The Differentiation between Autism and Asperger Syndrome

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*Autism* 1998; 2; 11

DOI: 10.1177/1362361398021003

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The differentiation between autism and Asperger syndrome

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ABSTRACT In discussing the differentiation between autism and Asperger syndrome, the paper aims to re-examine similarities and differences in symptomatology with reference both to the history of Asperger syndrome and to current research. Symptoms that have been suggested as possibly differential for diagnosis and shared diagnostic features are separately considered. Although the paucity of reliable research findings allows few definitive conclusions to be drawn, it is suggested that attempts to identify subtypes and achieve a greater understanding of the behavioural heterogeneities within autistic spectrum or pervasive developmental disorders is crucial to improving both clinical practice and research.

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INTRODUCTION

Do autism and Asperger syndrome need to be differentiated? In terms of more general diagnostic classification issues, it has been argued that differentiation is needed when the clinical and educational implications consequent on it are different (Rutter and Schopler, 1992) or when assigning an individual to a given diagnostic group has probability implications which it is clinically unsound to ignore (Meehl, 1973).

The overall heterogeneity of pervasive developmental disorders is not in dispute. Subtyping is needed to specify reliably co-occurring symptoms by which separate subtypes can be identified and, within each subtype, to demonstrate a sufficient amount of aetiological and prognostic homogeneity to allow the prediction of future behaviour and need. In attempting to validate subtypes, investigations of internal consistency or reliability and external validity (clinical significance, response to treatment, association with other non-diagnostic behaviours, aetiological markers, pathogenesis, course and prognosis) must proceed together in an appropriately coordinated fashion (Pennington, 1991; Szatmari, 1992).

The relationships between these different levels of enquiry are not
necessarily straightforward. Pervasive developmental disorders affect most areas of functioning, making it difficult to study associated behaviours that are independent of the diagnostic criteria themselves (Sztatmari, 1992). Different aetiologies may produce similar symptoms by affecting the same or similar underlying brain systems or one specific aetiology may have several distinguishable pathologies. Additionally, although the importance of moving beyond clinical features to investigate aetiology, outcome and treatment response is clear, it is still true that 'before we can begin to search effectively for the origins of a specific pattern of events, we must have established a reasonably good definition of the pattern and have been assured that it tends to occur with some internal regularity' (Maher, 1970).

Reviewing the validity of Asperger syndrome as a diagnostic category, Sztatmari (1992) reported little evidence of reliability in the use of suggested diagnostic criteria, little evidence of a meaningful separation from criteria for autism, and a paucity of information on treatment, treatment needs, aetiology and outcome. Despite this, certain clinical differences between the two were acknowledged and it was suggested that 'at this stage, the issue may be whether it is useful (not necessarily valid) to distinguish and characterize subtypes of autistic spectrum disorders for clinical practice, education and research' (Sztatmari, 1992). Clearly, however, agreement between professionals (clinicians and researchers alike) on the meaning of the term 'Asperger syndrome' and on its correct usage is a crucial factor in determining its usefulness.

A specific Asperger syndrome category was recently introduced into the formal diagnostic manuals DSM-IV (American Psychiatric Association, 1994) and ICD-10 (World Health Organization, 1993: see Appendix). Paradoxically, however, there appears to be very little satisfaction over its inclusion. On the one hand, there are clinicians and researchers who welcome this formal recognition in theory but question whether the criteria given have been correctly specified or appropriately weighted (for example, Klin, 1994). On the other hand, there are those who hold that the term 'Asperger syndrome' is synonymous with 'high-functioning autism' and, on the basis of the evidence currently available, consider this formal recognition to be – as yet – unwarranted (for example, Schopler, 1996).

The fact that there is disagreement over a diagnostic label does not necessarily mean that the diagnosis has no objective reality, just as the fact that it may be wrongly used should not influence decisions as to its merits (Meehl, 1973). Undoubtedly, specific inclusion of Asperger syndrome within the pervasive developmental disorder classification has been helpful in drawing clearer distinctions between this diagnosis and others associ-
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ated with quite different abnormalities in social functioning (such as reactive attachment or conduct disorders). Nevertheless, the present lack of appropriate syndrome validation and clinical consensus is extremely unhelpful to the children and adults in question, their families and the professionals involved with them. Currently, direct knowledge of the syndrome is based on behavioural descriptions of symptom clusters, with diagnosis entailing subjective judgements of whether behaviours are normal or clinically abnormal, qualitatively the same or different. While there is clearly a behavioural overlap between autism and Asperger syndrome, it is equally clear that, if the latter is to remain as a separate diagnostic category, it will be necessary to define it in such a way that the boundaries between it and autism are unambiguous. A re-examination of similarities and differences in symptomatology (with reference both to the history of Asperger syndrome and to current research) — rather than a re-evaluation of the external validity of the diagnosis — is the main concern of the present paper.

