DOI 10.1007/s00702-004-0115-1
J Neural Transm (2004) 111: 891–902

Journal of Neural Transmission

Bipolar disorder, schizophrenia, and other psychotic disorders in adults with childhood onset AD/HD and/or autism spectrum disorders

O. Stahlberg, H. Soderstrom, M. Rastam, and **C. Gillberg**

Department of Child and Adolescent Psychiatry, Göteborg University, Sweden

Received October 27, 2003; accepted January 12, 2004

Summary. Individuals with attention-deficit/hyperactivity disorder (AD/HD) and autism spectrum disorders (ASD) often display symptoms from other diagnostic categories. Exclusion criteria in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) and the International Statistical Classification of Diseases and Related Health Problems (ICD-10) impede the use of categorical diagnoses to describe the particular problem constellation in a patient. In this study, we describe the prevalence and patterns of comorbid bipolar and psychotic disorders in 241 consecutively referred adult patients with AD/HD and/or ASD. Thirty per cent of patients with AD/HD had comorbid ASD and 38% of patients with ASD had comorbid AD/HD. Of the subjects with ASD, 7% had bipolar disorder with psychotic features, and 7.8% had schizophrenia or another psychotic disorder. The corresponding figures for the patients with AD/HD were 5.0% and 5.0%, respectively. Current diagnostic criteria have to be revised to acknowledge the comorbidity of bipolar and/or psychotic disorders in AD/HD and ASD.

Keywords: AD/HD, autism, bipolar, psychosis, comorbidity.

Introduction

Childhood onset disorders of attention and impulse control are described in the DSM-IV (APA, 1994) under the diagnostic category of ''attention-deficit/hyperactivity disorder'' (AD/HD). This syndrome is further classified into four variants: ''predominantly inattentive subtype, AD'', ''predominantly hyperactive-impulsive subtype, HD'', ''combined'', or ''in remission''. In analogy, syndromes involving deficits in the triad of social interaction, communication, and flexibility/imagination are listed under ''pervasive developmental disorders'' (PDDs), also referred to as autism spectrum disorders (ASD). This category

covers autistic disorder, Asperger's disorder, and PDD not otherwise specified (PDD NOS) (''atypical autism'' in the ICD-10 (WHO, 1992)). A comprehensive overview of diagnostic criteria and clinical features is given in Gillberg (1995).

AD/HD and ASD are more frequent than previously assumed (Landgren et al., 1996; Kadesjo and Gillberg, 1998; Gillberg and Wing, 1999; Kadesjo et al., 1999), with clinically severe variants affecting at least 5% of all school-age children. They are highly heritable (Gillberg, 1995), linked to milder phenotypical expressions in relatives (Happé and Briskman, 2001; Briskman et al., 2001; Dawson et al., 2002), and affected individuals often display symptoms from several diagnostic categories (Gillberg, 1992). This ''comorbidity'' may be attributed to common genetic susceptibility factors and shared pathogenetic mechanisms, but also to one condition carrying an increased risk for the development of another.

Adult subjects with AD/HD and ASD sometimes display bizarre ideas, disorganized speech/cognitive processes (especially under stress), and significant mood swings. Positive psychotic symptoms, such as hallucinations, delusions, or confusion, are not included among the diagnostic criteria for childhood onset neuropsychiatric disorders and, if present, warrant an additional diagnosis of psychotic disorder.

Inherent in bipolar disorder are significant mood swings that may include psychotic symptoms during either depressive or manic phases. Schizophrenia comprises positive psychotic symptoms and basic cognitive problems (required in the case of an underlying ASD are hallucinations or delusions during at least one month). Schizoaffective disorder refers to the combination of schizophrenic symptoms and mood swings, and schizophreniform disorder is a schizophrenia-like condition of shorter duration. In the majority of psychotic disorders, the onset of psychotic symptoms is noted at or after adolescence. Based on epidemiological considerations, a significant overlap between childhood onset neuropsychiatric disorders and major mental disorders in adulthood would be expected.

In diagnostic classifications, hierarchies that exclude certain diagnoses in the presence of others make it difficult to use categorical diagnoses to describe the particular problem constellation encountered in an individual patient. A number of diagnostic categories in the DSM-IV have such exclusion criteria in addition to the symptom criteria, requiring (explicitly or implicitly) that a specific diagnosis may not be made in the presence of another. Thus, it is unclear how psychosis should be diagnosed in ASD, and whether or not the additional diagnosis of AD/HD is precluded in ASD.

