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A retrospective analysis of the clinical case records of 'autistic psychopaths' diagnosed by Hans Asperger and his team at the University Children's Hospital, Vienna

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To date, it is questionable whether the diagnostic criteria for Asperger syndrome (AS) as stated by ICD-10 or DSM-IV still reflect Asperger's original account of 'autistic psychopathy' (AP) from the 1940s. The present study examined 74 clinical case records of children with AP diagnosed by Hans Asperger and his team at the Viennese Children's Clinic and Asperger's private practice between 1950 and 1986. The characteristic features of the children are outlined, including reasons for referral, parental background, behavioural problems, cognitive functioning, communication and interests. Results show that the patients of Asperger described in our study represent a subgroup of children with very high intellectual functioning, specific circumscribed interests and talents but impaired social, communication and motor skills. Sixty-eight percent of the sample met ICD-10 criteria for AS, while 25% fulfilled the diagnostic criteria for autism. Implications for the diagnosis of AS are discussed.

Keywords: Asperger syndrome; 'autistic psychopathy'; high-functioning autism; diagnostic criteria

1. INTRODUCTION

AS or 'autistic psychopathy'—as the syndrome was originally termed by Hans Asperger—still constitutes a much discussed and controversial diagnostic category. Asperger, a Viennese paediatrician, described a series of children, mainly boys, with a typical pattern of deficits and assets, which he referred to as AP. In his summary of the typical features of this disorder, he delineates the children's appearance, their distinct intellectual functioning including their learning difficulties and attention problems, their problematic behaviour in social situations and their impairment of emotions and instincts. Asperger (1944, 1952) believed that AP was a constitutionally based personality disorder merging into the 'normal' continuum, that is, a group of eccentric, withdrawn, but often highly gifted, individuals who manage social integration despite their somewhat odd social interaction or communication. He stated that AP corresponded with autism as described by Kanner (1943) in wide terms but emphasized his belief that these disorders had a genetic background and were not caused 'exogenously'. In his view, the two main diagnoses to be differentiated from AP included cerebral organic conditions and schizophrenic psychoses (Asperger 1952). While several symptoms supposedly overlapped with both disorders (e.g. the social impairment or 'contact disorder', the bizarre stereotypes or pedantic rituals) he saw AP as a life-long, stable type of personality without the quality of a progressing fragmentation of personality typically seen in schizophrenia. Also, he stated that it was possible for 'autistic psychopaths' to form certain close interpersonal relationships in the course of their life while schizophrenic psychotic individuals were more likely to lose their ability to form close relationships over time.

From the 1920s onwards, several concepts had appeared in the literature all referring to similar or overlapping patterns of personality traits and problematic behaviours in children (mostly boys) as described by Asperger (for a historic literature review, see Gillberg 1998, Wing 1998 or Wolff 1991*a*). Different terms were in use, for example, schizoid character, schizothymia, schizoid personality disorder, children with circumscribed interests or, later, Asperger's AP.

In 1981, Lorna Wing described the clinical picture of Asperger's AP for the first time in more detail in an English-language journal, making the condition known to a wider scientific community (Wing 1981). She coined the term 'Asperger's syndrome' and slightly altered and extended Asperger's account. Wing observed some additional items in the developmental history of children with AS (e.g. a lack of interest or pleasure in human company in the first year of life) and pointed out that AP may also occur in individuals with learning disabilities. This was, in fact, mentioned by Asperger in his 1944 paper but seems to have been overlooked by researchers and even Asperger himself in his later papers (Frith 1991 in Wing 2000). Wing proposed a spectrum of autistic disorders with a triad of impairments, namely impairment of social interaction, communication and imagination.

Confusion over the definition of AS further increased with the introduction of several diagnostic criteria, including Gillberg and Gillberg's criteria of 1989 (outlined in

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Gillberg 1991), the criteria of Szatmari *et al.* (1989), ICD-10 (World Health Organization 1992, 1993) and DSM-IV (American Psychiatric Association 1994) criteria. For a diagnosis of Asperger's disorder to be made, both ICD-10 and DSM-IV require at least two manifestations of social impairment and one area of restricted interest or behaviour from a list of symptoms originally defining autistic disorder (Kanner syndrome). In contrast to autistic disorder, language development in AS is not supposed to be delayed and normal cognitive and self help skills need to present during the first three years of life—a requirement many researchers find problematic (Miller & Ozonoff 1997; Gillberg & Gillberg 1989; Leekam *et al.* 2000; Szatmari 2000; Wing 2000). In both diagnostic systems, 'dual diagnoses' of AS and autistic disorder are not possible. Therefore, autistic disorder takes precedence over AS if the child is delayed in aspects of his/her early development and meets at least six criteria from the 'autism list', even if s/he demonstrates problems that are quite characteristic for AS.

In contrast to DSM-IV and ICD-10, the criteria of Gillberg & Gillberg (1989) and those of Szatmari *et al.* (1989) do not require 'normal' early development for a diagnosis of AS to be made, and view language and communication peculiarities as a defining feature. Additionally, Gillberg & Gillberg proposed that motor control problems (poor performance on neurodevelopmental examination) have to be present.

The introduction of diagnostic criteria brought with it discussion of whether AS constitutes a valid diagnostic entity and can be differentiated from autism. Volkmar & Klin (2000) name several features that have been discussed in the literature to be of relevance in this debate. A later onset, the presence of special interests combined with amassing large amounts of factual information, poor motor functioning, interest in others but failure to establish friendships, a certain communication style (verbosity, tangentiality, certain prosodic deviancies), and associated problems, such as conduct disorders, have all been proposed as being specific markers for AS. Also, higher intellectual functioning (Miller & Ozonoff 1997) accompanied by better verbal than performance IQ (Klin *et al.* 1995) may differentiate AS from autism. Szatmari (2000) holds an alternative view in this debate by regarding AS as one possible pathway of different disorders of the autistic spectrum or pervasive developmental disorders. This implies that a person's diagnosis may, for instance, change from autism to AS over time. Similarly, Wing (2000) argues that a mixture of symptoms that are typical for autism and AS can often be found in the same individual and changes in symptoms may occur over time.

