

REVIEW ARTICLE

The Investigation and Differential Diagnosis of Asperger Syndrome in Adults

Fritz-Georg Lehnhardt, Astrid Gawronski, Kathleen Pfeiffer, Hanna Kockler, Leonhard Schillbach, and Kai Vogeley

SUMMARY

Background: As a result of the increased public interest in autism spectrum disorders (ASD), certain core manifestations of ASD—impaired social interaction and communication, bizarre interests—are now commonly recognized as being typical of autism, not only in children, but in adults as well. More often than before, general practitioners, neurologists, and psychiatrists find themselves being asked whether a patient is suffering from previously unrecognized Asperger syndrome (AS). The prevalence of ASD is estimated at 1%, and the ratio of diagnosed to undiagnosed cases at about 3:2. Little is known about the diagnostic evaluation of AS in adulthood.

Methods: We selectively searched the Medline database for pertinent literature, paying special attention to diagnostic manuals and to the guideline of the United Kingdom's National Institute for Health and Care Excellence (NICE).

Results: Centrally important aspects of the diagnosis of AS include an assessment of the patient's ability to assume the emotional perspectives of others, non-verbal modes of expression, repetitive behavior patterns, and childhood social behavioral history. The autism quotient (AQ) is now established as a simple but nonspecific screening test. Up to 70% of all affected adults have comorbid disturbances, most often depression and anxiety disorders. The differential diagnosis includes personality disorders, anxiety disorders, obsessive-compulsive disorder, and attention deficit-hyperactivity disorder. The diagnostic assessment should proceed in stepwise fashion, starting from simple screening in primary care and then moving on to evaluation of the suspected diagnosis by a mental health care specialist, followed by extensive further investigation in an outpatient clinic specifically devoted to patients with autism spectrum disorders.

Conclusion: The diagnostic assessment of autism in adults requires knowledge of the core and accompanying manifestations of autism and of their differential diagnoses. More research is needed for the development of further screening tests and the precise determination of diagnosis rates, differential diagnoses, and comorbidities.

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Scientific and public interest in the autism spectrum disorders (ASD) has risen greatly over the last 20 years. According to the most recent epidemiological studies, the prevalence of ASD has climbed to about 1% and is thus comparable to that of schizophrenia (1). One reason for the increasing prevalence is thought to be the inclusion of “milder” disturbances within the autism spectrum, above all Asperger syndrome (AS) and high-functioning autism (HFA).

The findings of a recent population-based study imply that, for every three cases of ASD that are diagnosed in children of primary-school age, two more cases remain unrecognized (2). Other studies have shown that many affected persons probably reach adulthood without having had an age-specific condition diagnosed in childhood or adolescence (3, 4). Because of the increased interest in ASD, these persons' persistent problems of social adaptation, eccentric behavioral traits, and “strange” interests are increasingly perceived as “autistic” by the affected individuals themselves, their families, and their treating physicians and therapists. Thus, psychiatrists, neurologists, and general practitioners in primary care are now being asked more often than before to determine whether a patient is suffering from a hitherto unrecognized ASD. These physicians need to know the relevant differential-diagnostic considerations and how the diagnostic assessment ought to proceed. It should be borne in mind that every second person receiving a late diagnosis of ASD suffers from a comorbid anxiety disorder or depression, and that half of all persons with ASD are unemployed and have a low socioeconomic status despite high educational attainments (5, 6). Psychotherapeutic and social-psychiatric interventions can only provide effective help in such cases if the patient's autistic background is recognized (4).

In comparison to the longstanding clinical expertise in the treatment of children and adolescents with ASD (7), relatively little is known about these disorders in adult medicine. The special outpatient clinics for ASD in adulthood that were only recently introduced are still too few in number to keep up with the increasing demand for diagnostic evaluation (8, 9). This evaluation must be rational and (cost-) efficient in order to lessen the waiting time till a secure diagnosis can be made (which is now generally several months long) and to enable timely initiation of the appropriate behavioral and social-therapeutic measures (10).

