



Asperger syndrome: diagnosis and external validity

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Asperger syndrome (AS) is one of the pervasive developmental disorders (PDD) which is a family of congenital conditions characterized by marked social impairment, communication difficulties, play and imagination deficits, and a range of repetitive behaviors or interests [1]. The prototypical PDD is autism, which was first described by Leo Kanner at Johns Hopkins in 1943 [2]. Autism occurs in 1 out of every 1000 births [3], is a neurobiologic disorder with a strong genetic component (a 2%–5% recurrence rate in siblings, which is a 50 fold increase relative to the general population) [4], and some as yet tentative biologic markers involving brain structure (eg, some individuals may have larger brains) and brain function (eg, the typical brain specialization to recognize faces is not present) [5]. Approximately 70% of individuals with autism have a degree of mental retardation, and the typical cognitive profile includes great variability of skills (eg, usually higher level nonverbal problem-solving skills and lower level language and conceptual skills) [6]. Universally, there is a considerable discrepancy between a person's cognitive potential (ie, IQ) and their ability to meet the demands of everyday life (or adaptive skills) [7]. The diagnosis of autism is entirely behavioral and is made through clinical examination of a child's history and current presentation in the areas of social, communicative, and play/imagination behaviors [8]. In the past decade, there has been progress in research of the biologic origins of autism, particularly in the areas of genetics and brain function, but there is no biologic test as yet (eg, through blood analysis) to identify individuals with this condition [9].

In 1944, Hans Asperger, an Austrian pediatrician with an interest in special education, described four children who had difficulty integrating socially into groups [10]. Unaware of Kanner's description of early infantile autism published just the year before, Asperger called the condition he described "autistic psychopathy," indicating a stable personality disorder marked by social isolation.

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Despite preserved intellectual skills, the children showed marked paucity of nonverbal communication involving gestures and affective tone of voice, poor empathy and a tendency to intellectualize emotions, an inclination to engage in long-winded, one-sided, sometimes incoherent and rather formalistic speech (he called them “little professors”), all-absorbing interests involving unusual topics that dominated their conversation, and motoric clumsiness. Unlike Kanner’s patients, these children were not as withdrawn or aloof. They also developed, sometimes precociously, highly grammatic speech, and in fact could not be diagnosed in the first years of life. Discarding the possibility of a psychogenetic origin, Asperger highlighted the familial nature of the condition, and even hypothesized that the personality traits were primarily male-transmitted. Asperger’s work, originally published in German, became widely known to the English speaking world only in 1981, when Lorna Wing published a series of cases showing similar symptoms [11]. Her codification of the condition she called Asperger syndrome (AS) blurred somewhat the differences between Kanner’s and Asperger’s descriptions, as she included a small number of girls and mildly mentally retarded children, and some children who had presented with some language delays in their first years of life. Since then, several studies have attempted to validate Asperger syndrome as distinct from autism without mental retardation, although comparability of findings has been difficult because of the lack of consensual diagnostic criteria for the condition [12]. Although AS was first granted official recognition in ICD-10 [13], and appears as Asperger disorder in DSM-IV [1], its nosologic status is still uncertain.

Clinical features

The diagnosis of AS requires the demonstration of qualitative impairments in social interaction and restricted patterns of interest, criteria that are identical to autism. In contrast to autism, there are no criteria in the cluster of language and communication symptoms, and onset criteria differ in that there should be no clinically significant delay in language acquisition, cognitive, and self-help skills. Those symptoms result in significant impairment in social and occupational functioning [1].