To date, it is highly questionable whether Asperger's original description of AP fits today's diagnostic criteria of AS in DSM-IV and ICD-10. Miller & Ozonoff (1997) examined the four cases of AP described by Asperger in his seminal paper and found that according to current DSM-IV and ICD-10 criteria all of them would be diagnosed with autistic disorder, rather than Asperger disorder due to the precedence rule in both diagnostic systems. The authors conclude that current criteria may not identify the syndrome that Asperger originally described and suggest areas of potential difference between Asperger disorder and autism (e.g. the presence of motor problems, higher intellectual functioning, better theory of mind). Leekam *et al.* (2000) found that of 200 individuals with autistic spectrum disorders, all met ICD-10 criteria for autism, whereas only 1% met criteria for Asperger disorder. However, 45% fulfilled Gillberg's criteria for AS. Again, the difference was due to the ICD-10 requirement for normal development of language, cognitive skills, curiosity and self-help skills.

In order to investigate this issue, our study tried to identify and analyse the clinical case records of children who were seen by Asperger and his team at the paediatric clinic in Vienna. The questions motivating the present study were as follows: (i) What were the characteristic features of AP? (ii) Which features were important for making the diagnosis? (iii) Do these features correspond with ICD-10 criteria? Other areas of interest include:

(i) family background, genetic factors,
(ii) developmental milestones,
(iii) social integration, social behaviour,
(iv) communication and language,
(v) apraxia, motor coordination problems and clumsiness,
(vi) special interests and skills,
(vii) intellectual ability, and
(viii) additional or reactive disorders.

In an attempt to keep the translation of the words and labels from German as clear as possible, in this article, the original label AP is used. In the German language, 'psychopathy' did not quite have the negative connotation it now has in English. It was merely a term for describing personality disorders and did not seek to stress the patients' proneness to criminality.

2. SAMPLING METHODS

The search for Asperger's original files turned out to be rather difficult, which probably results from the separate storage of the various records and the loss of data due to the war years. Eventually, two major sources were used: the archives of the remedial pedagogical ward at the Vienna University Children's Hospital and the card files of Asperger's private practice stored at the Institute of Medical History in Vienna.

(a) *Data from the Pedagogical Department, University Children's Clinic, Vienna*

All stored files of the remedial pedagogical unit were checked for diagnosis of AP. To compare the percentage of admissions, the cases with Kanner's autism and autistic features were also counted. Thirty-seven files of children with a clear diagnosis of AP could be identified and were selected for further analysis. As the original hospital building was destroyed during World War II, unfortunately no files dating from Asperger's famous publication on 'autistic psychopaths' in 1944 up to the 1960s could be found. The files originate from 1964 to 1986. Asperger became head of the Viennese University Children's Clinic in 1962 and remained in this post until 1977. Twenty-seven of the 37 children with AP (73%) were diagnosed or seen by Asperger himself during his weekly rounds on the remedial

ward. Most of the remaining 10 children ($n = 7$) were diagnosed and treated by his direct follower and student (Dr Kuszen) who had worked with Asperger for a long time. It can therefore be assumed that the majority of children were either seen by Asperger himself or diagnoses made were in accordance with his account of the disorder. The diagnosis of AP seemed most frequent during the 1970s, obviously the time when Asperger had the greatest influence in his career as head of the clinic. It seems that later the more general term 'autism' was used in favour of the term AP, which made it harder to select children with AS. The files are quite detailed, containing biographic histories, medical and psychological reports, and notes on the child's behaviour and progress on the ward. Often, various other materials were included, such as letters the children wrote to their parents, short notes by the medical staff, or the children's school work and drawings. Four additional patient records of 'autistic psychopaths' were obtained from the private card file of one of Asperger's former colleagues at the Viennese clinic (Dr Wurst). These records are from 1950 and 1951 and consist of less detailed descriptions. The children outlined had been admitted to the remedial pedagogical ward in Vienna and had been seen by Asperger and Wurst together.

(b) *Data from Asperger's private practice*

The legacy of Asperger's private practice in Vienna's Burggasse was given to the Institute of Medical History by his daughter. It consists of several boxes with thousands of file cards sorted by years. Again, all boxes were checked for the diagnoses of AP, AK and AFs. One hundred and thirty patients with autistic spectrum disorders could be found, 33 of which had received a definite diagnosis of AP. The patient records originate from 1951 to 1980 and include children and adolescents who were seen by Asperger in his private practice and were sometimes, in the course of the treatment, also admitted to the remedial pedagogical ward as inpatients. Many of the records are handwritten or in a hard-to-decipher shorthand and contain brief descriptions of each child, medical letters, letters of referral, etc. Only those children who were also admitted to the ward have more detailed files ($n = 9$).

3. RESULTS

(a) *Admissions to the remedial pedagogical ward*

The admission books from 1950 to 1986 were checked for: (i) total number of admissions per year; (ii) number of 'autistic psychopaths' admitted; (iii) number of children with AK admitted; (iv) and number of children with AFs admitted. The AP group includes all children with a clear diagnosis of AP or 'Asperger autism'. The AK group consists of all children with the diagnoses 'autism and low intelligence' or 'Kanner's autism'. The AF group constitutes a more heterogeneous group without a final diagnostic formulation. We included children with normal to high intelligence who either had an explicit statement saying that they showed distinct or mild AFs or who were described with a combination of social impairment (difficulty of integration into peer group) together with restricted interests/activities, language and communication peculiarities or motor apraxia.