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BOX 1

Diagnostic criteria for Asperger syndrome in the Adult Asperger Assessment (AAA) (13)*

- **A. Qualitative impairment of social interaction (at least 3 of 5 areas):**
 - marked impairment in the use of multiple nonverbal behaviors
 - failure to develop peer relationships
 - no interest in pleasing others or in communicating his/her experience to others
 - lack of social or emotional reciprocity
 - difficulty in understanding social situations and other people’s thoughts and feelings
- **B. Restricted, repetitive, and stereotyped patterns of behavior and interests (at least 3 of 5 areas):**
 - encompassing preoccupation with stereotyped and restricted patterns of behavior
 - apparently inflexible adherence to specific, nonfunctional routines or rituals
 - stereotyped and repetitive mannerisms
 - persistent preoccupation with parts of objects/systems
 - tendency to think of issues as black or white rather than consider multiple perspectives flexibly
- **C. Qualitative impairments of verbal and non-verbal communication (at least 3 of 5 areas):**
 - tendency to turn any conversation back onto self or own topic of interest
 - marked impairment in the ability to initiate or sustain a conversation
 - pedantic style of speaking or inclusion of too much detail
 - inability to recognize whether the listener is interested or bored
 - tendency to say things without considering their emotional impact on the listener (faux pas)
- **D. Impairments of imagination (at least 1 of 3 areas):**
 - lack of varied, spontaneous make-believe play (e.g. play games with children that involve pretending)
 - inability to tell, write, or generate a story
 - lack of interest in fiction, or interest restricted to its possible basis in fact (science fiction, history, film-making technique)
- **E. Prerequisites (all areas):**
 - delays or abnormal functioning in each of A–D across development, including childhood
 - resulting impairment in social, occupational, or other important areas of functioning
 - there is no clinically significant general delay in language development and no clinically significant delay in cognitive development
 - criteria are not met for another specific pervasive developmental disorder or schizophrenia

* modified in accordance with the German translation (AAA-D) by Christine M. Freitag und K. Leistschneider (child and adolescent psychiatry, Universitätsklinikum Frankfurt)

TABLE 1

Psychopathology associated with autism spectrum disorders (ASD)*

Area	Manifestations	Frequency	Source
Sensation	Hyper-/hyporeactivity to sensory stimuli , e.g., heightened perception of details, aversion to tactile stimulation or other external stimuli such as odor, temperature, pain	45–95 %	Crane et al. (2009) (e12), Ben-Sasson et al. (2009) (e13)
Sleep	Sleep disturbances with abnormal sleep architecture, e.g., increased REM sleep	30–88 %	Godbout et al. (2000) (e14), Allik et al. (2006) (e15)
Attention	Impaired attention and concentration, possibly as manifestations of comorbid ADHD	30–68 %	Yoshida et al. (2004) (e16), Lugnegård et al. (2011) (5)
Motor function	Motor clumsiness, mannerisms, motor tics / Gilles de la Tourette syndrome	11–20 %	Canitano et al. (2007) (e17), Jeste (2011) (e18)
Perception	Hallucinations and delusional convictions, usually as transitory psychotic manifestations	6–15 %	Hofvander et al. (2009) (6), Skokauskas et al. (2010) (e19)
Eating behavior	Bizarre eating rituals, restrictive eating behavior ranging to anorexia nervosa	3–6 %	Zucker et al. (2007) (e20), Hofvander et al. (2009) (6)
Emotion	Impaired emotional regulation , aggressive (including auto-aggressive) behavior ranging to delinquency	0–10 %	Anckarsäter et al. (2006) (e21), Newman et al. (2008) (e22)

*The frequency figures relate to the entities in boldface type; ADHD, attention deficit–hyperactivity disorder

Learning objectives

Our goals in writing this article are to:

- inform physicians about the psychopathological features of the core and accompanying manifestations of autism and their differential diagnoses,
- point out the special features of persons who receive a late diagnosis of ASD, and
- describe the process of outpatient diagnostic evaluation.

Methods

We selectively searched the PubMed database for relevant original articles and reviews, using the following search terms: “Asperger” OR “high-functioning autism” AND “adult*” AND “diagnosis [Title/Abstract]” (133 hits); “autism spectrum disorder” AND “adult*” AND “differential diagnosis” [Title/Abstract] (37 hits). Further sources for this article are the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV TR) (11), the ICD-10 Classification of Mental and Behavioural Disorders (ICD-10) (12), the pertinent guideline published in June 2012 by the National Institute for Health and Clinical Excellence of the United Kingdom (NICE, guidance.nice.org.uk/cg142) (4), and the authors’ personal experience in a special outpatient clinic for ASD in adulthood.

Core and accompanying manifestations of autism

The diagnostic criteria for AS in adulthood (ICD-10: F84.5, DSM-IV 299.80), as operationalized in the Adult Asperger Assessment (AAA) scheme (13), are summarized in *Box 1*. The three areas of core manifestations of autism are described in detail below.