Historical perspective

Although Kanner’s first description of autism appeared in 1943 and Asperger’s first description of his syndrome in 1944, it was Kanner’s work that largely influenced subsequent work in the field. Asperger’s ideas remained virtually unknown in the English-speaking world until 1981 when Wing used them to broaden the concept of autistic disorder to include children who, while not meeting available diagnostic criteria for autism, still presented with clear social impairments. Asperger’s original paper did not appear in English until Frith’s translation in 1991, although in 1979 The National Autistic Society’s own journal, Communication, had published a lecture that he had given in Switzerland in 1977 (Asperger, 1979). Van Krevlen’s (1971) comparison of autism and Asperger’s ‘autistic psychopathy’ had also previously appeared in English.

Were Kanner and Asperger describing the same sort of children? The similarities in their descriptions are clear. Both considered that the most important feature of the disorders they described was the child’s social impairment and both — independently — used the term ‘autistic’ to reflect this. Furthermore, both believed that the disorder was organic and present from the child’s earliest years, and both described common features such as poor eye contact, stereotypical behaviour, resistance to change and circumscribed special interests.

When it came to language abilities, motor skills and general learning styles, however, their views appear to have diverged (Happé, 1994). While Kanner described profound language delays and difficulties, Asper-
Kugler noted fluent speech with rapid mastery of a formal language system even in cases of an initial delay in language acquisition. While Kanner described variable gross motor functioning but good fine motor skills, Asperger emphasized 'clumsiness' and both gross and fine motor problems. In terms of general learning abilities, Kanner felt that his children were most adept at 'rote' learning; Asperger that his children had most difficulty with 'mechanical learning' but showed 'extraordinary originality of thought and spontaneity of activity' (Asperger, 1979).

Accepting that core social impairments are of crucial importance in both groups of children, current debate appears to focus on whether the differences noted simply reflect varying levels of 'severity' or whether they are sufficiently differential (for example, in terms of their implications for management and outcome) for the two to be considered as distinct, if related, disorders. Asperger's (1944) original paper appears to refer to a wide range of children. It includes cases very much like those described by Kanner but also concentrates on those with adult-like speech, clumsiness, highly developed isolated interests and good – sometimes highly original – thinking and expression. Asperger himself did not specify clear criteria for the diagnosis of his syndrome and his own ideas do not appear to have been entirely consistent over the years. In 1944, for example, he indicated that his disorder could be found at all levels of intelligence, while in 1979 he emphasized high intelligence. Similarly, although by 1979 he was describing children as developing good speech before they could walk, in 1944 he presented case study examples for whom this was clearly not the case.

Current practice

Current usage of the term 'Asperger syndrome' tends to focus on those high-functioning children who were among those that Asperger described as showing very specific social impairments. In terms of reported research, however, it is often unclear what sort of children have been included in different studies or on what basis children have been allocated to different experimental groups. Some authors (for example, Ozonoff et al., 1991) explicitly note that many of the children in the 'Asperger syndrome group' in their studies would also meet diagnostic criteria for autism. Others (for example, Ghaziuddin et al., 1994; Klin et al., 1995) are equally explicit about the fact that none of the children they have categorized in this way would meet criteria for autism. Some clinicians and researchers use the term 'Asperger syndrome' to describe 'high-functioning' children with autism (with 'high-functioning' reflecting good intelligence quotients and good language skills). Others use it in reference to children presenting
with relatively mild social difficulties; still others as an alternative ‘label’ for ‘pervasive developmental disorder not otherwise specified’ for children who do not fulfil the ‘specified’ diagnostic criteria for autism.

This heterogeneity of usage has not helped to answer the question of whether or not a differentiation between Asperger syndrome and autism is needed. Current classification systems (ICD-10, DSM-IV) – concurring on essential diagnostic features for the syndrome – were welcomed as ensuring that the same population of individuals would be studied and discussed. However, although DSM-IV criteria specify that the diagnosis should not be made if criteria are met for childhood autism, this important differentiation is less clear in ICD-10 criteria. It is also unclear whether the necessary and sufficient’ features that distinguish Asperger syndrome from other disorders have actually been identified.

Criticisms of ICD-10 and DSM-IV are self-evident. It can be argued that Asperger syndrome has merely been defined as autism without the language or cognitive impairments; that these definitions do not allow for those cases in which initial language delay (as Asperger himself described) is followed by apparently good language acquisition; that too much emphasis is placed on a lack of delay in cognitive development or adaptive behaviour; or that insufficient emphasis has been given to motor delays/clumsiness and/or all-encompassing special interests (both of which were given prominence by Asperger but neither of which were specified in ICD-10 or DSM-IV as essential to the diagnosis).