A total of 6459 children were admitted to the ward between 1950 and 1986, with a mean rate of 175 referrals per year. Of the 6459 children, 228 (3.5%) had autistic spectrum disorders. The distribution among the three subgroups (AP, AK, AF) was relatively even: 'autistic psychopaths' comprised 1.15% ($n = 74$) of all referrals, children with early infantile autism 1.23% ($n = 83$) and children with AFs 1.1% ($n = 71$). However, if the number of 'autistic psychopaths' is added to the number of children with AFs, this group comprises 2.25% of all admissions.

For the whole group of autism spectrum disorders, a male : female ratio of 9 : 1 could be found. For the children with AK this ratio decreased to 4 : 1, whereas for the children with AP it was as high as 24:1.

(b) *Referrals to Asperger's practice*

All file cards in the 23 boxes stored at the Institute of Medical History were counted and checked for diagnoses of autism spectrum disorders. According to the card file, Asperger saw approximately 9800 children between 1951 and 1980. Two hundred and thirteen children (2.17%) had disorders on the autistic spectrum. Similarly to the remedial pedagogical ward, 1.15% ($n = 113$) were recorded as having a clear diagnosis of AP. Fewer children had AK (0.68%; $n = 67$), and 0.35% ($n = 34$) were described as having AFs.

(c) *Analysis of the clinical case records and files*

(i) *Cases included for detailed analysis*

Only cases with explicitly stated diagnoses of AP ($n = 74$) were selected for further analysis. Detailed files from the time the children were inpatients at the ward were available for 46 of these cases (37 from the remedial pedagogical ward, 9 from Asperger's private card file). For categories that have several rating possibilities (e.g. several initial reasons for referral or types of language peculiarities) only the 46 detailed files were included as it is not certain whether missing values would indicate normalcy or not. For more factual information (e.g. IQ, father's profession) the whole AP sample ($n = 74$) was included, and lacking data were coded as missing values.

(ii) *Rating methods*

The information from the files was entered into a database containing variables covering the following aspects:

(i) general data (age at first referral, gender, school attended, etc.),
(ii) reasons for referral or admission,
(iii) diagnosis and additional diagnostic labels,
(iv) intelligence,
(v) family background,
(vi) pregnancy, birth and early developmental milestones,
(vii) behaviour at home/on the ward/at school,
(viii) language and communication,
(ix) non-verbal communication,
(x) special interests and skills, and
(xi) additional information (e.g. suspected prognosis, physical problems).

Most variables had a simple coding of 0 = not true/no,

1 = true/yes. There were only a few variables with alternative ratings (e.g. type of school).

The charts were reviewed and rated by a clinical psychologist as part of her PhD (first author). Parts of the data were re-rated by four psychology students who worked on this project (in an extended form) for their Master's theses. All raters had experience with autistic patients and patients with AS, either in clinical practice or care settings. The raters' training was carried out with the project's supervisor (second author) and consisted of group practice on the ratings of several cases, as well as an independent rating of one case each followed by discussion.

(iii) *Inter-rater reliability*

Twenty-six cases (35% of the whole AP sample) were re-rated. To determine inter-rater reliability, we used kappa coefficients. The average agreement on the initial reasons for referral was 84%, kappa values ranged from 0.519 to 1.00. Ratings on diagnoses were more consistent and an inter-rater agreement of 87% was reached (kappa values between 0.709 and 0.881). Average agreement on behavioural difficulties was 85% (kappa between 0.505 and 1.00) and 83% on language and communication deviancies (kappa from 0.489 to 1.00). No systematic difference across raters was found.

(d) *Description of the sample*

The children included in the analysis were seen between 1950 and 1986. They were born between 1938 and 1979 (and are now 23–64 years of age). Seventy-four percent of the admitted children (the majority) were inpatients on the ward between 1969 and 1979. Ninety-five percent of the children with this type of diagnosis were boys ($n = 70$), whereas only four girls showed full AP.

The age range of the children was between 4 and 17 years. The mean age at which the child was first seen at the clinic or at Asperger's practice was 8.2 years (s.d. = 2.5). Most children (66%) attended primary school at the time of the first admission or consultation; 11% were in kindergarten, 10% were at high school/college (Gymnasium) while 6% attended grammar school (Hauptschule). Another 6% were at special schools (Sonderschule).

Fifty children (68%) had been inpatients at the remedial pedagogical ward at some point; 24 (32%) were seen only by Asperger at his private practice. Forty-six of the 50 children admitted to the ward had detailed files. For those children who were inpatients, the duration of their stay on the ward ranged from 1 to 10 weeks (for children who had more than one stay, the weeks of admission were added up). The average duration of admission was four and a half weeks (s.d. = 1.71). Most of the admitted children were inpatients on the ward once (88%); 10% of the children were admitted twice; one child had three stays.

(i) *Initial reasons for admission*

All children with detailed files from the ward ($n = 46$) were included in the analysis. Combinations of more than one reason for referral were common. The most frequent reasons for referral consisted of learning difficulties at school, followed by difficulties in mixing with the peer group and disciplinary problems (for an overview see table 1).

Seven children (15%) had to be admitted to the ward because their behaviour was no longer acceptable at school and exclusion was imminent. A smaller number of children were referred because of developmental delay, enuresis/encopresis, sleeping or eating disorders. Difficulties occasionally reported as being the reason for referral included depressive episode, lack of drive, obsessive imitation of animal voices, elective mutism or whispering, maliciousness, nervous symptoms, obscene language, speech and language difficulties, unusual obsessions or compulsions, and hallucinations.