To assess the prevalence and patterns of comorbid psychotic disorders in adults with childhood onset neuropsychiatric disorders, we identified adult subjects meeting criteria for either ASD (autism, Asperger's disorder, or atypical autism) or AD/HD (AD, HD, combined, or in remission) in a large cohort of adult individuals who had undergone extensive neuropsychiatric assessments as part of a genetic study (the Göteborg Neuropsychiatric Genetics Project), and determined the frequency of co-occurring diagnoses of bipolar disorder with psychotic features, schizophrenia, and ''other'' psychotic disorders (including cases with schizoaffective and schizophreniform disorders).

Subjects and methods

Subjects

One of the main goals of the Göteborg Neuropsychiatric Genetics Project (approved by the Medical Research Ethics Committee at Göteborg University) is to establish large well-characterized clinical case cohorts for genetic studies. All patients aged over 18 years referred between January 2001 and April 2003 to the Göteborg Child Neuropsychiatric Clinic (the only diagnostic centre specifically for child neuropsychiatric assessments in the city of Göteborg) for evaluation of possible childhood onset neuropsychiatric disorders (AD/HD, ASD, tic disorders, or various kinds of learning disorders) were asked to consider participation in the project. All subjects provided informed consent.

Among 273 consecutive subjects aged 19–60 years (mean age 32.5 ± 9.7), 32 had neither ASD nor AD/HD and were excluded from the present study group, leaving 241 cases (135 men, 106 women, mean age 32.0 ± 9.4) for further analyses.

Methods

DSM-IV diagnoses (including those of AD/HD and ASD) were assigned in each case by the second and third authors in consensus. The individual diagnoses were based on all available information including clinical status of the patient, the Structured Clinical Interview for Diagnosis according to the DSM (SCID-I, n = 178, First et al., 1996), the Yale-Brown Obsessive- Compulsive Scale (Y-BOCS, n = 136, Goodman et al., 1989), the Asperger Syndrome and high-functioning autism Screening Questionnaire (ASSQ, n = 166, Ehlers and Gillberg, 1993), the Asperger Syndrome Diagnostic Interview (ASDI, n = 200, Gillberg et al., 2001), and the DSM-IV criteria checklist (APA, 1994), currently and retrospectively, for ASD, AD/HD, tic disorders, impulse control disorders, and all other relevant Axis I disorders not covered by the SCID-I (n = 241). Reliability and validity for all these scales are good to excellent. Whenever possible, a semi-structured collateral interview (n = 161) was performed with a relative who had known the index subject as a child. For all disorders, criteria limiting the possibility of assigning other comorbid psychiatric diagnoses were disregarded to allow a comprehensive recording of the pattern of comorbidity.

Results

A total of 129 subjects (79 men, 50 women, mean age 30.6 ± 9.7) had ASD (13 autism, 49 Asperger's disorder, and 67 atypical autism), and 161 (85 men, 76 women, mean age 32.2 ± 9.1) had AD/HD (47 predominantly AD, 18 predominantly HD, 76 combined, and 20 in remission). Forty-nine of these had both

Table 1. Diagnostic overlap between ASD and AD/HD

	No AD/HD (n = 80)	AD/HD combined (n = 76)	AD (n = 47)	HD (n = 18)	AD/HD in remission (n = 20)
No ASD (n = 112)		57	29	14	12
Autism (n = 13)	9	1	2	0	1
Asperger's disorder (n = 49)	36	5	3	1	4
Atypical autism (n = 67)	35	13	13	3	3

AD/HD and ASD. This means that 30% of subjects with AD/HD also met criteria for ASD, and that 38% of those with ASD also met criteria for AD/HD (Table 1).

Altogether 14 subjects had a bipolar disorder with psychotic features (one of whom also had substance-induced psychotic disorder), 4 had schizophrenia, and 11 had other psychotic disorders (delusional disorder in 2, brief psychotic disorder in 4, substance-induced psychotic disorder in 2, and psychotic disorder NOS in 2).