**Difficulties in resolving the controversy**

Unlike Kanner, who never seems to have referred to Asperger’s work in any of his own writings, Asperger did compare his children with Kanner’s. He reported them as being ‘at once so alike and yet so different’ and noted that ‘the differences are great’ (Asperger, 1979). Given the variability of opinion over what is necessary and sufficient for the diagnosis of his syndrome and the subjectivity and shortcomings of available research, the importance of these differences continues to be difficult to assess.

Very few studies have evaluated differences between Asperger syndrome and autism in a systematic manner and little work has been done on the co-occurrence of the features at the heart of this controversy. In attempting to examine the available literature, cross-referencing of articles already known to the author was supplemented by a computer-assisted search (PsycLIT) to September 1996, primarily, for any article specifically comparing autism and Asperger syndrome in the context of motor skills, language abilities, cognitive functioning, special interests and social interaction. Only studies published in English were examined and studies
of 'schizoid personality disorder' were not included as there appears to be a lack of consensus that this is the same condition as Asperger syndrome. Papers judged to address external validity – rather than similarities and differences in symptomatology – were also excluded (for example, comparisons of medical history or biological factors, as in the study by Ghaziuddin et al., 1995). Child, rather than adult, studies were targeted to minimize outcome differences that may have been confounded by differential long-term management.

Prior to the inclusion of specific criteria for Asperger syndrome in ICD-10 and DSM-IV, at least five sets of clinically diagnostic features had been suggested in the literature (Ghaziuddin et al., 1992). Differential diagnosis often proceeded in a non-hierarchical way, hence allowing for the diagnosis to be made even in cases where criteria for autism were fulfilled. A clear separation of Asperger syndrome from high-functioning autism, however, has been seen as crucial to the debate over whether the two are distinct disorders (Schopler, 1985; Wing, 1991). While not resolving validity issues for the syndrome, it was hoped that the hierarchical approaches taken by ICD-10 and DSM-IV would facilitate uniformity of usage among clinicians and researchers and provide a reference point for future refinements of characterization and validity studies' (Klin, 1994).

To date, however, few publications have used these criteria and those that have almost invariably modify them – making them either more stringent (for example, Klin et al., 1995; Kugler and Charman, 1995) or less so (for example, Manjiviona and Prior, 1995; Ozonoff et al., 1991).

Clinical practice, while properly and necessarily dependent on research findings, cannot wait for unequivocal results and individual clinicians must evaluate the available 'evidence' as best they can. Although there are now studies in the literature that have aimed, quite specifically, at comparing the motor, language and cognitive functioning of children with Asperger syndrome and, usually, high-functioning autism, the vast majority of these pre-date ICD-10 and DSM-IV. Most rely on DSM-III, DSM-III-R (American Psychiatric Association, 1980; 1987) or clinical opinion based on features suggested as diagnostic by Wing (1981), Gillberg (1989; Gillberg and Gillberg, 1989), Volkmar and his colleagues (1988) and others. A number of studies have found more false positive diagnoses of autism if the DSM-III-R system is used rather than the DSM-III (Hertzig et al., 1990; Volkmar et al., 1994; Waterhouse et al., 1996) and studies using these criteria may well have included children who would fulfil DSM-IV or ICD-10 criteria for Asperger syndrome (but not DSM-III, DSM-IV or ICD-10 criteria for autistic disorder or childhood autism) in their 'autism' groups.

Apart from the problem of subject selection, studies have reported
difficulties in matching Asperger syndrome and autism groups on levels of intellectual functioning, age and language abilities. It has been pointed out (for example, Kerbeshian et al., 1990) that group differences in language ability may well influence findings. Large discrepancies in chronological age (with children with high-functioning autism often being significantly older than children with Asperger syndrome if an IQ match is achieved) may also confound results (Szatmari et al., 1989). Further difficulties for the interpretation of research findings arise from variability in the specific features used for subject selection. For example, if clumsiness is used as a necessary feature for inclusion in an 'Asperger syndrome group', this will clearly bias any findings relating to motor skills (Gillberg, 1989). These difficulties may have been inescapable but need to be given due consideration before any firm conclusions are drawn.

Evidence for possibly differential diagnostic features

Motor skills

Despite reports of movement disorders in autism (see Leary and Hill, 1996, for a review), it has commonly been reported that children with classical 'Kanner autism' usually show relative strengths in motor functioning while children with Asperger syndrome are often clumsy (Burgoyne and Wing, 1983; Gillberg, 1991; Tantam, 1988). In terms of differential patterns of development, it has been suggested that children with autism walk before they talk while those with Asperger syndrome talk before they walk (Van Krevelen, 1971).

However, although the definition and assessment of clumsiness are not straightforward (Ghaziuddin et al., 1994), reports of clumsiness in children with Asperger syndrome are often based on clinicians' subjective impressions rather than on standardized tests of motor skills and, where tests have been used, the results appear to be inconsistent.