(ii) *Additional diagnostic labels*

The diagnostic formulation usually consisted of several labels to amplify and add to the main diagnosis. The diagnoses given most often in addition to AP were 'contact disorder' and 'instinct disorder'. According to clinicians who worked with Asperger, the term 'instinct disorder' was used to refer to the children's lack of common sense, their impaired 'practical intelligence' in everyday situations including deficient social understanding. In contrast to knowing 'instinctively' how to behave in a social situation or how to master day-to-day problems, it was believed that children with AP had to learn these skills through their intellect. 'Contact disorder' referred to the patient's difficulty in forming real interpersonal relationships. Despite good intellectual skills, approximately two-thirds of the children were also diagnosed with severe learning and/or attention deficits often leading to academic failure (for an overview of diagnostic labels see table 2).

(iii) *Additional information*

In four of the 46 children admitted to the ward (9%), schizophrenia was either suspected or put forward as a future prognosis. What Asperger called 'autistic malice' was observed in seven patients (15%); these children were described as seemingly good observers, showing intentional acts of malice, with malicious pleasure and apparent pride in what they had done. Some of the children were said to 'experiment' on others, that is, they seemed to do things on purpose to see how others reacted or to provoke a certain reaction. Eight children (17%) were reported as being hypersensitive towards criticism and jokes by others. For nine patients (20%) sensory deviancies were so striking that they were mentioned in the files (e.g. hypersensitivity to certain noises, obsession with smells).

(iv) *Intellectual functioning*

For 62 children, a brief general judgement of intellectual functioning (low intelligence–good intelligence–above average intelligence) was available. Twelve children (27%) were described as being of average intelligence while only one child (2%) was reported as being below average. Twenty-five (57%) children's intelligence was claimed to be above average. Six children (14%) were described as having low to average intelligence at present or being too young for testing but were given the prognosis that intellectual functioning would increase with age.

Results for 42 children from the HAWIK (which is equivalent to the WISC) were available. No children were below average (i.e. IQ lower than 85): 45% were of average intelligence while, in fact, 55% of the children func-

Table 1. Most frequent reasons for referral to the pedagogical ward in the AP group with detailed files ($n = 46$).

reasons for referral	*n*	percentage
learning difficulties, attention deficits, academic problems	27	69
social and interactive difficulties with peers	26	57
disciplinary problems at school	16	35
behavioural difficulties, aggression and opposition	12	26
educational difficulties, parental problems in child-rearing	12	26
isolation, withdrawal, solitariness	11	24
lack of independence and life skills	9	20
temper tantrums	6	13
anxiety attacks, phobia (e.g. fear of other children, physical education, darkness)	5	11

Table 2. Diagnostic labels in the AP group with detailed files ($n = 46$).

additional diagnostic labels	*n*	percentage
contact disorder	40	87
'instinct disorder'	35	76
learning difficulties, academic failure	31	68
apraxia, motor coordination problems, clumsiness	27	59
disciplinary problems	22	48
reduced sense of reality	17	37
obsessive and compulsive behaviours, rituals	17	37
familial and socio-economic difficulties	14	30

Table 3. FSIQ, VIQ and PIQ in children with AP and controls as measured by the HAWIK (German version of the WISC).

	AP group ($n = 38$) mean (s.d.) range	controls ($n = 2318$)[a] mean
FSIQ	116.21 (16.95) 85–153	105.91
VIQ	117.68 (15.40) 92–152	102.96
PIQ	110.34 (17.56) 75–150	107.65
sex (m : f)	35 : 3	1746 : 525

[a] From Schubert & Berlach (1982); no information on s.d. and range was available, only confidence intervals (likelihood: 99%) were reported (FSIQ, 105–107; VIQ, 102.1–103.8; PIQ, 106.7–108.6).

tioned in the high to superior range. Comparison data were taken from the study of Schubert & Berlach (1982) of 2318 children tested with the HAWIK at the remedial pedagogical ward between 1962 and 1979. They found a mean FSIQ of 106, VIQ of 103 and PIQ of 108. These figures, although slightly upwardly skewed (Schubert and Berlach argued for a revision of the HAWIK due to their findings), are still clearly lower than the measures in our sample. Schubert and Berlach also found a slightly higher PIQ than VIQ, whereas in the AP sample the opposite pattern was observed (see table 3).

(v) *Comparing VIQ and PIQ*

In many files (54%), it was mentioned that the children showed excellent verbal abilities with good formal and abstract thinking as well as general knowledge, whereas 'practical' intelligence (i.e. visual–spatial skills, social intelligence or visual–motor coordination) seemed impaired. For 38 cases, measured VIQ and PIQ could be compared. VIQ and PIQ were rated as discrepant if a 9-point difference or higher could be observed between the two measures. Applying this rule, 48% showed a higher VIQ than PIQ, whereas 18% demonstrated the opposite pattern. For 38%, VIQ and PIQ measures showed no significant differences.

Special gifts and abilities

Nineteen percent of the 46 children with detailed files were reported as being capable of original, sometimes even philosophical, thinking processes. Fourteen percent were said to have a special gift for abstract thinking and logical reasoning. A special insight into themselves (self-reflection and consciousness) was reported for another 17%. These children were described as being capable of looking at themselves from an outside or dispassionate view, but Asperger often mentioned that they did not draw conclusions from these insights and could not use them in the social context (i.e. see themselves through the eyes of *others* and behave accordingly). An outstanding mathematical talent was reported in 23%. Some children were said to invent their own calculation methods that were highly complicated but did not always lead to correct results. Other abilities mentioned included eidetic memory (14%) and musical or artistic talent (12%).

Specific learning disabilities

Eight children (17%) had problems in reading and writing (i.e. either isolated spelling or reading disorder or both combined), while only one child was reported as having problems in mathematics (dyscalculia). Four children (9%) showed difficulty in handwriting ('grapho-motor skills').