Nine of the 129 subjects with ASD (7.0%) had bipolar disorder with psychotic features, and 10 of 129 (7.8%) met criteria for schizophrenia or another psychotic disorder, yielding a combined prevalence of psychosis of 14.8% among subjects with ASD. Eight of the 161 subjects with AD/HD (5.0%) met criteria for a bipolar disorder with psychotic features, and 8 of 161 (5.0%) met criteria for schizophrenia or another psychotic disorder, yielding a combined prevalence of psychosis in AD/HD of 10.0%. The distribution of diagnoses is given in Table 2. Brief presentations of the comorbid cases are included in the Appendix.

Mean full-scale IQ (FSIQ) (assessed with the Wechsler scales) in the total study group (n = 241) was 86.4 (SD ± 19.6), verbal IQ (VIQ) 90.8 (SD ± 19.4), and performance IQ (PIQ) 83.3 (SD ± 19.6). The mean GAF (Global Assessment of Functioning Scale, included in SCID-I) score was 48.0 (SD ± 10.4). There were no significant differences in FSIQ across groups. However, the ASD bipolar subgroup had higher PIQ than other ASD subgroups. All groups with comorbid psychotic conditions had lower GAF-scores than those who had no comorbid psychotic condition. Subjects with schizophrenia or other psychotic disorders had significantly lower GAF scores than the other groups (Table 3), and none in this group was married or cohabited at the time of examination.

There were age and sex differences in the distribution of cases. Women more often displayed mood disorders and men more often schizophrenia or psychotic disorders. The women also tended to be younger than the men.

Table 2. Psychotic disorders in ASD and AD/HD

	Bipolar disorder (n = 14)	Schizophrenia (n = 4)	Other psychotic disorders (n = 11)
Autism (n = 13)	0/13 (0%)	0/13 (0%)	0/13 (0%)
Asperger's disorder (n = 49)	3/49 (6%)	1/49 (2%)	5/49 (10%)
Atypical autism (n = 67)	6/67 (9%)	3/67 (4%)	1/67 (1%)
AD/HD combined (n = 76)	5/76 (7%)	0/76 (0%)	5/76 (7%)
AD (n = 47)	2/47 (4%)	0/47 (0%)	0/47 (0%)
HD (n = 18)	1/18 (5%)	0/18 (0%)	0/18 (0%)
AD/HD in remission (n = 20)	0/20 (0%)	0/20 (0%)	3/20 (15%)

Table 3. VIQ, PIQ, FSIQ, and GAF compared across the different diagnostic categories (Mann-Whitney U Tests)

	ASD (n = 129)					AD/HD (n = 161)*				
	Group 1 (n = 109) Mean (SD) Median (min–max)	Group 2 (n = 11) Mean (SD) Median (min–max)	Group 2/1 p-value	Group 3 (n = 9) Mean (SD) Median (min–max)	Group 3/1 p-value	Group 4 (n = 147) Mean (SD) Median (min–max)	Group 5 (n = 7) Mean (SD) Median (min–max)	Group 5/4 p-value	Group 6 (n = 8) Mean (SD) Median (min–max)	Group 6/4 p-value
VIQ	91.2 (21.5) 90.0 (42–134)	92.2 (11.8) 95.0 (68–105)	NS	101.1 (11.2) 98.0 (88–117)	NS	88.9 (18.2) 89.0 (44–134)	88.7 (21.8) 95.0 (46–111)	NS	94.4 (18.3) 92.5 (58–117)	NS
PIQ	81.6 (21.2) 80.5 (32–137)	79.4 (14.6) 82.0 (56–94)	NS	96.6 (16.6) 103.0 (67–112)	0.047	83.7 (18.2) 83.0 (39–128)	79.6 (19.8) 90.0 (43–98)	NS	79.4 (19.0) 70.0 (59–110)	NS
FSIQ	86.2 (21.3) 86.0 (42–134)	85.0 (13.2) 92.0 (62–100)	NS	99.3 (14.1) 104.0 (80–117)	NS	84.9 (18.5) 85.0 (42–129)	84.1 (21.1) 92.0 (45–107)	NS	86.5 (19.5) 86.0 (53–117)	NS
GAF	45.8 (10.8) 45.0 (10–80)	38.3 (6.2) 35.0 (26–45)	0.006	44.6 (8.4) 50.0 (30–51)	NS	50.5 (9.6) 50.5 (25–80)	42.7 (8.8) 40.0 (34–60)	0.026	47.9 (10.6) 49.0 (30–60)	NS

