close monitoring in institutions for mentally retarded autistic people.

As expected females were found to have a much lower rate of convictions than males in the comparison sample (*Danish Statistical Yearbook*, 2003); however, this was not the case among cases. In her study of "schizoid" children Wolff (1992) did a similar observation.

As far as types of criminal behaviour are concerned, our findings suggest that people belonging to the case groups tend to commit more serious crimes than people from the comparison groups; however, only "arson" statistically separates AS cases from the comparison group, whereas "sexual offending" approaches statistical significance. In several case reports, particular attention has been given to violence, sexual offenses, and arson in AS. Wolff and Cull (1986) mentioned two boys who had started fires. Everall and LeCouteur (1990), Tantam (1991), and Palermo (2004) also called attention to fire setting in AS. Of the six men at Broadmoor found to have AS, three had been physically violent, one had committed arson, and the remaining two showed aggressive behaviour on the wards (Scragg & Shah, 1994). Siponmaa et al. (2001), who studied 126 young people referred for forensic psychiatric examination, noticed that the diagnoses of atypical autistic disorder and AS were statistically more frequent in the arson group than it was in the other crime groupings. Altogether 16 persons had committed arson. Ten (63%) of these people had atypical autistic disorder or AS. Altogether these findings suggest that arson may be more specifically related to behaviours seen in PDD.

However, all things considered it is important to bear in mind that serious crime is a rare occurrence in people with PDD.

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