

REVIEW ARTICLE

Asperger's Syndrome in Adulthood

Mandy Roy, Wolfgang Dillo, Hinderk M. Emrich, Martin D. Ohlmeier

SUMMARY

Introduction: Asperger's syndrome is one of the autism spectrum disorders. Affected individuals display considerably impaired capacity for social interaction, unusual special interests, and a tendency towards ritualized behavior.

Methods: The etiology, symptoms, diagnosis, and treatment of Asperger's syndrome in adulthood are outlined on the basis of a selective literature review via Medline and information in relevant reference books. Furthermore, the authors report their personal experience at a special clinic for adults.

Results: Asperger's syndrome in adulthood can be diagnosed by thorough anamnesis, heteroanamnesis—with emphasis on childhood—and painstaking clinical examination. The considerable psychosocial impairments affect the patients' professional, social, and private lives. The precise etiology is still unknown, but a multifactorial origin with genetic, neurobiological, and psychosocial components appears probable. Although no specific, empirically tested treatment concepts have yet been established, psychotherapeutic elements (structuring and directive interventions) seem to be helpful, together with pharmacotherapy—if indicated—in the presence of comorbidity.

Conclusions: Asperger's syndrome should be included in the differential diagnosis of adults who display the corresponding symptoms. The etiopathogenesis and treatment of Asperger's syndrome in adulthood should be further investigated.

Dtsch Arztebl Int 2009; 106(5): 59–64
DOI: 10.3238/arztebl.2009.0059

Key words: Asperger's syndrome, diagnosis, treatment concept, autism, pediatric disease

Asperger's syndrome is one of the autism spectrum disorders. Asperger's patients usually display a distinctive symptom pattern. Because their ability to intuitively recognize nonverbal signals in other persons is impaired, patients are considerably limited in their social interactions. Their interest in other people is often limited; on the other hand, Asperger's patients typically have "special interests" that may seem unusual because of their subject matter or the intensity with which patients pursue them. Asperger's patients are also often fixated on ensuring that their external environment and daily routines remain constant; sudden changes may exceed their coping mechanisms.

Depending on the severity of their symptoms, Asperger's patients may either exhibit unusual social behavior or be severely impaired in their social and professional life.

Although Asperger's syndrome is one of the more common differential diagnoses in child and adolescent psychiatry, in adults the disorder has received particular attention only recently.

This article provides an overview on the prevalence, diagnostics, and clinical symptoms of Asperger's syndrome in adults, as well as of current theoretical concepts and possible treatment options.

Methods

This article is based on a selective literature search of Medline, using the key words "Asperger's syndrome," "autism," "prevalence," "diagnostic," "comorbidity," "pathogenesis," and "brain." We included review articles and experimental original articles and reference books published to May 2008. We also report our own clinical experiences from a specialist outpatient clinic for adults with Asperger's syndrome.

Prevalence

The prevalence of Asperger's syndrome in childhood is estimated at 0.02% to 0.03% (1, 2). Asperger's is far more common in boys than in girls, with a sex ratio of 8:1 (3). Representative studies of the prevalence in adults are currently lacking. However, since the core symptoms of Asperger's syndrome persist throughout patients' lifetimes (4), we can assume that Asperger's syndrome is probably not much less common in adults.

Klinik für Psychiatrie, Sozialpsychiatrie und Psychotherapie/Zentrum für Seelische Gesundheit/Medizinische Hochschule Hannover (MHH): Dr. med. Roy, Dr. med. Dillo, Prof. Dr. med. Dr. phil. Emrich

Klinik für Psychiatrie und Psychotherapie (Ludwig-Noll-Krankenhaus), Klinikum Kassel: PD Dr. med. Ohlmeier

BOX 1

Diagnostic criteria for Asperger's syndrome according to DSM-IV (shortened)

- A) Qualitative impairment in social interaction, as manifested by at least two of the following:
 1. Marked impairment in the use of multiple nonverbal behaviors such as eye-to eye gaze, facial expression, body postures, and gestures to regulate social interaction
 2. Failure to develop peer relationships appropriate to developmental level
 3. Lack of spontaneous seeking to share enjoyment, interests, or achievements with other people
 4. Lack of social or emotional reciprocity
- B) Restricted repetitive and stereotyped patterns of behavior, interests, and activities, as manifested by at least one of the following:
 1. Encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus
 2. Apparently inflexible adherence to specific, nonfunctional routines or rituals
 3. Stereotyped and repetitive motor mannerisms
 4. Persistent preoccupation with parts of objects
- C) The disturbance causes clinically significant impairment in social, occupational, or other important areas of functioning.
- D) There is no clinically significant general delay in language e.g., single words used by age two years, communicative phrases used by age three years).
- E) There is no clinically significant delay in cognitive development.
- F) Criteria are not met for another specific pervasive developmental disorder or schizophrenia.