In some contrast to the social presentation in autism, individuals with AS find themselves socially isolated but are not usually withdrawn in the presence of other people, typically approaching others but in an inappropriate or eccentric fashion. For example, they may engage the interlocutor, usually an adult, in one-sided conversation characterized by long-winded, pedantic speech about a favorite and often unusual and narrow topic. They may express interest in friendships and in meeting people, but their wishes are invariably thwarted by their awkward approaches and insensitivity to the other person’s feelings, intentions, and nonliteral and implied communications (eg, signs of boredom, haste to leave, and need for privacy). Chronically frustrated by their repeated failures to engage others and form friendships, some individuals with Asperger

syndrome develop symptoms of a mood disorder that may require treatment, including medication. They also may react inappropriately to or fail to interpret the valence of the context of the affective interaction, often conveying a sense of insensitivity, formality, or disregard for the other person's emotional expressions. They may be able to describe correctly, in a cognitive and often formalistic fashion, other people's emotions, expected intentions, and social conventions; however, they are unable to act on this knowledge in an intuitive and spontaneous fashion, thus losing the tempo of the interaction. Their poor intuition and lack of spontaneous adaptation are accompanied by marked reliance on formalistic rules of behavior and rigid social conventions. This presentation is largely responsible for the impression of social naiveté and behavioral rigidity that is so forcefully conveyed by these individuals [12].

Although significant abnormalities of speech are not typical of individuals with AS, there are at least three aspects of these individuals' communication patterns that are of clinical interest [14]. First, speech may be marked by poor prosody, although inflection and intonation may not be as rigid and monotonic as in autism. They often exhibit a constricted range of intonation patterns that is used with little regard to the communicative function of the utterance (assertions of fact, humorous remarks). Rate of speech may be unusual (eg, too fast) or may lack in fluency (eg, jerky speech), and often there is poor modulation of volume (eg, voice is too loud despite physical proximity to the conversational partner). The latter feature may be particularly noticeable in the context of a lack of adjustment to the given social setting (eg, in a library, in a noisy crowd). Second, speech often may be tangential and circumstantial, conveying a sense of looseness of associations and incoherence. Even though in a small number of cases this symptom may be an indicator of a possible thought disorder, the lack of contingency in speech is a result of the one-sided, egocentric conversational style (eg, unrelenting monologues about the names, codes, and attributes of innumerable TV stations in the country), failure to provide the background for comments and to clearly demarcate changes in topic, and failure to suppress the vocal output accompanying internal thoughts. Third, the communication style of individuals with AS is often characterized by marked verbosity. The child or adult may talk incessantly, usually about a favorite subject, often in complete disregard as to whether the listener might be interested, engaged, or attempting to interject a comment, or change the subject of conversation. Despite such long-winded monologues, the individual may never come to a point or conclusion. Attempts by the interlocutor to elaborate on issues of content or logic, or to shift the interchange to related topics, are often unsuccessful.

Individuals with AS typically amass a large amount of factual information about a topic in an intense fashion [12]. The actual topic may change from time to time, but often dominates the content of social exchange. Frequently the entire family may be immersed in the subject for long periods of time. This behavior is peculiar in the sense that oftentimes extraordinary amounts of factual information are learned about very circumscribed topics (eg, snakes, names of stars, TV guides, deep fat fryers, weather information, personal information on members of

congress) without a genuine understanding of the broader phenomena involved. This symptom may not always be easily recognized in childhood because strong interests in certain topics, such as dinosaurs or fashionable fictional characters, are ubiquitous. In younger and older children, however, typically the special interests interfere with learning in general because they absorb so much of the child's attention and motivation, and also interfere with the child's ability to engage in more reciprocal forms of conversation with others.

Individuals with AS may have a history of delayed acquisition of motor skills, such as pedaling a bike, catching a ball, opening jars, and climbing outdoor play equipment. They are often visibly awkward and poorly coordinated and may exhibit stilted or bouncy gait patterns and odd posture. Neuropsychologically there may be a pattern of relative strengths in auditory and verbal skills and rote learning, and significant deficits in visual-motor and visual-perceptual skills and conceptual learning [15]. Many children exhibit high levels of activity in early childhood, and the commonest reported comorbid symptoms in adolescence and young adulthood are anxiety and particularly depression [16] (see also Towbin, this issue).