Disturbance of social interaction

The main feature is a lack of intuitive understanding of the rules of interpersonal relations. From early childhood on, the affected person stands out as socially isolated with little interest in initiating or maintaining friendships, particularly with age peers. The existing types of social contact may be eccentric or highly self-centered. Family members often perceive the affected person as cool and selfish, but also as highly reliable, honest, and free of cultural or sexist prejudice (14). There are marked difficulties in the appropriate assessment of the context of social situations (“weak central coherence”) and in the assumption of other people’s emotional perspectives—i.e., empathy, which is the ability to recognize other people’s feelings, intentions, and attitudes, to create an image of them in one’s own thoughts and emotions, and to feel them vicariously. Another way to characterize this is as an impaired ability to “mentalize,” or, as it has also been called, an impaired “theory of mind” (15, 16).

Impaired communication

There is a marked impairment in the perception, interpretation, and implementation of mutually modulated, context-driven nonverbal communication, e.g., facial

TABLE 2

Identification of a possible autistic disorder requiring further assessment* (4)

(A) Abnormalities in at least one area	
Social interaction	“Lone wolf” since childhood
	Lack of empathy and intuition in social relationships
	Marked self-centeredness in thought and behavior
Communication	Lack of eye contact, limited facial expression/gesticulation
	Bizarre melody of speech
	Incomprehension of implicit requests
Interests and rituals	Intense preoccupation with circumscribed areas of knowledge
	Passionate collecting without any social context
	Insistence on unusual habits
(B) Psychosocial effects in at least one area	
Persistent difficulties in vocational training and on the job	
Difficulty initiating and maintaining friendships	
Prior or current consultation for mental problems or specific developmental disorder	
History of neurodevelopmental condition (e.g. learning disability and ADHD) or mental illness (e.g., depression, anxiety disorder, schizophrenia, obsessive-compulsive disorder)	

* Modified according to the NICE guideline (2012); ADHD, attention deficit–hyperactivity disorder

expressions, prosody, body posture, and gesticulation. Eye contact may be noticeably elusive, or, alternatively, fixed, without being used for communicative purposes. Despite possessing highly developed language skills in terms of grammar and vocabulary, the affected person lacks understanding of social-pragmatic content (e.g., implicit requests, set phrases) and semantic content (e.g., irony, metaphor), so that communication tends to be highly formalistic.

Limited interests and repetitive behavior patterns

The affected person’s interests and activities are characterized by intense involvement in highly circumscribed areas (e.g., the collection and cataloguing of specific types of information), interest in rule systems and structures (e.g., language syntax or tables), and a lack of social context. Limited cognitive flexibility can manifest itself in unusual devotion to orderliness and in the introduction of rituals into everyday life that must be rigidly adhered to; when these rituals are interrupted, anxiety arises.

The common accompanying psychopathological manifestations of ASD include sensory and motor abnormalities, regulatory disturbances of attention and emotion, transient psychotic manifestations, and abnormal eating behavior (*Table 1*). In some cases, these accompanying manifestations actually dominate the clinical picture, compounding the difficulties in differential diagnosis that are described below.

TABLE 3

Synopsis of the diagnostic assessment of Asperger syndrome (AS) in adults

Screening instruments	
Self-assessment	AQ, AQ-10, EQ, SQ-R, TAS-20 (alexithymia)
Non-self-assessment	MBAS, SCQ
Comorbidities and differential diagnoses	BDI (depression), CAARS (ADHD), SPAI (social anxiety disorders), FPI-R or AMPS (personality disorders), PD scale (schizophrenia-like personality disorders), Y-BOCS (obsessive-compulsive disorder), and others
Operationalized clinical diagnosis	
Clinical diagnostic criteria	ICD-10 (12), DSM-IV (11), Gillberg (2002) (e23), Klin (2003) (e24), DSM-5 (as of May 2013)
Structured diagnostic interviews	AAA, ADI-R (history from parents)
Structured behavior observation	ADOS (module 4)
Longitudinal analysis	
History from persons other than the patient	parent interview (oriented to SCQ or ADI-R)
Documentation by persons other than the patient	primary school report cards, reports of school psychologists, prior hospital discharge summaries
Additional diagnostic testing (as needed)	
Neuropsychology	general intelligence (e.g., WIE, MWTB), social cognition (e.g., eyes task, MASC, FEFA), executive functions (e.g., WCST, TMT, COWAT, Stroop test), attention (e.g., TAP, CPT)
Somatic tests	brain imaging (MRI), EEG (epilepsy), chromosomal analysis (e.g., in congenital dysmorphisms)