Table 4. Area of fathers' professions in the AP sample compared with controls (figures do not add up to 100% as 11% of the jobs did not fit into the categories given).

area of fathers' professions	AP group (%) ($n = 37$)	controls (%) ($n = 80$)
technical (e.g. engineer, electrical engineer, technician)[a]	27	8
commercial	16	15
skilled manual (e.g. carpenter, builder)[b]	14	31
professionals (e.g. lawyer, doctor, journalist)	11	8
civil services	8	6
public services (e.g. post, transport)	5	14
clergy	5	0
teaching	3	1
unskilled worker (e.g. shelf stacker)	0	9

[a] Significant difference between the groups ($\chi^2 = 9.588$, d.f. = 1, $p = 0.002$).
[b] Marginally significant difference ($\chi^2 = 3.823$, d.f. = 1, $p = 0.051$).

(vi) *Family background*

For 35 fathers and 31 mothers of the sample, details about their educational qualifications were mentioned. More than half of the fathers ($n = 20$; 57%) and 42% of mothers ($n = 13$) had finished high school with A-levels ('Matura'). Almost one-third of the fathers ($n = 10$) and 23% of the mothers ($n = 7$) had a university degree, which seems to point to an upwardly skewed educational level compared with the normal population. To determine whether these figures are merely a selection bias due to the type of clients coming to the clinic, a control group was identified consisting of 82 files from the archives of the remedial pedagogical ward taken from 1958–1982. The children included were mainly diagnosed with behavioural problems (48%), learning/concentration/attention difficulties (27%), cerebral disorders (26%) and family problems (21%). In the control group, only a quarter of the fathers ($n = 19$) had completed A-levels, which is significantly less often than in the AP group ($\chi^2 = 11.489$, d.f. = 1, $p = 0.001$). Similarly, only 17% of the mothers ($n = 12$) in the control group had A-levels, compared with 42% in the AP sample ($\chi^2 = 7.090$, d.f. = 1, $p = 0.008$). Furthermore, university degrees were significantly less common in the control group than in the AP group. Thirty-one percent of fathers of children with AP as opposed to 12% of control fathers had a university degree ($\chi^2 = 6.561$, d.f. = 1, $p = 0.010$).

In 37 cases, the father's profession was mentioned. The most common profession among the fathers of children with AP was technical professions, which is significantly different from the control group ($\chi^2 = 9.588$, d.f. = 1, $p = 0.002$). In the control group, most fathers were in manual work, followed by commercial jobs (see also table 4).

The most frequently seen profession for fathers in our sample was engineer or electrical engineer (22%; $n = 8$). Compared with the control group, only 6% ($n = 5$) were engineers, which constitutes a significant difference ($\chi^2 = 5.922$, d.f. = 1, $p = 0.015$).

(vii) *Similarity with family members*

In 32 files, a short description of the impression the staff had of the parent's personality was available. Some resemblance between the child with AP and one or more family members was observed in 53% of the sample. Fourteen fathers (52%) were reported as being similar to their child in personality (e.g. aloof, odd, 'nervous') showing deviant behaviours or low social competence. Additionally, for four mothers (15%) and two siblings (7%) similarities with the presented child were mentioned.

(viii) *Pregnancy, birth and early developmental milestones*

Information about the mother's pregnancy, the child's birth, and his/her early development was available for the 46 cases with detailed files from the ward. Twenty-eight percent of the mothers had had difficulties during pregnancy, including bleeding, infection or extreme nausea. In 33% of the cases, difficulties during birth were reported.

Twenty-six percent of the children were late in being potty trained, or had phases of enuresis or soiling during their early childhood. Only 11% were reported as having been delayed in their motor development. By contrast, 20% of the children showed language delay (first words after 2 years). It was mentioned that seven children (15%) started to talk quite unexpectedly, that is, they did not talk at all until a certain age and were then suddenly capable of saying a number of words or even whole sentences. Four of these cases had been significantly delayed in saying their first words (2 years or more) but then rapidly developed a good use of phrases before the age of three.

(ix) *Behaviour on the ward/at home/at school*

The greatest behavioural difficulty of the 46 children admitted to the ward consisted of lack of integration into the peer group. Over 90% were reported as having severe deficits in this area. For the great majority, these problems consisted of a combination of being 'out of the group', having no friends, being ignored, disliked or bullied by the others. It was not so much that they were not interested in their peers but rather that they approached them in an inappropriate way or that their unpredictable behaviour (i.e. aggressive outbursts) made them unpopular with the others. Three-quarters of the children were described as being clumsy during their stay on the ward (i.e. it was mentioned in their files that they showed impaired fine and gross motor skills, poor motor coordination or difficulty in participating in sports and games) although not all of them received a diagnosis of apraxia (see table 2). The motor problems were sometimes also reflected in the children's poor drawing skills and particularly poor results

Table 5. Behavioural difficulties in children with AP who were admitted to the remedial pedagogical ward.

behavioural difficulties	*n*	percentage
no integration into peer group (lack of friends, victim of bullying, etc.)	42	91
marked clumsiness during stay on the ward	34	74
difficulty with completing school work (only follows his/her own interests, is too slow, too careless, etc.)	28	61
attention problems, poor concentration	27	59
problems with accepting authority, disciplinary problems, conduct disorder	23	50
absent-mindedness, 'in a world of his/her own'	23	50
verbal and physical aggression	20	44
inappropriate social behaviour (lack of personal distance to others)	19	41
stereotyped behaviour, tics	16	35
hyperactivity	16	35
anxiety, phobia	13	28
affective lability	9	20
'playing the fool' (in class)	7	15
temper tantrums	6	13

in the 'man-drawing-test', pointing to a deficient 'body schema' which was described as a lack of knowledge about their own body in space and the body's proportions. Other frequently seen problems concerned the children's difficulty in finishing school work. They were reported as being too slow, too pedantic or too careless because they were preoccupied with other things (e.g. their special interests) or had major attention deficits. Asperger often regarded the children as being 'distracted from within/or by themselves'. Furthermore, half of the children displayed disciplinary problems, negativism or conduct difficulties, particularly at school; they did not listen to what the teacher said or only followed their own 'spontaneous', idiosyncratic ideas. They were described as disrespectful towards authority, and could come across as impudent and blunt because they would speak out freely without thinking while being quite unaware of the situation or the status of the person to whom they were talking. Sometimes disciplinary problems went so far that s/he had to be expelled from school or excluded from PE lessons (20%). For a detailed overview see table 5.