Gillberg (1989) reported motor clumsiness (which had not been included as a necessary diagnostic criterion for Asperger syndrome in that study) as a distinctive feature of Asperger syndrome but not of autism. Szatmari et al. (1990) suggested that manual speed and dexterity were better in individuals with high-functioning autism than in those with Asperger syndrome. Klin et al. (1995) reported significantly greater evidence of deficits in both fine and gross motor skills in Asperger syndrome than in high-functioning autism but, although these results appear very clear, these skills were not independent of initial diagnostic assignment. Other studies addressing motor deficits show either variability in motor delays in Asperger syndrome (Volkmar et al., 1994) or
considerable variability in gross and fine motor functioning in both this
and the high-functioning autism groups, with both showing considerable
motor impairment (Ghaziuddin et al., 1994; Manjiviona and Prior,
1995).

Nearly all of these studies have been poorly controlled in terms of the
rationale underlying diagnostic assignment, level of intellectual function-
ing and chronological age, and have used small samples of subjects.
Authors reporting these results have, themselves, been careful not to draw
firm conclusions. They suggest that the pattern of motor deficits in Asperger
syndrome and autism may be different or that differences may be
qualitative rather than quantitative (with the ‘clumsiness’ reported in the
former being ‘more of a social nature than motoric’: Ghaziuddin et al.,
1994). Whereas the age ranges of subjects in the studies quoted are often
very broad (4–18 years in Gillberg’s study; 7–19 years in the Ghaziuddin
study; 7–32 years in the Szatmari study; 7–17 years in Manjiviona and
Prior’s), the importance of describing clumsiness in developmental terms
has been stressed by Klin (1994). As he points out, motor problems tend
to be noted early in life in children with Asperger syndrome (perhaps
because they are so much better at certain other things) and, at similar
ages, motor skills are often quoted as relative strengths for children with
autism (perhaps because they are so impaired in other areas). Although,
when they are older, children with autism may also present as ‘clumsy’;
it is possible that this ‘commonality in later life may result from different
underlying factors, for example, psychomotor deficits in the case of
Asperger syndrome and poor body image and sense of self in the case of
autism’ (Klin, 1994). Comparing children of such varying ages (and with
very few really young children included) tells us very little. In fact, by the
time that greater difficulties are being noted in children with autism, to
some extent remedial intervention and experience-based strategies (Tan-
tam, 1991) may well have ameliorated early deficits in children with
Asperger syndrome.

Language abilities
Asperger’s first descriptions invariably included comments about ‘adult-
like’ speech and an ‘unusually mature and adult manner’ of self-
expression. This lack of any persistent or significant delay in formal
language acquisition has been confirmed in subsequent studies. Gillberg
(1991), for example, notes that the children he described ‘all had good or
very good expressive language skills’ and that ‘they all had developed a
near-normal level of speech by the age of five’. At the same time, however,
problems with comprehension and use (pragmatic functions) of language
have also been consistently noted. These difficulties, which also encompass
non-verbal aspects of communication, appear very similar to those more generally reported for children with autism although some distinctions have been suggested. Thus, Van Krevelen (1971) commented that while, in children with autism, language does not attain the function of communication, in those with Asperger syndrome, although remaining 'one-way traffic', it does aim at doing so.

Once again, in trying to assess whether children with Asperger syndrome simply have better expressive language skills than the majority of children with autism, studies have yielded conflicting results. In general, the conclusion has been that more deviance in language and communication is apparent in high-functioning autism, both in terms of reported early behaviours such as babble, echolalia, pronoun reversal and repetitive speech, and in terms of deficits in areas such as articulation, vocabulary and verbal output assessed in later life (Kerbeshian et al., 1990; Klin et al., 1995; Szatmari et al., 1989; Volkmar et al., 1994).

More specifically, marked verbosity, with lengthy speech or incessant monologues, has been suggested as characterizing Asperger syndrome and distinguishing it from high-functioning autism (Kerbeshian et al., 1990; Klin, 1994). In terms of conversational skills and communicative strategies, differences between the two groups have been suggested both in the ways that intonation is used to convey information and in the way that language is used to 'reference' other information in 'verbal' and 'real-world' environments. In these studies, the high-functioning autism group less often employed functionally useful intonation patterns (appearing either to send random intonation signals to their conversational partners or to be misusing the linguistic system) than the Asperger syndrome group who showed only very minor deviations from the performance of an outpatient, non-socially impaired control group (Fine et al., 1991). In conversation with others, speakers with high-functioning autism showed a general paucity of referencing and referred to shared information in unexpected ways that failed to build on the previous verbal exchange. Speakers with Asperger syndrome did build on previous exchanges, doing so as frequently as the non-socially impaired control group although making significantly more references that were unclear (Fine et al., 1994). Interestingly, although it needs to be borne in mind that these studies suffered from diagnostic and age- and IQ-matching problems, the two target groups often differed from the non-socially impaired control group in opposite ways. This suggests that children with Asperger syndrome do not merely have milder but similar problems to children with high-functioning autism. As the authors point out, if these findings are replicated, they may have implications for the validity of Asperger syndrome as a distinct disorder.
Cognitive functioning

Although below normal IQ has also been suggested or reported (for example, Gillberg, 1989, described two boys with Asperger syndrome as 'mildly mentally retarded', IQ 50–69), the acceptance of age-appropriate cognitive functioning in the syndrome is reflected, in both ICD-10 and DSM-IV, by an insistence on the lack of significant delays in cognitive development. The absence of specific criteria relating to general levels of intelligence in childhood autism, on the other hand, allows this latter diagnosis to be made at all levels of functioning.