Group 1: ASD without psychotic or bipolar comorbidity, *Group 2*: ASD with schizophrenia or another psychotic disorder, *Group 3*: ASD with bipolar disorder, *Group 4*: AD/HD without psychotic or bipolar comorbidity, *Group 5*: AD/HD with schizophrenia or another psychotic disorder, *Group 6*: AD/HD with bipolar disorder, *NS* Non significant, *VIQ* Verbal IQ, *PIQ* Performance IQ, *FSIQ* Full scale IQ, *GAF* Global Assessment of Functioning scale.
* *Note*: one individual is counted in both group 5 and 6

Discussion

This study demonstrates a considerable overlap between ASD and AD/HD. Though there are formal problems diagnosing both conditions in one and the same individual under the DSM-IV, there is increasing awareness that ASD and AD/HD are, indeed, often comorbid. Gillberg (1983) demonstrated that severe variants of Attention Deficit Disorder (ADD) with concomitant motor-perceptual problems had associated autistic features in a majority of cases. Ehlers and Gillberg (1993) reported a very high rate of ADD/AD/HD in Asperger's disorder and more recent reports (Ghaziuddin, 1998; Clark et al., 1999) have found high rates of AD/HD in ASD and of ASD in AD/HD.

Important subgroups of adult patients with AD/HD (10.0%) and ASD (14.8%) met diagnostic criteria for bipolar disorder with psychotic features, or schizophrenia, or other psychotic disorders. Bipolar disorders seemed to be equally common in the AD/HD and ASD groups, while schizophrenia and other psychotic disorders tended to be more common in the ASD than in the AD/HD group in this study. A much larger group than those meeting diagnostic criteria for a psychotic disorder had occasional psychotic symptoms or mood swings, especially in stressful situations. The need for revision of diagnostic criteria in this field is obvious, particularly of those that preclude or diffuse the possibility of diagnosing comorbid AD/HD and psychotic disorders in ASD.

Before being conceptualised as a childhood onset syndrome in its own right, autism was considered to be an early onset variant of schizophrenia. However, after Kolvin's (1971) seminal work demonstrating the bimodal distribution of onset in ''childhood psychosis'', the two conditions of autism and schizophrenia have been regarded as entirely different and distinct. The present study shows that schizophrenia and other psychotic disorders do occur in patients with ASD.

In the literature, reports on comorbidity of AD/HD and bipolar disorder have been relatively frequent in recent years (Biederman et al., 2001). Both conditions appear to respond to some extent to mood stabilizers, including lithium (Dorrego et al., 2002).

The majority of our subjects had clear family histories of both neuropsychiatric problems and major mental disorders. We did not find specific family loadings of bipolar disorder or schizophrenia in the family histories of probands with these disorders, indicating that the genetic background in these comorbid conditions may be an unspecific vulnerability to neuropsychiatric and mood/psychotic disorders.

We found a general risk increase of major mental disorders in both AD/HD and ASD, manifested as a considerably higher prevalence than would be expected according to data from the general population. However, since ours was a clinically recruited study group, it cannot be assumed to be representative for any general background population even if the sample size is acceptable. Since the targeted disorders are rare and the diagnostic methods extremely time-consuming, the measures used in this study can hardly be applied in a population-based cohort. The present study design may thus be the only feasible option at this time, although further studies with careful clinical charac-

terisations of patient groups, and large scale longitudinal epidemiological studies using well validated screening instruments would add valuable information.

The results of this study, although preliminary, emphasise the need for further research and clinical attention to the issue of psychosis comorbidity in ASD and AD/HD. The finding that subjects with comorbid psychosis had considerably poorer global functioning than other subjects in this group underscores the urgent need to address this issue in new studies.