AQ, Autism Quotient; EQ, Empathy Quotient; SQ-R, Systematization Quotient—Revised; TAS, Toronto Alexithymia Scale; MBAS, Marburg Rating Scale for Asperger Syndrome; SCQ, Social Communication Questionnaire; BDI, Beck Depression Inventory; CAARS, Conners' Adult ADHD Rating Scales; SPAI, Social Phobia and Anxiety Inventory; FPI-R, Freiburger Persönlichkeitsinventar Revidiert (Freiburg Personality Inventory, Revised); AMPS, Aachener integrierte Merkmalsliste zur Erfassung von Persönlichkeitsstörungen (Aachen List of Items for the Registration of Personality Disorders); PD-S, Paranoid-Depressivitäts-Skala (Paranoid Depression Scale); Y-BOCS, Yale-Brown Obsessive-Compulsive Rating Scale; AAA, Adult Asperger Assessment; ADI-R, Autism Diagnostic Interview—Revised; ADOS, Autism Diagnostic Observation Scale; WIE, Wechsler Intelligence Test; MWTB, Mehrfachwahl-Wortschatz-Intelligenz-Test (Multiple Choice Vocabulary and Intelligence Test); MASC, Movie for the Assessment of Social Cognition; FEFA, Frankfurter Test zum Erkennen von fazialem Affekt (Frankfurt Test of Facial Affect Recognition); WCST, Wisconsin Card Sorting Test; TMT, Trail Making Test; COWAT, Controlled Oral Word Association Test; TAP, Testbatterie Aufmerksamkeitsprüfung (Attention Test Battery); CPT, Continuous Performance Test

Differentiation within the autism spectrum

Asperger syndrome (AS) differs from early-childhood autism (ICD-10 F84.0, DSM-IV 299.0) by a lack of cognitive developmental delay in the first years of life. In HFA, language development is delayed, but intelligence is normal (IQ >70) (11, 12). By the time the affected persons reach adulthood, reliable information about putative developmental delays in early childhood can generally no longer be obtained. As there is thus no reliable way to distinguish AS and HFA in adulthood by either clinical or neuropsychological criteria, the two designations are commonly used interchangeably (17). It is worth noting

that the latest edition of the Diagnostic and Statistical Manual of Mental Disorders (the DSM-5) puts early childhood autism, HFA, and AS together under the designation ASD, differentiating among them only with respect to the severity of manifestations in the individual case. Moreover, the DSM-5 introduces sensory hyper- or hyporeactivity as a new diagnostic criterion for ASD (www.dsm5.org) (18).

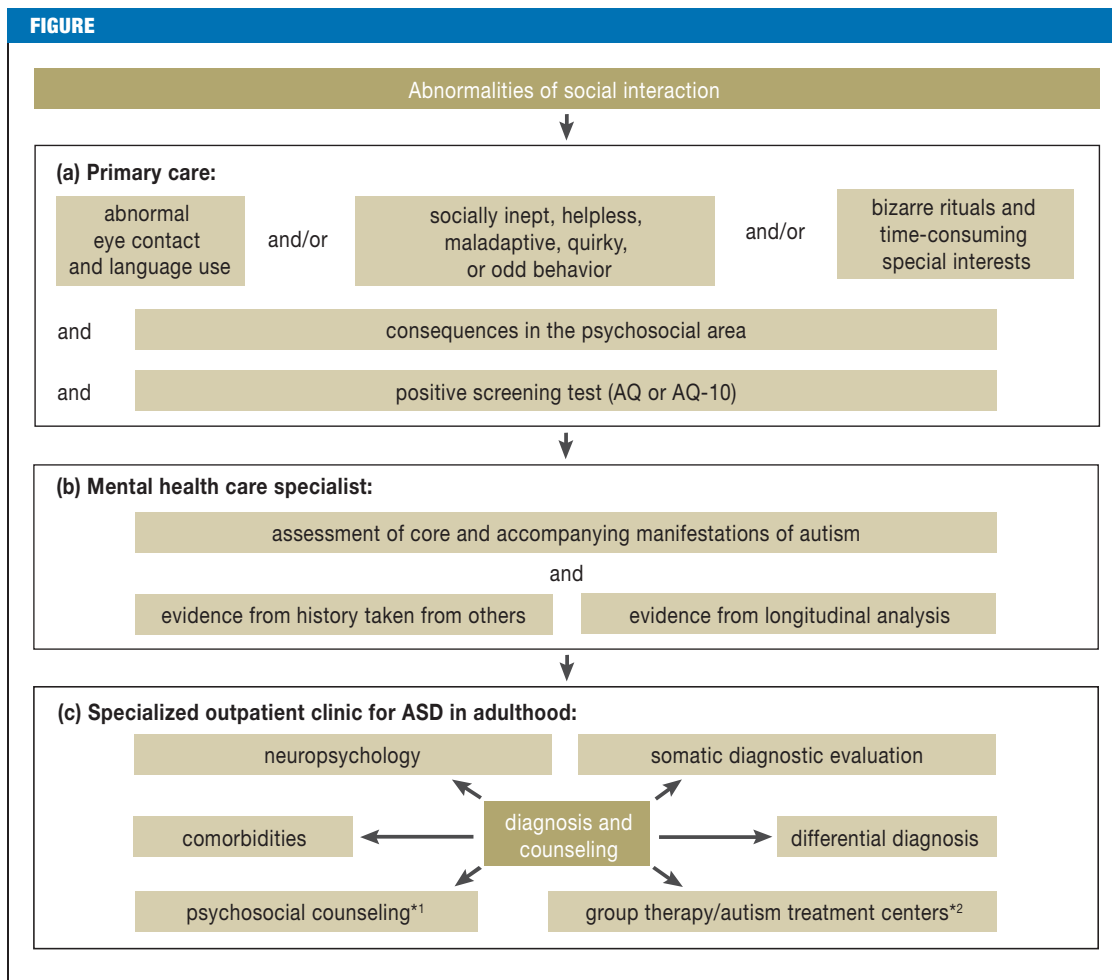
Particularities of patients with a late diagnosis of Asperger syndrome