Diagnosis and symptoms

Somato-organic findings to confirm Asperger's syndrome are not known. The diagnosis is a clinical one and is made on the basis of psychopathological findings and a thorough medical and psychiatric history—including a childhood history. In 1993, Asperger's syndrome was included as a "pervasive developmental disorder" (F84.5) in the 10th International Classification of Diseases (ICD-10), and in 1994 in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) of the American Psychiatric Association (*box 1*).

Initial symptoms of the disorder can be observed after the third year of life. Because it is often difficult to distinguish the syndrome from differential diagnoses, Asperger's syndrome should be diagnosed by a doctor specializing in psychiatry and psychotherapy or, in children, by a child and adolescent psychiatrist.

In addition to the clinical psychiatric examination, some questionnaire approaches are available that may be used for diagnostic purposes. The Adult Asperger Assessment (AAA) is an instrument that was developed especially for diagnosing Asperger's syndrome in adults (5). It entails two screening methods, the Autism-Spectrum Quotient (AQ) and the Empathy Quotient (EQ), as well as extended DSM-IV criteria (*box 2*).

The AQ captures 5 symptom areas of Asperger's syndrome in 50 items:

- Social skills
- Lapses in attention
- Attention to detail
- Communication
- Fantasy/imagination (threshold value >32 points).

The EQ prompts the capacity for empathy, i.e., sharing and understanding another's "state of mind" or emotion (threshold value <30). Both screening instruments are available in German-language versions (6).

Difficulties in making a diagnosis in adult patients often arise from gaps in childhood memories. In the authors' experience, it is useful in adult patients to also question parents and siblings about particular personality traits of the patient during childhood. School grade papers may be of great help. These may include remarks such as: "... has problems integrating into the class." However, such remarks do not necessarily indicate Asperger's syndrome and can thus only complement the diagnostic tools.

During the clinical examination of adults, typical traits may become noticeable. Initially, patients often do not pay attention to the doctor's instructions and may appear clumsy at finding their bearings in the room. Facial expressions and speech melody are often monotone and may appear rigid (7). A patient's speaking style may, however, come across as grammatically and lexically very honed. Direct visual contact is usually avoided (7), the patients often look around themselves in the room during the consultation. Their narrative is typically extremely detailed and they have problems separating important issues from unimportant ones. Affective modulations on the part of the examiner, such as a smile or humorous remark, are often not reciprocated.

The authors' own clinical experiences have shown that in adults, typical symptoms of Asperger's syndrome result in particular problems with regard to patients' social and professional lives. Many people with Asperger's syndrome live withdrawn lives and have few "real" social contacts. Often, their contacts take place via the internet, in Asperger discussion forums. Asperger's patients thus have the opportunity to communicate with people whose thought structures are similar and who use literal language without needing to recognize nonverbal signals.

Difficulties often arise especially in relationships (8). Because of their lack of empathy, persons with Asperger's

BOX 2

DSM-IV extensions after Adult Asperger Assessment (AAA) (modified)

Ad A) Difficulties in understanding social situations and other people's thoughts and feelings

Ad B) Tendency to think of issues as being black and white, rather than considering multiple perspectives in a flexible way

Additionally: Qualitative impairments in verbal or nonverbal communication with at least three of the following symptoms:

1. Tendency to turn any conversation back on to self or own topic of interest
2. Marked impairment in the ability to initiate or sustain a conversation with others. Cannot see the point of superficial social contact, niceties, or passing time with others, unless there is a clear discussion point/debate or activity.
3. Pedantic style of speaking, inclusion of too much detail
4. Inability to recognize when the listener is interested or bored
5. Frequent tendency to say things without considering the emotional impact on the listener

Additionally: Impairment in at least one of the criteria relating to childhood imagination:

1. Lack of varied, spontaneous make believe play appropriate to developmental level
2. Inability to tell, write or generate spontaneous, unscripted or unplagiarized fiction
3. Either lack of interest in fiction (written, or drama) appropriate to developmental level or interest in fiction is restricted to its possible basis in fact (e.g. science fiction, history, technical aspects of film)

syndrome may have difficulties to make contact with potential partners in an appropriate way. In a developing or existing relationship they may appear selfish or cold. The patients often experience the demands that are associated with relationships—a desire for more intense communication or mutual sympathy—as a strain. Often, persons with Asperger's syndrome will therefore conduct relationships over greater geographical distances, which results in time constrained contacts. This also includes the whole area of sexuality. Some people with Asperger's have a very low need for physical closeness, others even have an aversion to it. Some have great insecurities regarding sex, although their fundamental need is undiminished (8, 9), since sexual intimacy results from an intense capacity for mutual empathy. However, some patients manage to build stable relationships and have families.

With respect to Asperger's patients' professional development, two tendencies are obvious. Some Asperger's patients are quickly strained by contacts with colleagues and clients. Their direct, seemingly impolite manner may result in conflict, or they cannot adjust flexibly enough to different demands. Some, however, achieve great professional success owing to their special interest—for example, in information technology. High cognitive skills seem to enhance the potential to achieve professional and private objectives (clinical example, *see box 3*).

Differential diagnosis and comorbidities

In early childhood autism according to Kanner, the inability to make contact in a nonverbal manner is often accompanied by incomprehensible or lacking speech. Affected children display extensive stereotypical and unusual activity patterns (10). The clinical impairment in Kanner autism is more pronounced than in Asperger autism. The distinction of Asperger's syndrome from the

so-called high functioning autism has been much discussed. Compared with patients with early childhood autism, high functioning autists have greater intellectual and better social and communicative abilities, but overall their cognitive and speech development is delayed. More recent studies have concluded that with regard to deviant behavior there is no fundamental difference between Asperger's syndrome and high functioning autism (11).

Differential diagnostic distinction from schizoid and schizotypal personality disorders can be difficult. In both disorders, affected persons withdraw from interpersonal relationships; they are usually loners. The schizoid type has a flattened or restricted range of emotions, affective distance (a lack of affective rapport), and a diminished capacity for enjoyment/joy. The schizotypal personality disorder is characterized by odd behavior, often with magical ideas and a mistrustful or paranoid experience of relationships. Neither disorder features the limited special interests that are typical of Asperger's, nor do they entail a tendency towards stereotypical behavior.

Schizophrenic psychosis can also be accompanied by social withdrawal and a lack of empathy. Important distinctive features include disorganized thinking and delusions, which are characteristic for schizophrenia. The symptoms of Asperger's syndrome can be observed in early childhood, whereas, for example, the onset of hebephrenic schizophrenia does usually not predate adolescence. The onset of illness is also important in differential diagnostic distinction to simple schizophrenia disorder, which does not have productive symptoms.

Especially in women, borderline emotional personality disorders have to be differentiated, because this pathology also features difficulties in empathizing and recognizing nonverbal signals. However, these disorders are mostly accompanied by severe mood swings, whereas special interests and pronounced rational thinking are usually lacking.

BOX 3

Clinical example/case report

Mr M, age 35 years, has been an "eternal outsider and loner" since childhood. He has never developed any deep friendship. Although he intensely read books about human social behavior to gain a better understanding of his environment, he has always had to "capitulate" when faced with the "riddle" of interpersonal communication. He could imagine faces only without any movement, like "passport pictures with name inset." He deduced people's emotions in a highly labor intensive manner, by relating the position of the corners of their mouth to the angle of the eyebrows and lower eyelids. He used and understood speech in the most literal manner, which often resulted in misunderstandings. He had understood only as an adult that his parents, who called him a "Stubenhocker" (couch potato) did not mean he was a piece of furniture. He had ended his only relationship, a weekend affair, as "the benefits didn't justify all the effort." In spite of this he expressed a desire to have a life partner.

Professionally, he had found his niche. As a child he had spent almost all his time building "technically complex constructions" from Lego building blocks or learning by heart the titles of several hundred cartoons. As a teenager he had taught himself computer programming and, although he did not actually undergo a formal apprenticeship or professional training, he was now very successful in the computing business. Developing programs gave him "deep satisfaction," whereas the "inevitable social interaction" with colleagues posed a substantial strain on him.