Appendix: Brief presentation of comorbid cases

Bipolar disorder

Case	Sex	Age	History	Diagnosis
1	M	30	Single, no children, university degree, unemployed, dependent on social security. No family history of neuropsychiatric disorders.	Bipolar I disorder, Asperger's disorder, and obsessive-compulsive disorder (OCD)
2	M	30	Single, no children, university studies, income from study allowances. Stepmother suffers from bipolar disorder, and biological father has a history of criminality and drug abuse.	Bipolar I disorder, AD/HD combined, developmental coordination disorder (DCD), and bulimia nervosa.
3	F	34	Single, 2 children, living with her parents, university studies, income from study allowances. Her mother suffered from depression. Depression, mental retardation, epilepsy, and dyslexia known among her siblings. Criminality and mental retardation reported in one nephew. Maternal aunt diagnosed with bipolar disorder.	Bipolar I disorder current episode depressive, atypical autism, AD/HD predominantly AD, and OCD.
4	M	23	Single, no children, homeless, student, income from study allowances. His father suffers from depression and there's a history of criminality and drug abuse in a cousin who also has DCD.	Bipolar II disorder, substance-induced psychotic disorder, AD/HD combined, Tourette's disorder, DCD, OCD, social phobia, somatization disorder, anorexia nervosa, substance dependence in remission (bensodiazepine, cannabis, central stimulant, opioid, cocaine, hallucinogen, inhalant), and alcohol abuse in full remission.
5	M	36	Married/engaged, no children, university degree, employed. A brother has probable AD/HD + DCD and confirmed disabilities in reading, writing, and mathematics. His father,	Bipolar II disorder current episode depressive, atypical autism, Tourette's disorder, OCD, panic disorder, and generalized anxiety disorder.

(*continued*)

Appendix (*continued*)

Case	Sex	Age	History	Diagnosis
			paternal uncle and grandfather were compulsive drinkers. A maternal uncle suffered from depression and showed signs of OCD.	
6	M	39	Single, no children, college degree, employed. His mother is described as withdrawn, restless, and suffering from anxiety. A half-brother is diagnosed with AD/HD + DCD and a half-sister has anorectic problems. A paternal uncle is described as a ''withdrawn'' and ''depressed'' person.	Bipolar II disorder, atypical autism, panic disorder, agoraphobia, and alcohol abuse.
7	M	48	Single, 7 children, college degree, working part time. His son and nephew both have AD/HD + DCD and his father showed signs of bipolar disorder. A lot of alcohol abuse on the paternal side. His paternal grandfather died of alcohol abuse.	Bipolar II disorder, atypical autism, AD/HD combined, and alcohol dependence in remission.
8	M	55	Married/engaged, 3 children, completed nine years of comprehensive school, unemployed, dependent on social security. His mother had recurrent depressive episodes and attempted suicide. His father and his mother's brother both had vocal tics as have his son, sister and cousin who all have motor tics as well. Another daughter is diagnosed with AD/HD, dysthymic disorder, and social phobia. One of his sister's sons is diagnosed with AD/HD and Tourette's disorder.	Bipolar II disorder, AD/HD predominantly HD, Tourette's disorder, and alcohol abuse in full remission.
9	M	60	Divorced, 9 children, university degree, unemployed, dependent on social security. ASD suspected among several of his children and grandchildren. His father had periods of alcohol abuse.	Bipolar II disorder, Asperger's disorder, and panic disorder.
10	F	23	Single, 1 child, completed nine years of comprehensive school, unemployed, dependent on social security. Her mother suffers from depression and panic disorder and her father is described as hyperactive and restless.	Bipolar II disorder current episode depressive and AD/HD combined.
11	F	24	Single, no children, college degree, unemployed, dependent on social security. The patient was adopted at age 5 months. Biological father is described as having ''some kind of mental disorder''.	Bipolar II disorder, atypical autism, and AD/HD combined.

(*continued*)

Appendix (*continued*)

Case	Sex	Age	History	Diagnosis
12	F	24	Married/engaged, 1 child, college degree, student, income from study allowances. Her father was an alcoholic who committed suicide. Her mother suffered from anxiety and she is described as impulsive. She had drinking problems periodically. The patient's maternal great grandfather was addicted to alcohol and maternal grandmother is described as ''anxious'' and ''depressed''. Suspected mental retardation in maternal grandmother's sister.	Bipolar II disorder current episode depressive, AD/HD predominantly AD, DCD, generalized anxiety disorder, panic disorder, and social phobia.
13	F	25	Single, no children, living with her parents, college degree, unemployed, dependent on social security. Her half-sister has a daughter diagnosed with schizophrenia and possibly ASD. Both her father and mother have depressive traits and paternal grandmother had major depressive disorder. Alcohol addiction in paternal grandfather. Maternal grandmother and -father were cousins.	Bipolar II disorder, Asperger's disorder, OCD, and anorexia nervosa.
14	F	27	Married/engaged, no children, university degree, employed. Her mother and mother's oldest sister are described as ''depressed''. Her mother is also hyperactive and has attention problems along with mood-swings and mathematic disabilities. Both her father and brother have alcohol abuse. Brother has a history of criminality and an older cousin is described as having vocal tics.	Bipolar II disorder current episode depressive, atypical autism, panic disorder, and generalized anxiety disorder.