In the author's specialized outpatient clinic for ASD in adulthood, 90% of the patients referred with a late diagnosis of ASD meet the clinical criteria for AS (19). A possible reason for the delay in the diagnosis of AS, aside from the relatively "mild" manifestations of autism in this disorder, may be found in the affected persons' highly effective social and cognitive compensation. They are usually of high-average or above-average intelligence and can often cover up their deficits of social communication and interaction to some extent by means of cognitive learning processes, with the development and formulaic "overlearning" of explicit situational rules ("model learning") (20, 21). Affected persons with high verbal competence and introspective ability may achieve a comparatively high level of psychosocial functioning that often appears unremarkable, at least on the surface. Studies have shown that 50% to 80% of persons with AS live independently, up to 80% have completed higher education, and half report intimate interpersonal relationships (6, 19, 22). Such high functioning requires an ever-greater adaptation of autistic cognitive and behavioral structures to an increasingly complex social environment (23). Typically, non-intuitive compensatory strategies succeed up to a point and then finally fail, because of their excessive rigidity, in threshold-crossing situations such as moving out of the parental household, starting occupational training, taking a first job, changing one's occupation, or trying to start an intimate relationship. In consequence, up to 70% of the affected persons develop comorbid disturbances, mainly anxiety disorders and depression (5, 6, 19). If they then seek medical help, the manifestations of these secondary disturbances may camouflage autistic experiences and behavior, leading to difficulties in both differential diagnosis and treatment (24, 25).

Screening instruments

Only a few specific screening instruments have been developed to date for the initial diagnostic assessment of AS in adulthood. The best-known of these are two self-assessment instruments, the Autism Spectrum Quotient (AQ) (26) and the Empathy Quotient (EQ); both are accessible on the Internet (http://autismresearchcenter.com/arc_tests) (27). The AQ-10, a time-saving abbreviated version of the AQ, is recommended in the NICE guidelines (4); it consists of the 10 most informative items of the AQ and indicates autistic features if more than 6 of these are answered positively (28). Non-self-assessment instruments such as the Marburg Rating Scale for Asperger's Syndrome (MBAS) (29) and the Social

FIGURE



Resource-oriented diagnostic evaluation for suspected adult autism, modified according to the NICE Guideline (4).

*1 e.g., counseling about jobs or training, occupational assistance as provided by German law, integration services, assisted activities and employment, legally mandated provisions for the disabled, out-patient assisted living arrangements;

*2 specific group-therapy offerings: FASTER (Freiburg), GATE (Cologne), regional autism treatment centers, self-help organizations (e.g., Autismus Deutschland e.V.)

