Autism Spectrum Disorder Symptoms in Juvenile Suspects of Sex Offenses

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All listed authors have key responsibility for the material in the article. The authors declare that they have no competing interests.

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Objective: To investigate autism spectrum disorder (ASD) symptoms in juvenile suspects of sex offenses.

Method: A group of 175 juvenile suspected sex offenders (all males, mean ± SD age = 14.9 ± 1.4 years) was compared with a matched healthy control group (N = 500, mean ± SD age = 14.0 ± 1.4 years) and a group of children with DSM-IV–diagnosed ASD (N = 114, mean ± SD age = 14.2 ± 1.9 years) with respect to autistic symptoms as measured by means of a standardized questionnaire, the Children's Social Behavior Questionnaire. Furthermore, specific subgroups of sexual offenders, i.e., child molesters, solo peer offenders, and group offenders, were compared with regard to levels of ASD symptoms. The study was conducted from May 2003 to December 2006.

Results: Significantly higher levels of ASD symptoms were found in juvenile sex offenders than in healthy controls, while levels were lower than in the ASD group ($F = 148.259$, $p < .05$). Solo peer offenders and child molesters scored higher on several subscales as well as on core autistic symptoms than group offenders ($F = 5.127$, $p < .05$).

Conclusions: Levels of ASD symptoms are higher in juvenile suspects of sex offenses as compared to the healthy population, which argues for considering specific diagnostic assessment in this population, especially in solo offenders and child molesters.

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During adolescence, in order to develop a healthy adult sexual lifestyle, boys and girls are challenged by several key developmental stages, such as developing a sexual identity and managing physical and emotional intimacy. The psychosocial and biological commotion this creates enhances the likelihood that some youngsters unwillingly get involved in or are subjected to sexual harassment or coercion.[1] Displaying appropriate sexual behavior requires appropriate social and sexual skills and awareness of personal and other people's boundaries. Lack of these skills may lead to inappropriate, intrusive, and even offensive sexual behavior, while simultaneously increasing the risk of self-victimization. As such risks are likely to be more pronounced in persons with social-relational problems, studying this issue in adolescents who have sexually offended another person carries substantial relevance.

Disturbances in social interaction and communication are a common feature of children and adolescents with autism spectrum disorders (ASD). According to Realmuto and Ruble,[2] socially unacceptable behaviors are part of the core characteristics of autistic individuals, which may lead to social misjudgment and, in some, to socially inappropriate (sexual) behavior. In clinical practice, parents of children with ASD frequently express their concerns about the sexual behavior of their children.[3,4] As a result, they are apprehensive about their children being abused or engaging in sexually inappropriate behavior. Ruble and Dalrymple[5] described a broad spectrum of inappropriate

sexual behaviors as reported by parents of adolescents with ASD, including touching intimate body parts or even masturbating in public, removing their clothes in public, touching members of the opposite sex inappropriately, talking about inappropriate subjects, looking up shorts and down shirts, and touching parents in an inappropriate way. Not surprisingly, Hellemans et al.[6] found that intervention is warranted in one third of a group of institutionalized male ASD patients because of their sexual developmental and behavioral problems. Notwithstanding these studies, literature on the relationship between sexually offensive behavior and ASD is scarce. Only a few case reports describe criminal offending by individuals with ASD,[7,8] including offenses of a sexual nature.[9–11] It has been suggested that lack of empathy, lack of social understanding, the pursuit of obsessional interests, the misinterpretation of rules, and the failure to recognize the implications of their behavior either for themselves or for others are associated with violent attacks by people with ASD.[12,13]

The previously mentioned studies indicate that in ASD patients there may be an increased likelihood of sexual offending. From this finding, however, we cannot conclude that the prevalence of autistic symptoms is increased in the group of juvenile sex offenders. Prior studies, however, have indicated that sex offenders, specifically the subgroup of child molesters, have poorly developed social skills,[14–17] and it is suggested that sex offending might be associated with developmental disorders.[18] As these studies were based on clinical impressions or clinical file analysis, further study of this issue is warranted.