Schizophrenia and other psychotic disorders

Case	Sex	Age	History	Diagnosis
15	M	30	Single, no children, college degree, unemployed, dependent on social security. No family history is described in the medical case record.	Schizophrenia, atypical autism, and Tourette's disorder.
16	M	31	Single, no children, living with his parents, college degree, unemployed, dependent on social security. His sister has had a brief psychotic disorder and his paternal grandmother had some kind of psychosis as well. A maternal cousin has a history of suspected bipolar disorder.	Schizophrenia, atypical autism, and alcohol abuse in full remission.

(*continued*)

Appendix (*continued*)

Case	Sex	Age	History	Diagnosis
17	M	27	Single, no children, completed nine years of comprehensive school, unemployed, dependent on social security. His mother suffers from severe anxiety as well as obsessive-compulsive problems. Older brother described as being emotionally unstable and impulsive.	Schizophrenia and Asperger's disorder. .
18	F	27	Single, no children, homeless, completed nine years of comprehensive school, unemployed, dependent on social security. Father and brother both have tics and her mother suffers from OCD. Younger brother is described as withdrawn. Maternal grandfather had drinking problems and maternal uncle is addicted to alcohol.	Schizophrenia and atypical autism.
19	M	20	Single, no children, living with his parents, college degree, unemployed, income from study allowances. Two sisters of the patient's mother were diagnosed with schizophrenia.	Psychotic disorder NOS and Asperger's disorder.
20	M	23	Single, no children, living with his parents, college degree, unemployed, dependent on social security. His father has a disability pension due to OCD and both his paternal uncles had obsessive-compulsive problems as young. The patient's mother is described as being very shy.	Delusional disorder, Asperger's disorder, OCD, panic disorder, agoraphobia, and social phobia.
21	M	25	Single, no children, living with his parents, completed nine years of comprehensive school, unemployed, dependent on social security. His father and brother are described as being clumsy and his father have suspected motor and/or vocal tics in addition. A female cousin of his father was diagnosed with schizophrenia. Among his maternal relatives there have been several cases of alcohol abuse and his mother's cousin committed suicide.	Brief psychotic disorder, atypical autism, AD/HD in remission, concurrent major depression, and androgenic steroid abuse in full remission.
22	M	27	Single, no children, completed nine years of comprehensive school, unemployed, dependent on social security. His mother is drug-dependent and his father has a history of criminal behaviour. His sister	Psychotic disorder NOS and Asperger's disorder.

(*continued*)

Appendix (*continued*)

Case	Sex	Age	History	Diagnosis
			is described as being emotionally unstable and impulsive.	
23	M	29	Single, no children, living with his parents, college degree, unemployed, dependent on social security. His mother's father and brother are described as having difficulties with social communication along with paranoid traits. A female cousin on his mother's side as well as the cousin's mother committed suicide. Suspected anorexia in this cousin. A brother of the patient's maternal grandfather was mentally retarded.	Delusional disorder, Asperger's disorder, and previous major depression.
24	M	31	Single, no children, completed nine years of comprehensive school, unemployed, dependent on social security. His father is addicted to alcohol and his mother is described as having a history of depression. Maternal uncle committed suicide. A half-brother on his mother's side is diagnosed with AD/HD + DCD and dyslexia.	Brief psychotic disorder, Asperger's disorder, AD/HD in remission, and previous major depression.
25	M	35	Single, 2 children, college degree, half-time employed and half-time social security. His father is alcohol dependent. Maternal uncle committed suicide.	Substance-induced psychotic disorder, AD/HD combined, central stimulant dependence, and inhalant dependence in remission.
26	M	36	Single, no children, not completed nine years of comprehensive school, unemployed, dependent on social security. His mother, as well as her father, has a history of depressive disorders.	Brief psychotic disorder, atypical autism, AD/HD combined, Tourette's disorder, and cannabis dependence in remission.
27	M	38	Single, no children, not completed nine years of comprehensive school, unemployed, dependent on social security. Both parents have drinking problems.	Brief psychotic disorder, AD/HD in remission, DCD, and previous major depression.
28	M	45	Single, 2 children, college degree, has capacity for work, income from unemployment fund. A nephew is diagnosed with AD/HD + DCD. His father is described as being extremely temperamental and a cousin of the patient was depressed and committed suicide.	Substance-induced psychotic disorder, AD/HD combined, alcohol abuse, cannabis and central stimulant dependence.