Routines were important to him; he disrupted these rarely. Since childhood he had always put his clothes on in a certain sequence. He started his working days always by performing certain actions in the same order. Even minute disruptions to these routines disturbed his day to such an extent that he felt "derailed." Altogether the biggest strain for the patient was participating in life "outside his own private sphere."

Depression is one of the most important comorbid disorders. Its development is also caused by impairments in patients' personal and professional lives. Differential diagnosis is hampered by the fact that social withdrawal and impaired nonverbal communication are present in any case (12, 13). Often, affected persons will also have a compulsive disorder (3) or attention deficit/hyperactivity disorder (ADHD) (14).

Etiology and theoretical concepts

The precise etiology of Asperger's syndrome is not entirely clear, but a multifactorial origin is likely. A genetic component is assumed to have a role, especially chromosomes 1, 3, and 13 seem to be involved (15). Further, perinatal complications are also likely to contribute to the disorder (16). The theoretical disease model of Remschmidt and Kamp-Becker (7) includes three concepts of abilities that seem to be deficient in autistic disorders (*figure 1*):

- Theory of mind
- Central coherence
- Executive functions.

Theory of mind

The neuroscientific term "theory of mind" presents a model of the capacity for empathy. This is the ability to imagine, on the one hand, that other people have their

own ideas, thoughts, and emotions, and on the other hand, the ability to empathize with these. Persons with Asperger's syndrome have substantial deficits in this respect. Neurophysiologically, the theory of mind apparently correlates with different areas in the brain, such as the medial prefrontal cortex (17). In adult patients with Asperger's syndrome, functional imaging has shown that the execution of tasks testing theory of mind was accompanied by reduced activity in the left medial prefrontal cortex (18). The amygdala—an important structure in the limbic system that processes and regulates emotions—and the fusiform face area—an area in the temporal lobe that is specialized for the perception of human faces—also show reduced activity in Asperger's patients or patients with early childhood autism (19, 20).

Of particular importance for the ability to empathize and thus for the theory of mind is the mirror neuron system. This neural network becomes active during certain activities but is also activated—unconsciously and involuntarily—when this activity is being observed in another person (21). We can assume that the mirror neuron system is impaired in persons with Asperger's syndrome (22).

Central coherence

Central coherence describes the ability to integrate individual elements of perception into an overall context of meaning (the "bigger picture") (*figure 2*). The following statement could be typical of an Asperger's patient: "I see hundreds of individual trees, but I cannot see a forest." Those who are affected tend to a detail oriented, selective perception and have great difficulties in capturing the overall context—their central coherence is deficient. The precise neuronal correlate for this clinical phenomenon is not known.

Executive functions

The executive functions comprise skills such as planning and monitoring one's own actions, inhibiting impulses, focusing attention, and flexible searching for problem solving strategies. In patients with Asperger's syndrome, the executive functions are often impaired. The patients are inflexible in their attention and can use newly acquired behaviors only with difficulty. The prefrontal cortex is a crucial neuromorphological correlate of the executive functions (24).

However, it should be emphasized that in spite of initial pointers towards a functional impairment of certain areas of the brain, as described earlier, no comprehensive neurobiological concept for Asperger's syndrome exists.

Therapy

Not every case of Asperger's syndrome has disease status or requires treatment. If symptoms are pronounced to a certain extent, however, and especially in patients with comorbid disorders, a multimodal therapeutic concept with symptom oriented pharmacological and psychotherapeutic elements seems appropriate. In case of increased impulsiveness, a therapeutic attempt could be made using atypical neuroleptic drugs or mood stabilizers;

pronounced symptoms of compulsion or depression can be treated with selective serotonin reuptake inhibitors (SSRIs) if required (7, 10). In comorbid ADHD, the authors have reported positive experiences in one case of when stimulants were used (14). Medication specifically to treat Asperger's syndrome, however, does not exist.

Although neither established specific nor empirically tested therapeutic concepts for the psychotherapeutic treatment of adult Asperger's syndrome exist, existing concepts for childhood Asperger's can be used for orientation. Especially behavioral therapeutic approaches such as TEACCH (Treatment and Education of Autistic and related Communication-handicapped Children) and ABA (Applied Behavior Analysis) are assessed as helpful. Such programs promote social and communication skills by using unequivocally phrased instructions and partial steps. Adapting the external environment to the patient's difficulties is an additional objective (7).