The aim of this study was to investigate ASD symptoms in juvenile suspects of sex offenses. ASD symptomatology in juvenile sex offenders was compared to that in healthy controls and in a clinical adolescent ASD sample by means of a standardized instrument investigating the core symptoms dimensionally. Furthermore, differences in ASD symptoms between specific sexual offender subgroups were investigated.

METHOD

Subjects

In this study, a sample of juveniles suspected of sex offenses (N = 175) was investigated and compared to control groups from different studies (Hartman et al.[19,20] and C. A. Hartman, Ph.D.; E. Luteijn, Ph.D.; H. Moorlag, M.A., et al., internal publication available from the authors on request): healthy controls (N = 500) and autistic individuals (diagnosis of pervasive developmental disorder not otherwise specified [PDD-NOS; N = 91] or high functioning autism [HFA; N = 23]).

Juvenile Sex Offenders

As the police in the Netherlands are obliged to refer all 12- to 18-year-olds suspected of having committed a sex crime to the Child Protection Board (CPB), regional CPB offices were the primary site of inclusion. Four (of 22) regional offices of the Child Protection Board were selected for participation because of their location in rural and urban regions in the Netherlands. Part of this group was admitted to a juvenile justice institution (JJI) subsequent to their arrest. Male juvenile suspects of sex offenses admitted to the 4 (of 11) JJIs (the places to which the selected CPB offices usually referred these individuals) were asked to participate as well. Exclusion criteria were an IQ below 70 and insufficient command of the Dutch language. The study was approved by the Ethics Committee of the VU University Medical Center Amsterdam, the Netherlands. After the study was completely described to the subjects, informed consent was obtained from both subjects and their legal guardians. The study was conducted from May 2003 to December 2006.

A total of 309 boys were eligible, of whom 226 (73%) agreed to participate in the study (mean ± SD age = 14.98 ± 1.39 years). Responders did not differ from nonresponders with respect to age ($F = 0.232$; $p = .817$) or offense characteristics, such as gender of victim ($\chi^2 = 0.782$; $p = .676$), age of victim ($\chi^2 = 0.130$; $p = .719$), and type of offending (solo versus within a group: $\chi^2 = 0.887$; $p = .346$). Responders more often were of non-Dutch ethnicity than nonresponders (59% versus 44%, $\chi^2 = 4.198$; $p < .05$). For reasons such as not being able to contact the parents, parents' insufficient command of the Dutch language, and lack of time at the police station when boys were taken into custody, assessment of autistic symptomatology was not possible for an additional 51, resulting in a final group of 175 (all male, mean age = 14.94 ± 1.4 years).

Control Groups

A sample of 500 age-matched boys (mean age = 14.0 ± 1.4 years) was drawn from a larger normative sample of 2507 children recruited through schools in the Netherlands from urban as well as rural areas (Hartman et al.[20] and C. A. Hartman, Ph.D.; E. Luteijn, Ph.D.; H. Moorlag, M.A., et al., internal publication). This sample was used as a healthy control group.

Furthermore, participants were compared with 114 age-matched boys (mean age = 14.2 ± 1.9 years) with PDD-NOS (N = 91, mean age = 14.08 ± 1.8 years) or HFA (N = 23, mean age = 14.70 ± 2.1 years). These boys originated from a sample of 2271 clinically referred children with various emotional, behavioral, and developmental problems.[19] Children with PDD-NOS visited an outpatient clinic for child and adolescent psychiatry in Groningen, the Netherlands. Children diagnosed with HFA were recruited through "Autism Teams" from different parts of the Netherlands, which specialize in the assessment and treatment of these children. Through extensive diagnostic procedures, DSM-IV classifications were

made by child and adolescent psychiatrists. Children with PDD-NOS had problems with social interaction and communication severe enough to have a negative impact on daily functioning. Many of them had restricted repertoires of activities and interests. All of them had an IQ higher than 70 as estimated on the basis of IQ tests, school functioning, or clinical impression. None met the DSM-IV criteria for autistic disorder, Asperger's disorder, or other specific PDD categories. Children who met criteria for autistic disorder or Asperger's disorder and whose IQ was higher than 70 were diagnosed with HFA.