AQ, Autism Spectrum Quotient; ASD, autism spectrum disorders

Communication Questionnaire (SCQ) (30) can be used to assess the evidence for autistic behavior either at present or in childhood. If a screening instrument yields findings in the normal range, this is generally a reliable indication that the individual does not have an ASD (31, 32). On the other hand, our experience in a special outpatient clinic for ASD in adulthood has shown that values well above threshold do not by any means assure us that the individual has AS, as opposed to one of its common differential diagnoses, or perhaps merely an introverted or socially inhibited personality of no psychopathological significance. More research is clearly needed for the creation of better diagnostic instruments (including self-assessment instruments) for patients who are referred with a suspected diagnosis of autism (10).

Confirming a suspected diagnosis

The diagnosis of AS in adulthood requires time, resources, and clinical experience (4). In the United Kingdom, the National Assessment Service for Adults with Autism, confronted with a fivefold increase in referrals over the period 2005–2010, established a diagnostic process in three steps (10), which is shown in modified form in the *Figure*:

a) The primary-care physician becomes aware of clinical red flags and their psychosocial effects (*Table 2*), obtains a positive screening test (e.g., the AQ-10), and then refers the patient to a mental health care specialist with the suspected diagnosis of autism.

b) The specialist assesses the presence and intensity of the core manifestations of autism. The patient’s impaired abilities to assume the emotional perspectives of others, to empathize, and to understand complex social situations should be clearly evident from descriptions of the patient’s everyday behavior, both in private life and at work. In making this assessment, the specialist’s purpose is better served by a “tangential” discussion of the patient’s current living situation and social context, rather than by direct questioning about autistic modes of experience. Furthermore, the patient’s intuitive use of communicative modalities plays a major role here (e.g., set phrases, facial expressions, eye contact).

Typical specialized interests and ritualized behavior patterns should remain constantly in evidence over the patient’s life span. The specialist should obtain information from other persons about the patient’s social interactions in childhood, such as in group games and imitation games, in order to determine whether the

BOX 2

Differential diagnoses and neuropsychiatric comorbidities*

● **Differential diagnoses**

- ADHD
- alexithymia
- avoidant personality disorder
- antisocial personality disorder
- borderline personality disorder
- narcissistic personality disorder
- nonverbal learning disorder
- PTSD
- schizoid personality disorder
- schizophrenia simplex
- residual schizophrenia
- schizotypal personality disorder
- social phobia
- compulsive (anankastic) personality disorder
- obsessive-compulsive disorder

● **Comorbidities**

- ADHD
- bipolar disorder
- depression
- disorder of emotional regulation
- epilepsy
- eating disorder
- generalized anxiety disorder
- insomnia
- catatonia
- mutism
- prosopagnosia
- psychosis
- self-injurious behavior
- social phobia
- substance abuse
- tic disorder
- Gilles de la Tourette syndrome
- obsessive-compulsive disorder

*modified from Remschmidt & Kamp-Becker (2006) (38) and Hofvander et al. (2009) (6)
ADHD, attention deficit-hyperactivity disorder; PTSD, post-traumatic stress disorder

characteristic impairments of social interaction were already present in childhood and then persisted, or else developed secondarily later on. Teachers' assessments of the patient's social behavior, as noted in primary-school report cards, can be helpful in this respect. In history-taking, special attention should be paid to evidence of severe emotional neglect or physical or sexual abuse in childhood, which can cause quasi-autistic impairments of emotional experience and behavior patterns (33).

c) If an ASD is still suspected on the basis of the assessment up to this point, the patient should be referred to a specialized outpatient clinic for ASD in adulthood

for a comprehensive diagnostic and differential-diagnostic evaluation, including the identification of possible psychiatric comorbidities (Table 3). Useful additional testing may include neuropsychological instruments for assessing the patient's general cognitive performance profile and circumscribed social-cognitive deficits. The testing of attention and executive functions can also yield valuable clues to areas of poor performance in which special help is needed (21, 34). Whenever a definitive diagnosis of ASD is made, the patient should be given comprehensive psychosocial counseling and offered the appropriate treatment (35–37) (Figure) (4).

Psychiatric comorbidity or differential diagnosis?

The commonest differential diagnoses of AS (Box 2) are personality disorders (PD), social anxiety disorders, obsessive-compulsive disorders, and attention deficit-hyperactivity disorder (ADHD) (25, 38–40). PD are maladaptive behavior patterns that persist over time and manifest themselves regardless of the social context; they are characterized by rigid reactions to varying personal and social situations, and they lead to a corresponding impairment (11). A study in which patients with AS were assessed with the structured clinical interview for DSM-IV (the SCID-II) revealed that 19–32% of them met formal criteria for compulsive PD, 21–26% for schizoid PD, 13–25% for avoidant PD, and 3–13% for schizotypal PD (6, e1). Personality disorders differ from AS in that the abnormal behavior pattern of a PD generally appears in puberty or later, after initially well-adjusted social behavior in childhood.