(x) *Special interests and hobbies*

For 44 cases with detailed files, information on special interests was available. Eighty-two percent were reported as having special, original and narrow interests and hobbies. Asperger and his team often described these interests as highly scientific and distinctive, while other interests were rather obscure or atypical for children that age (e.g. eye muscles, rubbish bins, earthworms, religious hymns, gangsters). For 33 children, the nature of the interests was mentioned and a categorization was attempted (see table 6).

Table 6. Special interests and hobbies in children with AP ($n = 33$).
(Thirty per cent of the children with special interests had hobbies which could not be categorized, such as a fascination with puns, letters, comics, Mickey Mouse, gangsters, national socialism, clocks, inventing own methods for calculation.)

special interests	*n*	percentage
animals and nature	10	30
technical and/ or scientific interests	9	27
obsessive reading, collecting facts	8	24
public transport systems, trains, cars	6	18
religion	4	12
drawing	4	12
music	3	9
space, astronauts	2	6

(xi) *Language and communication*

Ninety-five percent of the admitted patients displayed some kind of language and communication deviancies that can be regarded as typical for AS (excluding common speech problems, like stuttering, or problems not specific for AS, such as talking too fast or too quietly).

Asperger considered the 'autistic psychopath's' language peculiarities as one of the most dominant characteristics of the disorder. When describing the more able children's language, Asperger (and his team) most often referred to their unusually sophisticated and distinguished language, their good verbal ability. The children supposedly spoke like scholars or professors about their chosen field often using original expressions or unusual words. Asperger drew a connection between their language and their thought processes, which he thought of as often being creative, spontaneous and original. For many children, deviant prosody and quality of voice was reported (e.g. monotonous speech, singing quality of voice, high pitched tone, over-precise articulation). The children were frequently regarded as ignorant of the social situation when speaking, and sometimes seemed to talk to themselves, commenting on their own actions or giving monologues without needing a listener. One-third of the children showed associative, tangential language and were unable to stay with one topic for a longer period of time (unless they talked about their interests). One-quarter were reported as showing 'obsessional' questioning or were said to have some kind of need to debate things endlessly. Common speech problems, like stuttering or lisping, were present in a smaller number of children. For an overview of language and communication deviancies see table 7.

Table 7. Speech and language characters in children with AP ($n = 43$).

language and communication	*n*	percentage
ignorant of social situation when talking	29	68
talking in monologues, commenting on own actions, talking to him/herself	24	56
distinguished language, good verbal ability	23	54
deviant modulation (e.g. monotonous) and articulation (e.g. over-exact)	23	54
associative language, 'derailment of thoughts', getting off-topic	14	33
pedantic, long-winded, complicated speech	13	30
verbosity, 'endless talking'	12	28
'obsessional' questioning, 'getting into endless debates'	11	26
precocious, 'know-it-all'	9	21
neologisms, original or unusual words and phrases	9	21
common speech problems (e.g. stutter, lisp)	9	21
echolalia and verbal perseverations	8	19

(xii) *Non-verbal communication*

Facial expression was regarded as limited or different in 80% of the admitted children. More than one-third of these children lacked emotional expression; 13% seemed tense; 17% had facial twitches/tics or an unnatural expression (e.g. permanent smile or grin); 17% appeared unusually serious and not child-like in their facial expression.

Thirty-five percent of the children showed deviant eye contact (no or reduced eye contact 29%, unusual gaze, for example, staring 7%). Limited use of gestures (11%) or stereotyped movements (9%) were reported less frequently than rather bizarre, gauche or clumsy body language and gait which was seen in a third of the admitted children (33%).

(e) *Application of ICD-10 criteria*

In order to determine whether Asperger's patients would fit the diagnostic criteria for Asperger's disorder today, 44 children with AP were analysed according to ICD-10 research criteria (World Health Organization 1993). Twelve cases (29%) were double-rated by four students. For points A, B and D of the diagnostic criteria, 100% agreement could be reached. For point C (circumscribed interest or restricted, repetitive and stereotyped behaviour patterns) there was disagreement on one case. For the sub-scores, reliability coefficients (kappa) ranged between 0.66 and 1.00.

The results show that 68% of the children would be diagnosed with AS according to current ICD-10 criteria. Twenty-five percent of the children ($n = 11$) did not meet the requirement of normal development before the age of three. Six of these cases showed delayed language development (first words after 2 years), one child had delayed cognitive development, one displayed deficient self-help skills and three showed a combination of delayed language and impaired self-help skills. Nearly all of the children fulfilled the criteria for points B (abnormal reciprocal social interaction) and C (circumscribed interest or restricted, repetitive and stereotyped patterns of behaviour). In 11 cases (all cases with some kind of developmental delay), autism took precedence over Asperger's disorder. One child was also diagnosed with OCD and therefore could not be diagnosed with Asperger's disorder at the same time. Five percent of the children ($n = 2$) clearly diagnosed with AP by Asperger and his team would not be captured by ICD-10 criteria at all. Table 8 provides a symptom count on ICD-10 criteria for AS.