Implicit in these systems, therefore, is the acknowledgement that high-functioning autism (often defined in terms of IQ>70, IQ>80 or IQ>85) and Asperger syndrome are not synonymous. Furthermore, an empirical distinction between high-functioning autism and Asperger syndrome in terms of neuropsychological profiles (with the latter but not the former showing assets and deficits consistent with non-verbal learning disabilities syndrome) was clearly suggested when age- and IQ-matched groups were compared following diagnostic assignment according to a stringent (ICD-10 based) procedure (Klin et al., 1995).

Although, once again, methodological problems frequently confound results and replication is often lacking, available studies tend to suggest that, despite similar general levels of functioning, patterns of verbal and non-verbal abilities are significantly different in Asperger syndrome and high-functioning autism. Findings suggest generally higher VIQ and lower PIQ in Asperger syndrome than in high-functioning autism, and higher VIQ than PIQ in Asperger syndrome (Klin et al., 1995; Ozonoff et al., 1991; Volkmar et al., 1994).

In terms of specific skills, children with Asperger syndrome have been reported as having better verbal reasoning abilities than children with high-functioning autism (Szatmari et al., 1990), and as performing significantly better on verbal memory and auditory perception tasks. However, they show relative weaknesses (in relation to other skills) in spatial skills. In comparison with children with high-functioning autism, they also show deficits in visual-motor integration, visual-spatial perception, visual memory, non-verbal concept formation and emotion perception (Klin et al., 1995; Ozonoff et al., 1991).

While executive function defects (Ozonoff et al., 1991), poor social and emotional competence and verbal concept formation problems (Klin et al., 1995) have been shown to be similar in both groups, analysis of ability profiles in Ozonoff et al.'s study suggested that first-order theory of mind (a 'strength' in the Asperger syndrome group) was one of the weakest skills in the high-functioning autism group. In terms of cognitive style (defined by Tennant, 1988, as a characteristic and consistent approach...
to the organization and processing of information), there are indications that field independence may be associated with autism (Shah and Frith, 1993) but field dependence with Asperger syndrome (Kugler and Charman, 1995). In addition, whereas individuals with autism seem to prefer to process information in a holistic way, those with Asperger syndrome may prefer to do so analytically (Jordan and Riding, 1995). Although the results of these studies are extremely tentative, cognitive styles have important educational implications (for example, Neimark, 1985; Niaz, 1987; Zelniker, 1989) and these potential differences merit further exploration.

**Similarities and differences in shared diagnostic features**

Qualitative impairments in social interaction and restricted repetitive and stereotyped patterns of interests and behaviour are included as diagnostic criteria for autism and Asperger syndrome by both ICD-10 and DSM-IV, and this reflects a commonality of impairment clearly apparent in earlier suggested clinical criteria (Gillberg and Gillberg, 1989; Szatmari et al., 1989; Tantam, 1991; Wing, 1981). The only dispute here – if ‘dispute’ there is – concerns the emphasis given to particular features and the characteristic forms of expression of these features in each case.

Hence, in terms of early history, children with high-functioning autism are reported as showing a greater lack of responsiveness to their mothers, other adults and peers, ‘enjoying’ others less, being more insistent on sameness, showing a greater lack of imaginative play and more motor stereotypies and bizarre preoccupations with unusual objects/topics (Szatmari et al., 1989; 1990). In contrast, from early infancy, children with Asperger syndrome are more frequently reported as ‘affectionate babies’ and as sharing interests with their parents although they, nevertheless, appear to be as ‘routine-bound’ as children with high-functioning autism.

Many of these characteristics appear to persist into later childhood and adolescence, with a pervasive lack of responsiveness and bizarre responses to the environment being reported as more typical of autism than of Asperger syndrome (Kerbeshian et al., 1990). Van Krevelen (1971) suggests that the child with autism lives in a world of his own and acts as if other people do not exist, whereas the child with Asperger syndrome lives in our world in his own way and evades other people of whom he is aware. Children with Asperger syndrome appear to be more interested in making friends and meeting people than children with high-functioning autism but, because they lack the social and emotional competence to engage others successfully, they are also more likely to make odd and inappropriate approaches to others (Klin, 1994; Wing and Attwood, 1987).