Instruments

File information. Offense characteristics, such as age and gender of the victim and number of (co)offenders were retrieved from both police records and CPB files. Juvenile sex offenders were divided into 3 subgroups on the basis of offense characteristics: (1) child molesters—offenders who were suspected of having sexually abused children (below 12 years of age) who were at least 4 to 5 years younger than the offender himself (N = 37), (2) solo peer offenders—offenders who were suspected of having raped or sexually assaulted peers (at least 12 years old) or older persons on their own (N = 58), and (3) group offenders—offenders who while participating in a group were suspected of having raped or sexually assaulted peers (at least 12 years old) or older persons (N = 80).

Autistic symptoms. Symptoms of ASD were investigated by means of the Children's Social Behavior Questionnaire (CSBQ) (Hartman et al.[19,20] and C. A. Hartman, Ph.D.; E. Luteijn, Ph.D.; H. Moorlag, M.A., et al., internal publication). The CSBQ is filled out by parents or caregivers who are involved in the education and development of the child and consists of 49 items describing a broad range of features that are typically seen in children with ASD, especially in its milder forms. To allow identification of specific symptom patterns of ASD, 6 subscales relating to specific behavior/emotional problems can be differentiated as follows.

1. Tuned: behavior/emotions with respect to adaptation to the social situation. It measures troublesome behavior that is also seen in typically developing children, but which manifests itself in an extreme form in PDD. Boys who have a high score on the tuned scale exhibit emotions and behavior that is not optimally tuned to the social situation. They show sudden changes of mood, are disobedient, are difficult to correct, make painful remarks to others, are stubborn, are unstoppable, and make a fuss over little things. Example of items within the tuned subscale are "overreacts to everything and everyone" and "quickly gets angry."
2. Social: aspects related to social contact, social interest, and social reciprocity. It refers to both initiation of contact and reaction to social overtures by others. Examples of items within the social subscale are "lives in a world of his own" and "makes no eye contact."
3. Orientation: orientation in time, place, or activity. This scale refers to the ability to keep an overview of what goes on and where one is headed. A high score on this subscale implies having a lack of overview in a situation or an activity, having no sense of time, and having a lack of guidance of one's own behavior. Examples of items within the orientation subscale are "gets lost easily" and "has difficulties doing 2 things simultaneously."
4. Understanding: characteristics related to understanding the rules of communication and the social use of language. Boys with high scores on this subscale are considered to be exceptionally naive, talk confusedly, frequently do not understand what is said, and say irrelevant things. Examples of items within the understanding subscale are "does not understand jokes" and "takes things literally."
5. Stereotyped: items describing specific stereotypical behavior, making odd movements with fingers and hands, smelling objects and being unusually sensitive to certain sounds, and being pleased by certain movements. Examples of items within the stereotyped subscale are "flaps arms and hands when excited" and "sways to and fro."
6. Change: items referring to fear of and resistance to changes. Children with a high score on this scale are strongly attached to definite routines and show strong resistance when new or different situations come up. An example of an item within the change subscale is "panics in new situation or if change occurs."

The subscales social, understanding, stereotyped behavior, and change (listed in Table 1) refer to the 3 core symptoms of ASD as described in DSM-IV-TR. The 2 remaining subscales of the CSBQ, tuned and orientation, provide information on associated symptoms that are, along with the core symptoms, frequently seen in children with ASD. The CSBQ has good psychometric properties with regard to validity and reliability.[19]

Statistical Procedure

The data were processed and analyzed using SPSS (Statistical Package for the Social Sciences, version 13.0). For all calculations, the level of statistical significance was set at .05. First, differences between the group of juvenile sex offenders and healthy controls were analyzed by means of t tests. Second, differences between (subgroups of) juvenile sex offenders, healthy controls, and clinical subgroups were analyzed using analysis of variance (ANOVA) followed by post hoc multiple comparison