Clinical assessment

AS, like the other pervasive developmental disorders, involves delays and deviant patterns of behavior in multiple areas of functioning. To thoroughly evaluate all relevant domains, different areas of expertise, including overall developmental functioning, neuropsychologic features, and behavioral status are required. Hence the clinical assessment of individuals with this disorder is most effectively conducted by an experienced interdisciplinary team. In most cases, a comprehensive interdisciplinary assessment involves the following components: a thorough developmental and health history, psychological and communication assessments, and a diagnostic examination including differential diagnosis [17]. Further consultation regarding behavioral management, motor disabilities, possible neurologic concerns, psychopharmacology, and assessment related to advanced studies or vocational training also may be needed. Given the prevailing difficulties in the definition of AS and the great heterogeneity of the condition, it is crucial that the aim of the clinical assessment be a comprehensive and detailed profile of the individual's assets, deficits, and challenges, rather than simply a diagnostic label. Effective educational and treatment programs can only be devised on the basis of such a profile, given the need to address specific deficits while capitalizing on the person's various resources and strengths.

The psychologic assessment aims at establishing the overall level of intellectual functioning, profiles of psychomotor functioning, verbal and nonverbal cognitive strengths and weaknesses, style of learning, and independent living skills. At a minimum, the psychologic assessment should include assessments of intelligence and adaptive functioning, although the assessment of more detailed neuropsychologic skills can be of great help to further delineate the child's

profiles of strengths and deficits (eg, organizational skills). A description of results should include not only quantified information but also a judgment as to how representative the child's performance was during the assessment procedure and a description of the conditions that are likely to foster optimal and diminished performance. For example, the child's responses to the amount of structure imposed by the adult, the optimal pace for presentation of tasks, successful strategies to facilitate learning from modeling and demonstrations, effective ways of containing off-task and maladaptive behaviors such as cognitive and behavioral rigidity (eg, perseverations, perfectionism, ritualized behavior), distractibility (eg, difficulty inhibiting irrelevant responses, tangentiality), and anxiety are all important observations that can be extremely useful for designing an appropriate intervention program. Within the psychological assessment, particular attention should be placed on adaptive functioning, which refers to capacities for personal and social self-sufficiency in real-life situations. The importance of this component of the clinical assessment cannot be overemphasized. Its aim is to obtain a measure of the child's typical patterns of functioning in familiar and representative environments such as the home and school that may contrast markedly with the demonstrated level of performance and presentation in the clinic. It provides the clinician with an essential indicator of the extent to which the child is able to use his or her potential (as measured in the assessment) in the process of adaptation to environmental demands. A large discrepancy between intellectual level and adaptive level signifies that a priority should be made of instruction within the context of naturally occurring situations to foster and facilitate the use of skills to enhance quality of life.

The communication assessment should examine nonverbal forms of communication (eg, gaze, gestures), nonliteral language (eg, metaphor, irony, absurdities, and humor), suprasegmental aspects of speech (eg, patterns of inflection, stress and volume modulation), pragmatics (eg, turn-taking, sensitivity to cues provided by the interlocutor), and content, coherence, and contingency of conversation. Particular attention should be given to perseveration on circumscribed topics, metalinguistic skills (eg, understanding of the language of mental states including intentions, emotions, and beliefs), reciprocity, and rules of conversation.

The diagnostic assessment should integrate information obtained in all components of the comprehensive evaluation, with a special emphasis on developmental history and current symptomatology. It should include observations of the child during more and less structured periods. This effort should take advantage of observations in all settings, including the clinic's reception area (eg, contacts with other children or with family members), the halls (eg, how the child interacts initially with the examiners), and in the testing room during breaks, periods of silence, or otherwise unstructured situations. Often the child's disability is much more apparent during such periods in which the child is not given any instruction and has no adult-imposed expectation as to how to behave. Specific areas for observation and inquiry include the patient's patterns of special interest and leisure time, social and affective presentation, quality of attachment to family members, development of peer relationships and friendships, capacities for self-

awareness, perspective-taking and level of insight into social and behavioral problems, typical reactions in novel situations, and ability to intuit other person's feelings and infer other person's intentions and beliefs. Problem behaviors that are likely to interfere with remedial programming should be noted (eg, anxiety, temper tantrums). The children's ability to understand ambiguous nonliteral communications (particularly teasing and sarcasm) should be further examined, particularly in regard to the child's patterns of response (eg, misunderstandings of such communications may elicit aggressive behaviors). Other areas of observation involve the presence of obsessions or compulsions, ritualized behaviors, depression and panic attacks, integrity of thought, and reality testing.