The psychiatric comorbidities that were revealed by an observational study to be the most common ones among patients with late-diagnosed AS (Box 2) are depressive disorders in 53%, anxiety disorders in 50%, ADHD in 43%, and obsessive-compulsive disorders in 24% (6, 24). It is noteworthy, that the latter three are also of differential diagnostic relevance. Only a few studies to date have addressed the question of how late-diagnosed AS can be distinguished from its psychiatric comorbidities and differential diagnoses; far more studies have been devoted to this question for AS diagnosed at a typical age (24, 25). Table 4 illustrates the phenomenological overlap of late-diagnosed AS with the other conditions that will be described in the following sections.

Differential diagnoses

Schizophrenia-like personality disorders

Paranoid, schizoid, and schizotypal personality disorders, which are grouped together in Cluster A of the DSM-IV, have also been collectively termed “schizophrenia-like” personality disorders (e2). In the study of Barneveld et al. (2011), 40% of a group of patients with ASD met formal criteria for a schizotypal PD (39). Other studies have confirmed that autistic behavior traits overlap with schizotypal and schizoid ones (e3, e4). One of the distinguishing features of schizoid PD is a marked narrowing of affect with an impaired capacity for emotional experi-

TABLE 4

Phenomenological overlap of relevant differential diagnoses of AS that involve abnormal social interaction

	AS	Schizoid PD	Schizotypal PD	Avoidant PD	Social phobia	Obsessive PD	OCD	ADHD
Social interaction	●	●	●	●	●	●	●	●
Core manifestations of autism								
– verbal communication	●	●	●	●	●	●	●	●
– facial expression/gestures/prosody	●	●	●	●	●	●	●	●
– eye contact	●	●	●	●	●	●	●	●
– theory of mind	●	●	● ^{*1}	● ^{*4}	● ^{*4}	●	●	● ^{*7}
– empathy	●	● ^{*2}	●	●	●	●	●	● ^{*7}
– interests/rituals/compulsions	●	● ^{*3}	● ^{*3}	●	●	● ^{*5}	● ^{*6}	●
Accompanying manifestations								
– attention	●	●	●	●	●	●	●	●
– psychomotor function	●	●	●	●	●	●	●	●
– self-injurious behavior	●	●	●	●	●	●	●	●
– psychotic manifestations	●	●	●	●	●	●	●	●
Long-term manifestations								
– social interaction in childhood	●	●	●	●	●	●	●	●
– biographical stress factors	●	●	●	●	●	●	●	●

● usually abnormal; ● usually normal; ● potential accompanying manifestation; ^{*1} suspicious-paranoid misattributed; ^{*2} markedly restricted affect; ^{*3} e.g., intense preoccupation with fantasy, magical thinking, or violent scenarios; ^{*4} hypermentalization of other persons' irritation, criticism, or rejection; ^{*5} intense preoccupation with order, lists, and formal aspects; ^{*6} egodystonic character; ^{*7} due to attention deficit.

AS, Asperger syndrome; PD, personality disorder; OCD, obsessive-compulsive disorder; ADHD, attention deficit–hyperactivity disorder;

ence and expression. In contrast, schizotypal PD is typified by seemingly eccentric social-contact behavior, with apparently paranoid perceptual distortion and bizarre convictions (“magical thinking”). By definition, persons with schizophrenia-like personality disorders do not meet the diagnostic criteria for schizophrenia: in particular, they have neither of the two key positive manifestations (delusions and auditory hallucinations). Persons with AS are “hypo-mentalizers,” i.e., they fail to recognize social cues such as verbal hints, body language, and gesticulation, but persons with schizophrenia-like PD tend to be “hyper-mentalizers,” overinterpreting such cues in a generally suspicious way (39). Although they may have been socially isolated from childhood onward, most people with schizophrenia-like PD displayed well-adapted social behavior as children, along with apparently normal emotional function.