Table 1. Children's Social Behavior Questionnaire Subscales and Items Referring to Core Symptoms

Social	Understanding	Stereotyped	Change
Does not look up when spoken to	Talks confusedly; jumps from one subject to another in speaking	Flaps arms/hands when excited	Panics in new situations or if change occurs
Acts as if others are not there	Only talks about things that are of concern for himself/herself	Makes odd, fast movements with fingers or hands	Remains clammed up in new situations or if change occurs
Lives in a world of his/her own	Does not fully understand what is being said to him/her, ie, tends to miss the point	Sways to and fro	Opposes change
Makes little eye contact	Frequently says things that are not relevant to the conversation	Is unusually sensitive to certain sounds, eg, always hears certain sounds earlier than other people	
Dislikes physical contact, eg, does not want to be touched or hugged	Does not understand jokes	Is extremely pleased by certain movements and keeps doing them, eg, turning around and around	
Does not seek comfort when he/she is hurt or upset	Takes things literally, eg, does not understand certain expressions	Smells objects	
Does not initiate contact or play with others	Is exceptionally naive; believes anything you say	Constantly feels objects	
Has little or no need for contact with others		Is fascinated by certain colors, forms, or moving objects	
Does not respond to initiatives by others, eg, does not join in or play along when asked			
Cannot be made enthusiastic about anything; does not particularly like anything			
Does not show his/her feelings in facial expressions and/or bodily posture			
Does not appreciate it when someone else is hurt or sad			

Table 2. Mean CSBQ Scores for Juvenile Sex Offenders and Clinical Subgroups

	Healthy Controls		Juvenile Sex Offenders		PDD-NOS		HFA		Statistical Analysis[a]	
Score[b]	Mean	SD	Mean	SD	Mean	SD	Mean	SD	F[c]	p
Tuned	3.56	3.95	6.82	5.63	12.20	6.10	11.70	5.70	107.828	< .05
Social	2.25	3.13	4.79	4.43	8.74	4.93	11.40	5.49	115.166	< .05
Orientation	1.54	2.22	3.46	3.59	5.87	3.66	5.87	3.32	81.274	< .05
Understanding	2.10	2.28	3.79	3.44	6.23	3.85	7.87	2.97	84.838	< .05
Stereotyped	0.75	1.39	1.76	2.53	1.81	2.46	4.52	3.72	39.875	< .05
Change	0.53	1.08	1.08	1.57	2.21	2.12	2.78	1.73	55.535	< .05
CSBQ total	10.71	11.08	21.70	17.02	37.05	14.59	44.13	15.53	148.259	< .05
Core symptoms	5.62	6.23	11.42	9.53	18.99	9.00	26.57	9.92	134.418	< .05

[a]Post hoc comparisons showed that juvenile sex offenders had significantly higher scores on all measures compared with the healthy control group and significantly lower scores than the PDD-NOS and HFA groups on all measures except the stereotyped subscale, for which the comparison with PDD-NOS was nonsignificant.
[b]Tuned: behavior/emotions not optimally tuned to the social situation; Social: reduced contact and social interest; Orientation: orientation problems in time, place, or activity; Understanding: difficulties in understanding social information; Stereotyped: stereotyped behavior; Change: fear of and resistance to changes; Core symptoms: sum of subscales social, understanding, stereotyped behavior, and change.
[c]df = 3,785.
Abbreviations: CSBQ = Children's Social Behavior Questionnaire, HFA = high functioning autism, PDD-NOS = pervasive developmental disorder not otherwise specified.

tests (with Bonferroni correction for multiple comparisons). Third, Cohen's d was used to measure effect sizes between subgroups of juvenile sex offenders and healthy control, PDD-NOS, and HFA groups. Effect sizes of 0.20 to 0.49 were considered small, 0.50 to 0.79 were considered medium, and 0.80 or greater were considered large.[21]

RESULTS

Juvenile Sex Offenders Versus Control Groups

Juvenile sex offenders scored between healthy controls and the PDD-NOS and HFA groups (Table 2) on total scores and most subscale scores. Post hoc tests showed that juvenile sex offenders as a group had significantly higher scores than the healthy control group and significantly lower scores in comparison with the HFA group and the PDD-NOS group. Only on the subscale stereotyped behavior was no difference found between the PDD-NOS group and juvenile sex offenders.