Treatment

As in autism, treatment of AS is essentially supportive and symptomatic, and to a great extent, overlaps with the treatment guidelines applicable to individuals with autism unaccompanied by mental retardation [18]. One initial difficulty encountered by families is proving eligibility for special services. As individuals with AS are often verbal and some of them do well academically (at least in some areas), educational authorities might judge that the deficits—primarily social and communicative—are not within the scope of educational intervention. In fact, these two aspects should be the core of any educational intervention and curriculum for individuals with this condition. With regard to learning strategies, skills, concepts, appropriate procedures, cognitive strategies, and behavioral norms may be more effectively taught in an explicit and rote fashion using a parts-to-whole verbal instruction approach, where the verbal steps are in the correct sequence for the behavior to be effective. Additional guidelines should be derived from the individual's neuropsychologic profile of assets and deficits. The acquisition of self-sufficiency skills in all areas of functioning should be a priority. The tendency of individuals with AS to rely on rigid rules and routines can be used to foster positive habits and enhance the person's quality of life and that of family members. Specific problem-solving strategies, usually following a verbal algorithm, may be taught for handling the requirements of frequently occurring, troublesome situations (eg, involving novelty, intense social demands, or frustration). Training is usually necessary for recognizing situations as troublesome and for selecting the best available learned strategy to use in such situations. Social and communication skills are best taught by a communication specialist with an interest in pragmatics in speech in the context of individual and small group therapy. Communication therapy should include appropriate non-verbal behaviors (eg, the use of gaze for social interaction, monitoring and patterning of inflection of voice), verbal decoding of nonverbal behaviors of others, social awareness, perspective-taking skills, and correct interpretation of ambiguous communications (eg, nonliteral language). Often, adults with AS fail to meet entry requirements for jobs in their area of training (eg, college degree) or fail to maintain a job because of their poor interview skills, social disabilities,

eccentricities, or anxiety attacks. It is important, therefore, that they are trained for and placed in jobs for which they are not neuropsychologically impaired, and in which they will enjoy a certain degree of support and shelter. It is also preferable that the job does not involve intensive social demands, time pressure, or the need to quickly improvise or generate solutions to novel situations. The little experience available with self-support groups suggests that individuals with AS enjoy the opportunity to meet others with similar problems and may develop relationships around an activity or subject of shared interest. Special interests may be used as a way of creating social opportunities through hobby groups. Supportive psychotherapy and pharmacologic interventions may be helpful in dealing with feelings of despondency, frustration, and anxiety, although a more direct, problem-solving focus is believed to be more beneficial than an insight-oriented approach.

External validity

Although AS was first described more than 50 years ago [10], it was not until 1994 that it was included in DSM-IV [1] as one of the PDDs. Inclusion in the DSM-IV followed limited evidence that it could be differentiated from autism unaccompanied by mental retardation, or higher functioning autism (HFA) [19]. As noted, however, its nosologic status remains unclear, in part because of the adoption of varying diagnostic schemes in the research literature [12]. Although the advent of the DSM-IV definition was intended to create a consensual diagnostic starting point for research, it has been consistently criticized as overly narrow [20,21], rendering the diagnostic assignment of AS improbable or even “virtually impossible” [22,23].