Apart from the requirement for delayed development, 45% of the children also met the ICD-10 criteria for autism, i.e. they fulfilled points B1 (social impairment), B2 (communication impairment) and B3 (restricted behaviour), and met six or more criteria for the symptoms listed under point B, as well as criteria C. A high number of children showed language deviancies (table 7) and, to an extent, these were captured by ICD-10 criteria for autism: 25% had delayed language, 33% showed marked impairment in the ability to initiate or sustain a conversation with others, 39% demonstrated stereotyped and repetitive use of language or idiosyncratic language, and 8% displayed a lack of varied, spontaneous make-believe play or social imitative play.

4. DISCUSSION

In the present study we wanted to outline how Asperger and his team characterized their clients with AP, which features led to a diagnosis, and how this conforms with today's diagnostic criteria of AS. After systematically analysing 74 descriptions of 'autistic psychopaths' delineated by Asperger and his team from 1950 to 1986, we hope that a somewhat clearer picture of 'what Asperger meant' may arise.

Limitations to the study lie in the fact that different types of files with varying amounts of information were included in the analysis. In particular, the file cards from Asperger's private practice lacked information. In these files, Asperger apparently only recorded what he found most striking about the individual child and what would have been most useful for further intervention. Owing to this problem, we had to confine the sample to a much smaller number of 46 cases with detailed files from the ward for many of the categories described. Another limitation is that raters who re-examined the cases for inter-rater reliability were not blind to diagnosis as they had all been involved in the process of identifying and collecting data and were therefore familiar with the case files analysed.

Results show that 'autistic psychopaths' comprised over 1% of all referrals to the remedial pedagogical unit of the children's clinic or to Asperger's practice. Added to the number of children with affiliated disorders without an

Table 8. ICD-10 symptom count for 44 cases with AP.

point	ICD-10 criteria applied to Asperger's clients with AP	*n*
A	lack of delay in spoken and receptive language or cognitive development	33 (75%)
B	qualitative abnormalities in reciprocal social interaction	43 (98%)
	(i) failure adequately to use eye-to-eye gaze, facial expression, body posture, ...	26 (61%)
	(ii) failure to develop peer relationships ...	40 (91%)
	(iii) lack of social–emotional reciprocity ...	41 (93%)
	(iv) lack of spontaneous seeking to share enjoyment, interests, ...	12 (29%)
C	unusually intense, circumscribed interest or restricted, repetitive and stereotyped patterns of behaviour, interests and activities	42 (96%)
	(i) encompassing preoccupation with one or more stereotyped and restricted patterns of interest ...	33 (77%)
	(ii) apparently compulsive adherence to specific, non-functional routines or rituals	15 (35%)
	(iii) stereotyped and repetitive motor mannerisms ...	14 (32%)
	(iv) preoccupations with part-objects or non-functional elements of play ...	4 (9%)
D	the disorder is not attributable to other varieties of pervasive developmental disorder; simple schizophrenia; schizotypal disorder; OCD; anankastic personality disorder; reactive and disinhibited attachment disorders of childhood	32 (73%)
Does the diagnosis of AS apply?		30 (68%)
Autism taking precedence over AS		11 (25%)
No diagnosis or other diagnosis (OCD)		3 (7%)

explicit diagnosis of AP the percentage lies between 1.5% and 2.3%. Only 5% of the analysed cases were females. Typically, the children were first referred in middle childhood (mean age 8 years), the initial reasons for their referral being mostly learning difficulties, academic failure and attention deficits. The children were described with several diagnostic labels, most commonly 'contact and instinct disorder', i.e. a combination of low social competence and a lack of *instinctive* knowledge about how to solve everyday problems or how to behave appropriately in a variety of situations. The most dominant behavioural difficulty of the children consisted of lack of integration into the peer group. The children seemed to others to be isolated and were often ignored, bullied or disliked by their classmates. Although they did not lack interest in others, their social approaches were often awkward and inappropriate—a feature which has been discussed as characteristic for AS compared with HFA (Volkmar & Klin 2000) and may correspond to the 'active but odd' group of Wing & Gould (1979). The ability to concentrate on schoolwork was usually poor, and disciplinary problems and conduct disorder were seen in half of the children of the sample. These children were not capable of following the rules and joining in with the normal school routine. Usually, typical pedagogical measures proved to have no effect on the child's behaviour, but rather made it worse. More extreme forms of aggression ('autistic malice') were reported less often. Over 80% of the children had special interests, most of which consisted of a fascination for certain animals and aspects of nature or were of a technical kind.

Intellectual functioning was clearly higher in the AP sample than in other children referred to the clinic at about the same time. No child was below average, whereas over half of the children showed high to superior intellectual skills—a finding that seems quite surprising considering the fact that Asperger (1944) did mention that AP could occur in less able individuals as well. Clinicians who worked with Asperger in the 1970s report that it was an 'unspoken rule' (set by Asperger) that a diagnosis of AP was usually only considered in children with good to high intelligence, which would explain why Asperger in his later papers 'overlooked' the coexistence of AP and learning disabilities he had suggested before (Wing 2000). Whether it was Asperger's intention to exclude less able individuals from the diagnosis is unclear.

Looking at VIQ and PIQ in the admitted children of our sample, we found that a significantly higher VIQ than PIQ was more than twice as common as the converse (44% versus 18%). The former pattern has been proposed as being typical for AS (Klin *et al.* 1995; Miller & Ozonoff 1997). A meta-analysis on studies measuring IQ profiles in subjects with HFA and AS by Lincoln *et al.* (1998) confirmed the assumption that individuals with AS typically demonstrate higher VIQ than PIQ, whereas subjects with HFA display the opposite pattern.