Juvenile Sex Offender Subgroups

Comparison of the juvenile sex offender subgroups revealed that the groups of child molesters and solo offenders had significantly higher scores on the total and core symptom scores as well as the tuned and orientation subscales compared to group offenders. In addition, child molesters had significantly higher scores on the subscale understanding, while solo offenders had significantly higher scores on the subscale change compared to group offenders (Table 3).

Comparison of subgroups of juvenile sex offenders and healthy controls revealed that juvenile sex offenders had significantly higher scores on the total and core symptom scores and all subscales compared to healthy controls, with an exception for group offenders on the change subscale.

When the different subgroups of juvenile sex offenders were compared to the PDD-NOS subgroup, significant differences were found for the total score (F = 23.817;

Table 3. Mean CSBQ Scores for Juvenile Sex Offender Subgroups

	Group Offender		Solo Peer Offender		Child Molester		Statistical Analysis	
Score[a]	Mean	SD	Mean	SD	Mean	SD	F[b]	p
Tuned	5.16	4.58	8.21[c]	6.36	8.22[c]	5.63	6.800	< .05
Social	3.93	3.93	5.47	4.77	5.59	4.68	2.868	.060
Orientation	2.46	2.92	4.28[c]	3.84	4.32[c]	4.04	5.968	< .05
Understanding	2.99	3.01	4.09	3.78	5.08[c]	3.35	5.253	< .05
Stereotyped	1.43	2.08	2.03	3.00	2.05	2.62	1.294	.277
Change	0.66	1.23	1.48[c]	1.78	1.35	1.69	5.568	< .05
CSBQ total	16.62	14.00	25.55[c]	18.73	26.62[c]	17.60	7.042	< .05
Core symptoms	9.00	8.05	13.07[c]	10.45	14.08[c]	9.93	5.127	< .05

[a]Tuned: behavior/emotions not optimally tuned to the social situation; Social: reduced contact and social interest; Orientation: orientation problems in time, place, or activity; Understanding: difficulties in understanding social information; Stereotyped: stereotyped behavior; Change: fear of and resistance to changes; Core symptoms: sum of subscales social, understanding, stereotyped behavior, and change.
[b]df = 2,172.
[c]Significant difference vs. group offenders.
Abbreviation: CSBQ = Children's Social Behavior Questionnaire.

Table 4. Effect Sizes[a] of Juvenile Sex Offenders Compared to Healthy Controls, PDD-NOS, and HFA Subgroups

	Compared to Healthy Controls			Compared to PDD-NOS			Compared to HFA		
Score[b]	Group Offender	Solo Peer Offender	Child Molester	Group Offender	Solo Peer Offender	Child Molester	Group Offender	Solo Peer Offender	Child Molester
Tuned	0.40	1.09	1.14	1.29	0.64	0.67	1.35	0.56	0.62
Social	0.52	0.97	1.03	1.07	0.67	0.65	1.73	1.19	1.16
Orientation	0.40	1.12	1.16	1.02	0.43	0.41	1.13	0.43	0.41
Understanding	0.37	0.80	1.26	0.93	0.56	0.31	1.63	1.06	0.87
Stereotyped	0.45	0.79	0.86	0.17	0.08	0.10	1.22	0.77	0.80
Change	0.12	0.81	0.72	0.88	0.37	0.43	1.56	0.74	0.84
CSBQ total	0.51	1.23	1.37	1.43	0.70	0.67	1.92	1.04	1.04
Core symptoms	0.52	1.10	1.29	1.17	0.62	0.53	2.07	1.31	1.26