The introduction of AS in DSM-IV and ICD-10 [24] was prompted by the recognition that autism is a clinically heterogeneous disorder and that the characterization of subtypes of PDD might help behavioral and biologic research by allowing the identification of clinically more homogeneous groups [25–27]. Although this effort has been successful for some PDD conditions (eg, Rett syndrome) [28], it has not been the case in AS. Published reports have modified DSM-IV or ICD-10 criteria [15,29], treated AS and HFA interchangeably [16,17,30,31], or used unique investigator-defined criteria [32], making it difficult to compare studies. Only two studies [33,34] have systematically compared different diagnostic schemes. These two studies generally revealed that different nosologic schemes result in the assignment of different diagnoses to the same patients, raising the important issue of how to compare studies using different definitions of AS. These studies, however, did not consider the question of the usefulness of a given diagnostic concept relative to important predictions that may have practical value to research (eg, differences in neuropsychologic or neurobiologic findings between AS and HFA), or clinical practice (eg, differences in treatment efficacy, comorbid symptomatology, or outcome as a function of the given diagnostic assignment) [35]. To summarize, the state of discussions on the

nosologic status of AS is, therefore, extremely problematic, given that studies cannot be necessarily compared because of the adoption of different diagnostic definitions, and there has been no comparison across different diagnostic schemes with regard to the relative usefulness of each of the schemes. And yet, the absence of a consensual or validated definition has not deterred the upsurge of research publications on the syndrome nor the apparently marked increase in the use of the diagnosis in clinical and educational settings [36].

It is apparent from this brief discussion of the external validity of AS that studies comparing the usefulness of different diagnostic schemes is badly needed. This agenda for research is needed for several reasons. First, there is a need to gauge the extent to which available research data obtained using different diagnostic systems are comparable. Second, despite the upsurge in research and clinical interest in AS, the absence of a validated definition prevents the development of standardized instrumentation that could enhance reliability of diagnostic assignment and make possible cross-site collaborations that are essential to behavioral and biological research. Third, there are indications that the DSM-IV definition is being ignored in clinical practice [23], with the term being used as synonymous to higher functioning autism (HFA) (ie, autism unaccompanied by mental retardation) or, maybe even more commonly, to PDD-NOS [12], creating a rift between DSM-IV and research and clinical practice, thus confusing and alienating investigators, clinicians, and parents alike. And fourth, the scientifically interesting question as to whether or not there are qualitative discontinuities among the PDDs, or alternatively, whether the PDDs should be considered along a dimensional continuum (and what this dimension should be) is left unresolved without some resolution of the validity of the AS diagnosis.

Several lines of research could serve the purpose of assessing the usefulness of different diagnostic schemes. First, learning profiles of assets and deficits are of great importance in educational treatment planning for individuals with PDDs [6], particularly in individuals with normative IQs [17]. Neuropsychologic research of AS is extremely equivocal to date. In 1995, the authors' group [15] documented considerable differences between individuals with HFA and AS. Specifically, individuals with AS showed a profile of assets and deficits consistent with a nonverbal learning disability (NLD) [37]. NLD is characterized by strengths in verbally mediated skills (eg, vocabulary, rote knowledge, verbal memory, verbal output) and deficits in nonverbal skills (eg, visual–spatial problem solving, visual–motor coordination). Individuals with HFA exhibited the opposite profile. Such “double dissociation” has been shown to be one of the most powerful external validators of specific subtypes of syndromes [38]. These findings have been supported by several studies focused on IQ profiles [39–41], although several other studies have failed to replicate them [42,43]. As noted, however, direct comparison across studies is not possible because different diagnostic schemes were used in them.

A second potential area of validation research in AS could use patterns of comorbidity. Research on the psychiatric difficulties associated with the PDDs is of great importance for treatment planning, given that these symptoms may have

the potential for being extremely debilitating (eg, limiting the effectiveness of educational interventions and posing further limitations on the individual's ability to use his or her internal coping resources). Documentation of these difficulties can lead to psychopharmacologic approaches that can greatly alleviate such symptoms, thus making the student more available to other forms of intervention (eg, educational [see Towbin, this issue]). AS has been associated with a host of comorbid conditions, including schizophrenia [44,45], Tourette syndrome [46], and attentional, affective, and obsessional disorders [47,48]. More recent research has emphasized anxiety, mood, and obsessional disorders to be particularly prevalent in this population [49,50]. As stated previously, however, there has been no attempt to study patterns of comorbidity that may be specific to HFA and AS, with most studies using the two diagnoses interchangeably.