Klin and Volkmar (25) recommend the following therapeutic principles for patients with Asperger's syndrome:

- Practicing and discussing social perceptions
- Stepwise and structured training/coaching in problem solving skills and life skills
- Practicing behaviors in unfamiliar situations
- Practicing the transfer of certain insights to other situations
- Promoting a concrete development of identity that is based on everyday behaviors
- Analyzing situations that trigger frustrations and analyzing how patients may affect others
- Facilitating further helpful measures, such as ergo-therapy or physiotherapy.

In sum, structured, directive interventions that discuss situations with the help of concrete, real-life examples, seem beneficial (8). In all experience, however, psychodynamic therapeutic approaches may also be useful, especially with respect to the common problem of low self esteem.

Conflict of interest statement

The authors declare that no conflict of interest exists according to the guidelines of the International Committee of Medical Journal Editors.

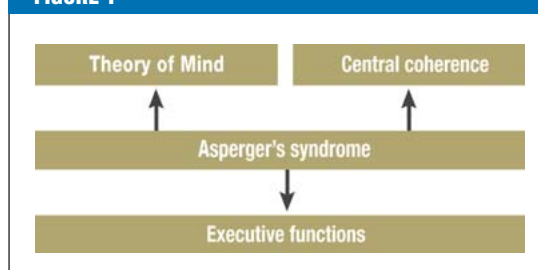
Manuscript received on 21 July 2008, revised version accepted on 30 October 2008.

Translated from the original German by Dr Birte Twisselmann.

REFERENCES

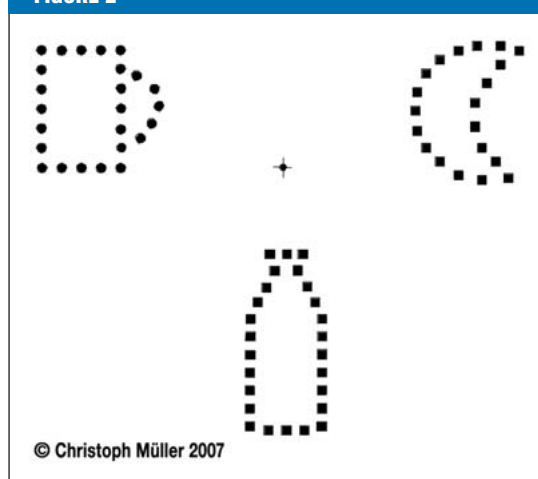
1. Baird G, Charman T, Baron-Cohen S et al.: A screening instrument for autism at 18 months of age: a 6-year follow-up study. *J Am Acad Child Adolesc Psychiatry* 2000; 39: 694–702.
2. Fombonne E, Tidmarsh L: Epidemiologic data on Asperger disorder. *Child Adolesc Psychiatr Clin N Am* 2003; 12: 15–21.
3. Remschmidt H, Kamp-Becker I: Das Asperger-Syndrom – eine Autismus-Spektrum-Störung. *Dtsch Arztebl* 2007; 104(13): A873–82.
4. Tantam D: Adolescence and adulthood of individuals with Asperger Syndrome. In: Klin A, Volkmar F, Sparrow S (eds.): *Asperger Syndrome*. New York: Guilford Press 2000.
5. Baron-Cohen S, Wheelwright S, Robinson J, Woodbury-Smith M: The Adult Asperger Assessment (AAA): a diagnostic method. *J Autism Dev Disord* 2005; 35: 807–19.

FIGURE 1



A current theoretical disease model is based on the assumption that in Asperger's syndrome the abilities reflected by the three concepts "theory of mind," "central coherence," and "executive functions" are deficient (adapted from [7]).

FIGURE 2



Testing central coherence. The patient is given the task to assign one of the two images at the top to the image at the bottom. People with a holistic perception will assign the beaker to the bottle at the bottom. Detail-oriented perception in poorly developed central coherence will lead to the decision that the top right object matches the bottom object as they both consist of squares. The task is taken from a scientific study and not suited for use in routine diagnostics. From: Müller C: *Autismus und Wahrnehmung. Eine Welt aus Farben und Details*. Marburg: Tectum 2007. With permission from Tectum Publishers, Marburg (23)

Key messages

- The core symptoms of Asperger's syndrome include reduced socioemotional empathy, special interests, and ritualized behavior.
- Asperger's syndrome can be diagnosed in adulthood by using thorough anamnesis and heteroanamnesis, as well as clinical-psychiatric examination.
- The origin of Asperger's syndrome is multifactorial; especially deficits in the theory of mind, central coherence, and executive functions are noted.
- Symptom-oriented pharmacological treatment and psychotherapy provide an effective therapeutic approach.
- Not every case of Asperger's syndrome has disease status and requires treatment.