[a]Effect sizes Cohen d. An effect size of $d \geq 0.20$ is characterized as small, $d \geq 0.50$ as medium, and $d \geq 0.80$ as large (see Cohen[22]).
[b]Tuned: behavior/emotions not optimally tuned to the Social situation; Social: reduced contact and social interest; Orientation: orientation problems in time, place, or activity; Understanding: difficulties in understanding social information; Stereotyped: stereotyped behavior; Change: fear of and resistance to changes; Core symptoms: sum of subscales social, understanding, stereotyped behavior, and change.
Abbreviations: CSBQ = Children's Social Behavior Questionnaire, HFA = high functioning autism, PDD-NOS = pervasive developmental disorder not otherwise specified.

df = 3,262; p < .05), core symptoms (F = 16.986; df = 3,262; p < .05), and all subscales (tuned: F = 22.086; df = 3,262; p < .05; social: F = 16.582; df = 3,262; p < .05; orientation: F = 13.046; df = 3,262; p < .05; understanding: F = 12.657; df = 3,262; p < .05 and change: F = 11.093; df = 3,262; p < .05) except for stereotyped behavior. Compared to the PDD-NOS subgroup, group offenders had significantly lower scores on the total CSBQ and all subscales except for stereotyped behavior. Solo offenders displayed lower scores than the PDD-NOS group on the total CSBQ and the subscales tuned, social, orientation, and understanding. As for child molesters, only their scores on the subscales tuned and social and on the total CSBQ were lower compared to those of the PDD-NOS group.

When the same procedure was conducted for the different subgroups of juvenile sex offenders compared to the HFA group, significant differences were found on all subscales (tuned: F = 9.863; df = 3,194; p < .05; social: F = 16.230; df = 3,194; p < .05; orientation: F = 7.287; df = 3,194; p < .05; understanding: F = 13.835; df = 3,194; p < .05; stereotyped behavior: F = 7.908; df = 3,194; p < .05; change: F = 11.728; df = 3,194; p < .05) and the total CSBQ (F = 17.497; df = 3,194; p < .05) as well as the core symptoms score (F = 21.030; df = 3,194; p < .05). Group offenders had significantly lower scores on all subscales and on the total and core symptoms CSBQ scores in comparison with the HFA group. When comparing the 2 other subgroups of juvenile sex offenders with the HFA group, both solo peer offenders and child molesters scored significantly lower on the total and core symptoms CSBQ scores and on all subscales except for tuned and orientation.

To qualify these findings further, Table 4 summarizes how the 3 subgroups of juvenile sex offenders compare to healthy controls and PDD-NOS and HFA subgroups in terms of effect sizes. These effect sizes qualify the findings from the ANOVAs by showing that in terms of autistic symptomatology, group offenders resemble healthy controls while solo offenders and child molesters can be

situated between healthy controls and clinical groups, in some respects showing similar characteristics to PDD-NOS and HFA individuals.

DISCUSSION

The objective of this study was to investigate the occurrence of ASD symptoms dimensionally in juvenile suspects of sex offenses compared with healthy controls and children with an ASD. Levels of ASD symptoms of juvenile sex offenders were found to be between those of healthy controls and clinical subgroups. When subgroups of suspected sex offenders were compared, child molesters and solo peer offenders had higher levels of ASD symptoms than group offenders. These findings argue for further investigating the possible relationship between sexual offending and ASD phenomena.

Juvenile sex offenders had higher levels of ASD symptoms than healthy controls, but lower levels than the PDD-NOS and HFA subgroups. In particular, when a cut-off of the mean score for the clinical subgroups was used, almost 1 out of 5 juvenile sex offenders were at or above the PDD-NOS mean score and 1 out of 8 were at or above the HFA mean score. As recent estimates of autism spectrum disorder are in the range of 6.5 to 6.6 per 1000 for the general population,[22–24] the proportion of juvenile sex offenders with levels of ASD symptoms that are similar to those in boys with PDD-NOS and HFA may be considered very high. Although it cannot be concluded from this that autistic disorders occur at high rates in juvenile sex offenders, as no independent diagnostic assessment was performed, further clinical and scientific investigation of this phenomenon is a necessity.