Examining the cases in our sample according to ICD-10 research criteria (World Health Organization 1993) it could be found that, unlike the results of Leekam *et al.* (2000), 68% of the present sample did fulfil the criteria for AS. However, a closer analysis led to somewhat contrasting results.

In one way, ICD-10 criteria seem over-inclusive, as they capture neither impaired verbal/non-verbal communication nor motor problems. In our sample, we found that 95% of the children had some form of language deviancies most often connected with the pragmatic aspects of language use followed by prosodic differences. Although, in the present sample, early motor development was not found to be delayed very often, 59% had an additional diagnosis of motor apraxia, almost three-quarters showed motor clumsiness during their stay on the ward and another third displayed awkward or gauche body language and gait. It has been suggested that developmental motor delay and the presence of motor clumsiness (Gillberg 1991) may be a defining feature of AS but so far no evidence has been found of clumsiness as a specific marker for AS in comparison with HFA (Ghaziuddin *et al.* 1994). Both language deviancies and motor clumsiness, however, seemed crucial for a diagnosis of AP in the present sample.

However, ICD-10 criteria appeared too narrow, as 25% of the children examined (some of which were described as 'classic autistic psychopaths') did not fit the diagnosis due to early developmental delays, mostly regarding language. Forty-five percent fulfilled point B of the diagnostic criteria for autism. For the rest, the impairments in communication required for autism did not conform to the communication difficulties in the children with AP. It could be assumed that the rather high intellectual functioning and excellent verbal ability found in our sample may lead to a different appearance of language and communication impairments.

Ghaziuddin & Gerstein (1996) suggested that 'pedantic speech' may be specific to AS, defining it as 'that type of speech in which the speaker conveys more information than the topic and goals of the conversation demand, violating expectations of relevancy and quantity; sentence structure may have the formality and vocabulary display the erudition expected of written language. Conversational turns resemble rehearsed monologues rather than contributions to a jointly managed dialogue. Articulation may be precise and intonation formal' (p. 589). Although the word 'pedantic' was rarely used in our sample (and if so it mainly referred to somewhat lengthy, complicated speech), many single features listed above were mentioned in the files when describing the children's language, particularly the distinguished, 'scholarly' language, the precise articulation, the ignorance of the social context when talking and the tendency to speak in monologues. The inclusion of specific language issues into current diagnostic criteria for AS are therefore considered as highly important.

Other more selected results of the present study also coincide with other authors' findings. The parents of the children in our sample, for instance, had significantly higher educational qualifications than the parents of other patients visiting the clinic (which might derive directly from the clinicians' habit of only diagnosing AP in children with higher intellectual functioning). However, fathers of children with AP also more often worked in technical professions (particularly engineering) compared with controls, which confirms the suggestion of Baron-Cohen *et al.* (1997) that there may be a link between autism and engineering or, generally spoken, superior functioning in the domain of 'folk physics'. The authors presume that the very same genes leading to high ability in 'folk physics' may, in some cases, lead parents to have a child with autism. A number of children with AP whose files we examined also showed high mathematical and/or technical ability, often even working on 'new inventions'. However, these were often described as not being very usable. Half of the fathers were reported as resembling their child in personal characteristics supporting Asperger's own observation of a genetic background to the disorder.

Furthermore, a certain overlap of our cases with Sula Wolff's sample of 'schizoid' children exists (Wolff 1991*a*,*b*). The author pointed out that maybe 'schizoid' children come closer to Asperger's account of AP than the commonly used diagnosis of AS today. She stated that 'schizoid' children were usually of higher intelligence than children diagnosed with AS today and their social handicaps did sometimes not manifest until school age—findings that can be confirmed by the results of this study. The majority of 'schizoid' children were described as being less disabled and superficially resembling children with reactive conduct disorder or emotional disorder, having more specific but not pervasive developmental delays (Wolff 1991*b*). This also applies to our sample, especially regarding the additional presence of conduct disorders. Furthermore, Wolff (1991*a*) mentions a better outcome for 'schizoid children' than that described for children with AS by other authors. Asperger also often emphasized the good outcome in his clinical records, provided the child would find a niche in which his/her special abilities could be of use.

In sum, the patients of Asperger described in our study represent a subgroup of children with high intellectual functioning, specific circumscribed interests and talents but impaired social, communication and motor skills who partly resemble Sula Wolff's description of 'schizoid' individuals. However, a quarter of these children also fulfil diagnostic criteria for autism, which points to the possibility of a mixture of symptoms regarded as typical for AS and autism. The authors would therefore agree with the point of view of Wing (2000) that AS cannot be clearly distinguished from autism but may still be clinically useful as a diagnostic category (also Szatmari 2000). As can be seen in this analysis, the phenotypic appearance of children with AS can be very distinct from that normally associated with Kanner's autism. Specific areas of difference might perhaps be a function of the higher (verbal) intelligence.

In any case, current ICD-10 and DSM-IV criteria for AS do not quite capture the individuals originally described by Asperger and his team. They appear to differentiate AS from autism solely based on the onset criteria, regardless of the patient's social impairment later in life (Volkmar & Klin 2000, p. 44). In particular, motor and social clumsiness as well as speech and communication deviancies should be taken into consideration in further discussion of diagnostic criteria for AS.

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GLOSSARY

AF: autistic feature
AK: autism (Kanner type)
AP: autistic psychopathy
AS: Asperger syndrome
FSIQ: full-scale intelligence quotient
HAWIK: Hamburg–Wechsler-Intelligenztest für Kinder
HFA: high-functioning autism
OCD: obsessive–compulsive disorder
PIQ: performance intelligence quotient
VIQ: verbal intelligence quotient
WISC: Wechsler Intelligence Scale for Children