Abnormal preoccupations (other than with unusual objects) and
interests have been noted as more common in Asperger syndrome than in high-functioning autism (Volkmar et al., 1994) and all-absorbing, circumscribed special interests (with huge amassing of factual information) in the former have been contrasted with the manipulative, visual-spatial and musical skills or savant talents more commonly described in the latter (Klin, 1994). It has also been suggested that the imposition of these preoccupations on other people is particularly characteristic of Asperger syndrome (Gillberg, 1991). 'Hypertrophic development' of isolated skills was well described by Asperger and there is emerging support for the view that they are truly typical of Asperger syndrome and should be given due consideration when necessary requirements for the diagnosis are specified. In this context, Kerbeshian and his colleagues (1990) concluded that the major symptom discriminators for a diagnosis of Asperger syndrome were the presence of hypertrophied skills or circumscribed interests and the absence of pervasive lack of responsiveness.

Discussion

Following Kanner's 1943 paper, early approaches to 'defining' autism tended to be descriptive, defining categories of behaviour relatively loosely and giving little consideration to separating primary from secondary symptoms (Creak, 1961; Wing and Wing, 1965). Not only did this lead to considerably different interpretations on the part of individual clinicians, but it also gave a fragmented impression of 'symptoms' that are, in fact, interactive. With time, attempts at identifying those impairments that are specific to autism led to a better understanding of their close interrelationship but, in the interim, differing views reflected the differential importance attributed to particular behavioural abnormalities. For example, odd responses to sensory stimuli led to suggestions that the basic impairment in autism might be an abnormality of physiological arousal; impaired intellectual functioning to the consideration of autism as 'a variety of mental subnormality'; impaired language development to the hypothesis of a fundamental inability to comprehend sounds (see Rutter, 1968).

This conceptual diversity was reflected in poor agreement between American and European diagnostic systems. Even with increased understanding of the importance of the co-occurrence of impairments in social interaction, communication and play/interests/activities, the succession of revisions within such systems (cf. the discrepancies between DSM-III, DSM-III-R and DSM-IV) has been a clear indication of the heterogeneity of clinical presentation involved. Substantial agreement on the pattern of difficulties essentially defining autism has only recently been achieved in ICD-10 and DSM-IV.
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Having worked hard on increasing the reliability of our diagnosis of autism, evidence of its validity may need to await a much greater understanding of aetiologies and pathogenesis. In the initial absence of agreement on features central to the definition of autism, issues of heterogeneity were largely given lower priority. Given our imperfect understanding of the specific aetiologies underlying autism, appropriate diagnosis has rested on an attempt at recognizing true similarities in clinical presentation and, on this basis, trying to identify causes and effective interventions. Too much emphasis on individual differences, at too early a stage of understanding, is counterconstructive to the formulation and testing of hypotheses.

It is possible, nevertheless, to let the balance swing too far the other way and allow too broad a classification to obscure differences that might have very real implications for causation, course, response to intervention and outcome. Kraemer (1996) stressed the need for a greater understanding of the heterogeneities in autism in order to be able to judge more appropriately what is random variation and what is clinically important. She points out that 'we do not know the boundaries of autism or any subtype of autism' and joins other colleagues contributing to the same publication (Bristol et al., 1996) in suggesting the crucial importance, for all research, of identifying reliably occurring subtypes.

In terms of the specific differential diagnosis which is the subject of this paper, the dearth of reliable research findings permits few definitive conclusions to be drawn. Individual differences in general levels of cognitive ability, language and motor skills and the type of special interests shown in autism have, after all, never been denied. Previous studies – predating the high-functioning autism versus Asperger syndrome debate – have suggested, for example, that the heterogeneity of autism probably includes subgroups with different patterns of cognitive skills and that identifying more homogeneous subgroups would enhance the reliability and validity of both diagnosis and research (Fein et al., 1985). More recently, a study subdividing higher-functioning children with pervasive developmental disorders solely on measures of language development (Szatmari et al., 1995) showed greater competence, or fewer abnormal behaviours, in reciprocal social interaction, adaptive behaviours and formal tests of language skills (but no differences on a variety of measures of non-verbal cognition) in the absence of delayed and deviant language development. It was reported that these results were not due to differences in IQ, functional language or differentiation on the basis of any specific pervasive developmental disorder symptom. What was not clear, however, was whether early language differences promoted better social development (which, in turn, may have lessened the prevalence of pervasive developmental disorder symptoms), or whether possible early differences
in social competence might have led to earlier and better development of language.

In attempting to define the distinction of Asperger syndrome from autism more meaningfully, we need to achieve a greater general understanding of the interrelationship of all the features reviewed in the present paper. The mutual influence of social and cognitive development has recently been discussed elsewhere (Dunn, 1996), along with links between sociability and language development, language acquisition and the capacity for joint attention, and the relationship between cognitive skill development and both joint attention and social referencing behaviours (Sigman, 1996). Similarly, Sigman has also pointed out the independence of intelligence level and responsiveness to others’ emotions, while Leary and Hill (1996) have argued for the influence of ‘movement disturbance’ on effective communication, interaction and general participation with others, and Tantam (1991) for the influence of social structuring on movement patterns.