Social anxiety disorders

The category of social anxiety disorders contains social phobia and avoidant personality disorder (e5). The main feature of social anxiety disorders is an intense fear of situations where the affected person occupies the center of attention, which leads to the development of strategies for keeping out of such situations. In the extreme case, there may be total withdrawal from social contact. The root cause is a deep-seated fear of criticism

and negative judgment by others. Persons with these disorders often have longstanding social behavioral inhibitions, e.g., avoidance of eye contact and reduced communicative expression from childhood onward (11). Such persons' inadequate emotional perception is characterized by the selective perception of social cues connoting a negative assessment, e.g., rejection or disdain (e6). When they face less social stress, e.g., within the family, they can usually succeed at recognizing the emotions of others.

Obsessive-compulsive disorders

Obsessive-compulsive disorders can massively impair social functioning and lead to social isolation if the performance of compulsive behaviors becomes the single biggest part of the patient's life. Empathic and social-cognitive skills are generally not affected. Persons with AS may seem to be obsessive-compulsive because of the behavioral rituals, organizing systems, or collecting habits that they pursue intensely, feeling uneasy or frightened whenever such actions are not carried out (25, e7). Persons with AS, unlike those with obsessive-compulsive disorders, usually perceive the repetitive actions as reasonable and appropriate; moreover, the actions themselves lack the “neutralizing” character of true compulsions, e.g., hand-washing because of fear of contamination (e8).

Compulsive (anankastic) personality disorder

The manifestations of compulsive personality disorder consist of an intense preoccupation with order, lists, and formalities and an emphasis on peripheral details at the expense of flexibility and openness. As a result, the sufferers' social competence may be massively impaired. Their social contact behavior is characterized by formalism, distance, and strict adherence to rigid notions of morality and values (e1, e9). Excessively high performance standards, perfectionism, a disproportionate inclination to self-criticism, and agonizing indecisiveness when the customary rules and values do not apply are all features of compulsive personality disorder that typically are not seen in persons with Asperger syndrome.

Attention deficit-hyperactivity disorder

The situationally independent triad of manifestations of attention deficit-hyperactivity disorder (ADHD) consists of lack of attention, lack of impulse control, and increased motor activity, with resulting impairment of social-cognitive performance. Recent studies have revealed a prevalence of 3% to 7% among the children and adolescents studied. The manifestations are thought to persist into adulthood in half of all cases (e10). Genetic and neuropsychological findings suggest that ASD and ADHD are etiologically and pathogenetically related, though it is not yet clear whether there is a "genuine" comorbidity or, rather, a specific ASD phenotype with ADHD-like manifestations (e11). The problems of attention in Asperger syndrome include increased distractibility by external stimuli and intolerance to stress. Impulsive behavior may arise if the rigid behavior patterns and rituals are interrupted. Impaired motor coordination, bizarre body language, and fleeting eye contact can also be features of either condition. Phenomenologically, AS is distinguishable from ADHD, with AS being characterized by (38):

- more severe impairment in social and emotional communication,
- characteristically restrictive behavior patterns and special interests,
- a detail-oriented perceptual style,
- lack of volatility of thought and behavior,
- more severe impairment of communicative modes of expression, and
- a rarer tendency toward disorganization.

Conflict of interest statement

Dr. Lehnhardt and Dipl.-Psych. Gawronski have had meeting participation fees reimbursed by the Volkswagen Foundation.

Dr. Schilbach received financial support from the Volkswagen Foundation for an interdisciplinary research project on social cognition.

Prof. Vogelej has received payment for medicolegal work involving autism. He has received reimbursement of meeting participation fees as well as financial research support from the Volkswagen Foundation.

Dipl.-Psych. Pfeiffer and Dr. Kockler state that they have no conflict of interest.

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Translated from the original German by Ethan Taub, M.D.

KEY MESSAGES

- Many persons with Asperger syndrome (AS) only receive the diagnosis in adulthood when their social-cognitive adaptive strategies have failed in threshold situations, leading to depression or an anxiety disorder.
- Persons with AS are often highly educated and capable of living independently, yet half are unemployed and have a low socioeconomic status.
- The main clinical features are a poor ability to assume the emotional perspectives of others, impaired social-communicative behavior, unusual interests, and restrictive behavior patterns. These manifestations are already present in early childhood and persist thereafter.
- The differential diagnosis of AS includes schizoid, obsessive-compulsive, and avoidant personality disorders. Its common psychiatric comorbidities include anxiety disorders, obsessive-compulsive disorders, and attention deficit-hyperactivity disorder.
- Simple screening measures by the primary-care physician, followed by further assessment of the suspected diagnosis of AS by a mental health care specialist, are resource-efficient initial diagnostic steps before the patient with suspected AS is referred to a dedicated outpatient clinic for patients with this disorder.

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