6. Baron-Cohen S: Vom ersten Tag an anders. Das weibliche und das männliche Gehirn. München: Wilhelm Heyne Verlag 2003.
7. Remschmidt H, Kamp-Becker I: Asperger-Syndrom. Heidelberg: Springer Verlag 2006.
8. Preißmann C: Psychotherapie/Menschen mit Asperger-Syndrom: Konzepte für eine erfolgreiche Behandlung aus Betroffenen- und Therapeuten-sicht. Stuttgart: Kohlhammer 2007.
9. Attwood T: Ein ganzes Leben mit dem Asperger-Syndrom. Alle Fragen – alle Antworten. Stuttgart: TRIAS Verlag 2008.
10. Deutsche Gesellschaft für Kinder- und Jugendpsychiatrie und Psychotherapie and others (eds.): Leitlinien zur Diagnostik und Therapie von psychischen Störungen im Säuglings-, Kindes- und Jugendalter. Köln: Deutscher Ärzte Verlag, 3. überarbeitete Auflage 2007; 225–37.
11. Dissanayake C: Change in behavioural symptoms in children with high functioning autism and Asperger Syndrome: evidence for one disorder? *Aust J Early Child* 2004; 29: 48–57.
12. Stewart ME, Barnard L, Pearson J, Hasan R, O'Brien G: Presentation of depression in autism and Asperger syndrome: a review. *Autism* 2006; 103–16.
13. Ghaziuddin M, Weidmer-Mikhail E, Ghaziuddin N: Comorbidity of Asperger syndrome: a preliminary report. *J Intellect Disabil Res* 1998; 42: 279–83.
14. Roy M, Dillo W, Bessling S, Emrich HM, Ohlmeier MD: Effective Methylphenidate treatment of an adult Aspergers Syndrome and a comorbid ADHD. *J Atten Disord* 2009; 12: 381–5.
15. Ylisaukko-oja T, Nieminen-von Wendt T, Kempas E et al.: Genome-wide scan loci of Asperger syndrome. *Mol Psychiatry* 2004; 9: 161–8.
16. Gillberg C, Cederlund M: Asperger syndrome: familial and pre- and perinatal factors. *J Autism Dev Disord* 2005; 35: 159–66.
17. Frith U: Mind blindness and the brain in autism. *Neuron* 2001; 20: 969–79.
18. Happé F, Ehlers S, Fletcher S et al.: "Theory of mind" in the brain. Evidence from a PET scan study of Asperger Syndrome. *Neuroreport* 1996; 8: 197–201.
19. Baron-Cohen S, Ring HA, Wheelwright S et al.: Social intelligence in the normal and autistic brain: an fMRI study. *Eur J Neurosci* 1999; 11: 1891–8.
20. Pierce K, Müller RA, Ambrose J, Allen G, Courchesne E: Face processing occurs outside the fusiform "face area" in autism: evidence from functional MRI. *Brain* 2001; 124: 2059–73.
21. Bauer J: Warum ich fühle, was du fühlst. Hamburg: Hoffmann und Campe 2006.
22. Williams JHG, Whiten A, Suddendorf T, Perrett DI: Imitation, mirror neurons and autism. *Neurosci Biobehav Rev* 2001; 25: 287–95.
23. Müller C: Autismus und Wahrnehmung. Eine Welt aus Farben und Details. Marburg: Tectum 2007.
24. Fuster JM: The prefrontal cortex: anatomy, physiology, and neuropsychology of the frontal lobe. Philadelphia: Lippincott Williams and Wilkins 1997.
25. Klin A, Volkmar FR: Treatment and intervention guidelines for individuals with Asperger Syndrome. In: Klin A, Volkmar FR, Sparrow SS (eds.): *Asperger Syndrome*. New York: Guilford Press 2000; 340–66.

Corresponding author

Dr. med. Mandy Roy
 Klinik für Psychiatrie, Sozialpsychiatrie und Psychotherapie
 Medizinische Hochschule Hannover (MHH)
 Carl-Neubergstr. 1
 30625 Hannover, Germany
 roy.mandy@mh-hannover.de