Attempts to identify specific patterns of skills and deficits that reliably co-occur with particular forms of expression of ‘social impairment’ should further our understanding of particular subtypes and of autism in general. An understanding of such patterns is likely to have implications for differential interventions and would, therefore, be highly relevant to establishing at least the predictive validity of any proposed subtypes. What evidence there is, for example, suggests that, despite having similar cognitive levels, children with Asperger syndrome spend fewer years in special education and have greater psychiatric morbidity than children with high-functioning autism (Green, 1990; Szatmari et al., 1989). Happé (1994) has argued that, while their ‘late acquired theory of mind working abnormally hard’ predisposes them to this greater risk for psychiatric disturbance, it also contributes to their better ‘social’ prognosis.

Despite reported conceptual similarities between Asperger syndrome and other disorders (such as non-verbal/right hemisphere learning disabilities, for example), Asperger syndrome is still currently considered as most appropriately classified within the autistic spectrum or pervasive developmental disorders (Pennington, 1991; Semrud-Clikeman and Hynd, 1990), with the social impairment acknowledged as primary. It is clearly important to consider disorders with shared primary impairments together rather than to separate them, and encouraging subtyping should not be seen as arguing against this. For example, while the neurological basis of autism has yet to be indentified, support for the view that the core deficit in the autistic spectrum disorders is in early social cognition has implicated limbic system mediation of social and emotional behaviour and probable secondary dysfunction at a neocortical level (Denckla, 1996).
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Although many alternative hypotheses have been suggested, it may well be the case that the primary deficit in both Asperger syndrome and autism does prove to be a basic limbic system defect. Even so, an understanding of differential deficits in higher-order cognitive functions, reflecting ‘only’ secondary problems in the neocortex, may still have important implications for the developmental course of the syndrome and for appropriate interventions and outcome.

The logic of grouping on the basis of primary symptoms (such as social impairment) is clear, and renewed interest in Wing and Gould’s (1979) ‘social interaction subtypes’ has led to recent attempts at their validation (Borden and Ollendick, 1994; Sevin et al., 1995; O’Brien, 1996; Waterhouse et al., 1996). On the other hand, the consensus of opinion seems to be, not that subgrouping on the basis of associated symptoms (such as cognitive profiles) is meaningless, but that it is only meaningful if it furthers our understanding of underlying deficits and has differential implications for management and prognosis (Bishop, 1989; Gillberg, 1992; Pennington, 1991; Tsai, 1992). Diagnostic criteria continue to be broad and non-specific and, although they can and do act as a useful synopsis of difficulties, greater understanding of the behavioural heterogeneities among individuals with autism is crucial to improving both clinical practice and research.

In identifying clear subtypes, we face the same difficulties that arose in the demarcation of autism from other disorders and that are inherent in all forms of diagnosis in the absence of objective diagnostic tests and knowledge of underlying causes. At our current stage of knowledge, there is surely a place for investigating both social interaction subtypes and the co-occurrence of features that might lead to these as different expressions of a core ‘social impairment’ and for appropriately integrating our findings. For the purposes of research and epidemiology, we must have clearly agreed definitions of diagnostic categories, sound methodology and clearly interpretable data. Research encouraging the use of multivariate statistical techniques that allow the classification of groups to be derived from the data itself rather than relying on group assignment by diagnostic criteria (Szatmari, 1992) needs to be carefully considered. Despite its apparent advantages, the derived classification can only be as valid as the population targeted and the variables selected for study.

For clinical purposes, we also need a good understanding of individual differences and of the validity of the interpretations we make on the basis of available research (for example, an appropriate understanding of statistically significant differences, of overlapping populations and the application of probabilities to individual cases). These issues are not new (Meehl, 1973) but frequently appear to be forgotten. They should not be: a recent
report to the National Institutes of Health (Bristol et al., 1996) shows that
diagnoses are still not being made consistently in clinical or research
settings and, without greater clarity at this stage and appropriate coordina-
tion of both clinical opinion and research findings, we are unlikely to
progress further in our knowledge base or in the planning of services for
the children affected.

Weller and Eysenck (1992) noted that 'replicable research results
allow us to distinguish between fact and opinion, and create a foundation
for sound clinical practice'. Clinical practice, however, cannot be sus-
pended until such a foundation has been laid. While syndrome validation
must remain at the forefront of our minds, the practical requirements of
any classification system should not be forgotten (Jablensky, 1988).
Ultimately, the 'purpose of classification is to help doctors carry out their
work' and 'any system of classification that proves useful to practising
doctors will become widely used' (Lewis and Mann, 1992). In the
experience of our own clinical service, the differentiation between autism
and Asperger syndrome has proved useful and merits continuing attempts
at refinement. Its usefulness has been corroborated by those receiving the
diagnosis, and their families and other professionals (Cox, 1991; Green,
1990), both in terms of a fuller understanding of the problems experi-
enced and in terms of greater empowerment to seek appropriate support
and minimize secondary problems.