References

American Psychiatric Association (1994) The diagnostic and statistical manual of mental disorders, 4th edn. American Psychiatric Press, Washington DC

Biederman J, Birmaher B, Carlson GA, Chang KD, Fenton WS, Geller B, Hoagwood KE, Hyman SE, Kendler KS, Koretz DS, Kowatch RA, Kupfer DJ, Leibenluft E, Nakamura RK, Nottelmann ED, Stover E, Vitiello MD, Weiblinger G, Weller E (2001) National Institute of Mental Health Research roundtable on prepubertal bipolar disorder. J Am Acad Child Adolesc Psychiatry 40: 871–878

Briskman J, Happé F, Frith U (2001) Exploring the cognitive phenotype of autism: weak ''central coherence'' in parents and siblings of children with autism. II. Real-life skills and preferences. J Child Psychol Psychiatry 42: 309–316

Dawson G, Webb S, Schellenberg GD, Dager S, Friedman S, Aylward E, Richards T (2002) Defining the broader phenotype of autism: genetic, brain and behavioural perspectives. Dev Psychopathol 14: 581–611

Dorrego MF, Canevaro L, Kuzis G, Sabe L, Starkstein SE (2002) A randomized, double-blind, crossover study of methylphenidate and lithium in adults with attention-deficit/hyperactivity disorder: preliminary findings. J Neuropsychiatr Clin Neurosci 14: 289–295

Ehlers S, Gillberg C (1993) The epidemiology of Asperger syndrome. A total population study. J Child Psychol Psychiatry 34: 1327–1380

First MB, Gibbon M, Spitzer RL, Williams JB (1996) User's guide for the structured clinical interview for DSM-IV Axis I disorders – Research version 2.0 (SCID-I). NY State Psychiatric Inst, Biometrics Research Department, New York

Ghaziuddin M, Weidmer-Mikhai E, Ghaziuddin N (1998) Comorbidity of Asperger syndrome: a preliminary report. J Intellect Disabil Res 42: 279–283

Gillberg C (1992) Autism and autistic-like conditions: subclasses among disorders of empathy. J Child Psychol Psychiatry 33: 813–842

Gillberg C (1995) Clinical child neuropsychiatry. Cambridge University Press, Cambridge

Gillberg C, Wing L (1999) Autism: not an extremely rare disorder. Acta Psychiatr Scand 99: 399–406

Gillberg C, Gillberg IC, Råstam M, Wentz E (2001) The Asperger Syndrome (and high-functioning autism) Diagnostic Interview (ASDI): a preliminary study of a new structured clinical interview. Autism 5: 57–66

Goodman WK, Price LH, Rasmussen SA, Mazure C, Fleischmann RL, Hill CL, Heninger GR, Charney DS (1989) The Yale-Brown Obsessive-Compulsive Scale. I. Development, use and reliability. Arch Gen Psychiatry 46: 1006–1011

Happé F, Briskman J (2001) Exploring the cognitive phenotype of autism: weak ''central coherence'' in parents and siblings of children with autism. I. Experimental tests. J Child Psychol Psychiatr 42: 299–307

Kadesjo B, Gillberg C (1998) Attention deficits and clumsiness in Swedish 7-year-old children. Dev Med Child Neurol 40: 796–804

Kadesjo B, Gillberg C, Hagberg B (1999) Brief report: Autism and Asperger syndrome in seven-year-old children: a total population study. J Autism Dev Disord 29: 327–331

Kolvin I (1971) Studies in the childhood psychoses. I. Diagnostic criteria and classification. Br J Psychiatry 118: 381–384

Landgren M, Pettersson R, Kjellman B, Gillberg C (1996) AD/HD, DAMP, and other neurodevelopmental/psychiatric disorders in 6-year-old children: epidemiology and comorbidity. Dev Med Child Neurol 38: 891–906

WHO (1992) The international statistical classification of diseases and related health problems (ICD-10). WHO, Geneva

Authors' address: C. Gillberg, Kungsgatan 12, S-411 19 Göteborg, Sweden, e-mail: christopher.gillberg@pediat.gu.se