A third potential line of research for external validation studies of AS relates to the aggregation of social and other psychiatric disorders in family relatives. Research into patterns of genetic liability associated with the PDDs has been one of the most active areas of investigation in autism and related conditions [4]. Studies have consistently shown higher rates of social disabilities or difficulties in family members of individuals with autism [51,52], and of other psychiatric symptoms including anxiety, mood, and obsessional disorders [53,54]. None of these studies, however, has made the attempt to assess the usefulness of separating families of probands with HFA from those of probands with AS. The available data on the familiarity of AS are essentially limited to a handful of case reports and some preliminary studies [55,56]. Many case reports have been consistent with Asperger's original observation [10] of similar traits in family members, particularly fathers or male relatives [57–59]. Whether or not variants of autism such as AS might reflect greater or lower genetic liability could be of great significance in elucidating mechanisms involved in producing the marked heterogeneity among PDDs. Such studies, however, cannot be conducted without standardized diagnostic procedures, which, in turn, depend on some initial consensus as to the criteria for the definition of AS.

To avoid insularity among research groups (ie, each one adopting its own diagnostic scheme) and to advance the field from its current stalemate, one approach might be to simultaneously compare different diagnostic schemes and assess each one on the basis of independent factors of clinical or research significance. Such research is not yet available.

Future directions for research and clinical service

The current state of affairs in nosologic research of AS, with little available evidence to point to a distinction between this concept and HFA, PDD-NOS, and other similar diagnostic entities [12], has prompted many investigators to derive premature conclusions. For example, some have treated AS as different from other conditions, whereas others have treated it as the same as other conditions. The more typical approach is to see AS within the spectrum of

PDDs, maybe indicating some half point between autism and normalcy. The authors' discussion suggests that either position is unwarranted at present. Those who view AS as different from other disorders have the onus to document in what ways AS is unique among the social disabilities. This task requires comparison of extant diagnostic schemes. Those who view AS as within the spectrum of social disabilities have the onus to define what this spectrum consists of. This task requires isolation of specific psychologic (eg, IQ, language functions, metacognitive skills) or neurobiologic (eg, genetic liabilities, neurostructure, or neurofunction findings) that can quantify the social disability spectrum and predict social outcome. Both of these programmatic research areas are still in their incipience.

It is nevertheless crucial to separate this research discussion from the areas of clinical practice and provision of services dedicated to individuals with AS and their families. The unavoidable confusion conveyed to parents and advocates inherent in the fragility of the validity status of AS is sufficiently harmful to justify a concerted effort on the part of clinicians and advocates to adhere to some unequivocal principles so that the needs of their clients are properly addressed. First, whether or not there is controversy over the fine-grained distinctions between AS and other conditions, and despite some literature and great media coverage over some famous individuals exhibiting or not exhibiting this condition, the vast majority of children, adolescents, and adults with AS require a comprehensive package of treatments. Equivocating about these individuals' needs on the basis of the poor scientific status of the diagnostic concept is unjustified. Second, adequate educational programs should not be based on a diagnostic label and generalizations associated with it, but on individualized profiles of assets and deficits that can be accomplished only through thorough evaluations involving psychologic, communication, and psychiatric assessments. And third, the notion that AS is simply a "milder" form of autism, regardless of whether or not this statement is scientifically justified, should be well contextualized in that, whereas "mild" is a term comparing individuals with this condition with those with prototypical autism and a degree of mental retardation, it is certainly not "mild" when considering these individuals' great difficulties in meeting the demands of everyday life. In other words, eligibility for services should be fiercely advocated. Treatment should focus on those areas of greatest challenges, those that are known to deleteriously impact on these individuals' capacity for independent living, vocational satisfaction, and better social adjustment. These include socialization skills in general (eg, social reciprocity and social communication), adaptive skills (eg, "street smarts," how to function in the community, how to fend for oneself in potentially inhospitable environments), organizational skills (eg, how to perform complex tasks and anticipate problems), a cognitive-behavioral, and sometimes psychopharmacologic plan to alleviate anxiety and depression when these emerge, and sympathetic mental health and educational professionals who strive to build on these individuals' unique assets to compensate for their deficits and to create more positive social experiences.

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