Appendix: ICD-10 diagnostic criteria for childhood autism
and Asperger syndrome
Reprinted, with permission, from World Health Organization (1993)
International Classification of Diseases: Diagnostic Criteria for Research, 10th edn.
Geneva: WHO.

Diagnostic criteria for F84.0 childhood autism
A Abnormal or impaired development is evident before the age of 3 years
in at least one of the following areas:
   1 receptive or expressive language as used in social communication;
   2 the development of selective social attachments or of reciprocal
social interaction;
   3 functional or symbolic play.
B A total of at least six symptoms from 1, 2, and 3 must be present, with
at least two from 1 and at least one from each of 2 and 3:
   1 Qualitative abnormalities in reciprocal social interaction are mani-
fest in at least two of the following areas:
      (a) failure adequately to use eye-to-eye gaze, facial expression,
body posture and gesture to regulate social interaction;
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(b) failure to develop (in a manner appropriate to mental age and despite ample opportunities) peer relationships that involve a mutual sharing of interests, activities and emotions;

(c) lack of socio-emotional reciprocity as shown by an impaired or deviant response to other people’s emotions; or lack of modulation of behaviour according to social context; or a weak integration of social, emotional and communicative behaviours;

(d) lack of spontaneous seeking to share enjoyment, interests or achievements with other people (e.g. a lack of showing, bringing or pointing out to other people objects of interest to the individual).

2 Qualitative abnormalities in communication are manifest in at least one of the following areas:

(a) a delay in, or total lack of, development of spoken language that is not accompanied by an attempt to compensate through the use of gesture or mime as an alternative mode of communication (often preceded by a lack of communicative babbling);

(b) relative failure to initiate or sustain conversational interchange (at whatever level of language skills is present), in which there is reciprocal responsiveness to the communications of the other person;

(c) stereotyped and repetitive use of language or idiosyncratic use of words or phrases;

(d) lack of varied spontaneous make-believe or (when young) social imitative play.

3 Restricted, repetitive and stereotyped patterns of behaviour, interests and activities are manifest in at least one of the following areas:

(a) an encompassing preoccupation with one or more stereotyped and restricted patterns of interest that are abnormal in content or focus; or one or more interests that are abnormal in their intensity and circumscribed nature though not in their content or focus;

(b) apparently compulsive adherence to specific, non-functional routines or rituals;

(c) stereotyped and repetitive motor mannerisms that involve either hand or finger flapping or twisting, or complex whole body movements;

(d) preoccupations with part-objects or non-functional elements of play materials (such as their odour, the feel of their surface, or the noise or vibration that they generate).
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C The clinical picture is not attributable to the other varieties of pervasive developmental disorder: specific developmental disorder of receptive language (F80.2) with secondary socio-emotional problems; reactive attachment disorder (F94.1) or disinhibited attachment disorder (F94.2); mental retardation (F70–F72) with some associated emotional or behavioural disorder; schizophrenia (F20.–) of unusually early onset; and Rett's syndrome (F84.2).

Diagnostic criteria for F84.5 Asperger syndrome

A There is no clinically significant general delay in spoken or receptive language or cognitive development. Diagnosis requires that single words should have developed by 2 years of age or earlier and that communicative phrases be used by 3 years of age or earlier. Self-help skills, adaptive behaviour and curiosity about the environment during the first 3 years should be at a level consistent with normal intellectual development. However, motor milestones may be somewhat delayed and motor clumsiness is usual (although not a necessary diagnostic feature). Isolated special skills, often related to abnormal preoccupations, are common, but are not required for diagnosis.

B There are qualitative abnormalities in reciprocal social interaction (criteria as for autism).

C The individual exhibits an unusually intense, circumscribed interest or restricted, repetitive and stereotyped patterns of behaviour, interests and activities (criteria as for autism; however it would be less usual for these to include either motor mannerisms or preoccupations with parts-objects or non-functional elements of play materials).

D The disorder is not attributable to the other varieties of pervasive developmental disorder: simple schizophrenia (F20.6); schizotypal disorder (F21); obsessive-compulsive disorder (F42.–); anankastic personality disorder (F60.5); reactive and disinhibited attachment disorders of childhood (F94.1 and F94.2 respectively).

Acknowledgements

Thanks to Hilary Cass and Lindsay Isaacs for their helpful comments on this paper and to all the children and families at Harper House who continue to stimulate my interest and inform my thinking in relation to this differential diagnosis.

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