Not only core ASD symptoms as measured by the subscale social, but also other core symptomatology as measured by the subscales understanding, stereotyped behavior, and change, were high in juvenile sex offenders compared to healthy controls. On the subscale stereotyped behavior, no difference (e.g., a similar high score) was found compared to the PDD-NOS group. It has been suggested previously that lack of empathy, lack of social understanding, pursuit of obsessional interests, misinterpretation of rules, and failure to recognize the implications of their behavior for either themselves or others are associated with violent attacks by people with ASD.[12,13] More specifically, an impairment in the understanding of social information is thought to lead to the misinterpretation of another person's intents and feelings and therefore can lead to undesirable sexual behavior, while stereotyped and repetitive behavior may result in touching private parts in public, touching other people, or being interested in the opposite sex in a rigid, stereotyped, or compulsive way. The profile of restrictive, repetitive, and stereotyped behavior and lack of social understanding found in the present study may support that these impairments are related to (sexually) offensive behavior in ASD patients. Thus, although it cannot be concluded that autistic disorders occur at high rates in juvenile sex offenders, as a diagnostic interview is required to diagnose accurately, the elevated levels of autistic symptoms are a strong indication for considering further diagnostic assessment.

In addition to elevated levels of core ASD symptomatology (subscales social, understanding, stereotyped behavior, and change), the subscales tuned and orientation were also higher in sexual offenders than healthy controls. While related to ASD, these characteristics are also seen in children with oppositional defiant disorder and attention-deficit/hyperactivity disorder (ADHD) (Hartman et al.[20] and C. A. Hartman, Ph.D.; E. Luteijn, Ph.D.; H. Moorlag, M.A., et al., internal publication). For example, in the Hartman et al.[19] study, scores on the tuned and orientation scales were 12.63 and 7.05 in ADHD, compared to 12.36 and 6.42 in PDD-NOS and 12.13 and 7.71 in HFA, respectively. Neither HFA nor PDD-NOS differed from ADHD on these scales. So, the high scores on these subscales do not unambiguously imply an indication for PDD symptomatology and could possibly be explained by a co-occurrence of ADHD and oppositional defiant disorder symptomatology in this group of juvenile sex offenders.

As for differences between subgroups, when we observed the particular subscales that represent core symptomatology of ASD, it was seen that juvenile sex offender subgroups had higher scores compared to healthy controls. Moreover, compared to the PDD-NOS subgroup, no differences (e.g., similar high scores) were found on the scales stereotyped behavior (all 3 subgroups of juvenile sex offenders), change (solo offenders and child molesters), or understanding (child molesters). Two out of 3 of the DSM-IV-TR core symptoms for ASD (measured by the subscales stereotyped behavior, fear and resistance to change, and understanding social information) were seen separately in all subgroups of juvenile sex offenders, but all 3 were seen together in the group of child molesters. Thus, when only core symptoms were considered, child molesters did indeed show the most pronounced ASD symptoms.

On the basis of the literature,[15,16,18] it was expected that symptoms of ASD would be highest in the group of child molesters. However, in the present study, similar levels were also found for solo peer offenders. In prior research, socially inadequate behavior and isolation were described as child molester–specific characteristics.[17,18] The present findings suggest that solo offending, rather than the age of the victim, is related to ASD symptomatology.

Limitations

While findings of this study address an issue of substantial relevance, they should be considered in light of some shortcomings. First, as only self-report questionnaires were used and no independent diagnostic assessment was performed, clinical ASD diagnoses could not be

made. Because the assessment of ASD is complex and time-consuming, it was not possible to organize clinically based categorical diagnostic assessment in a large-scale epidemiologic study like the one presented here. Second, selection bias may explain the high rates of ASD symptoms in juvenile sex offenders. Because juvenile sex offenders with ASD problems are likely to get caught or referred more easily than offenders without these particular symptoms, they may be overrepresented in studies like ours. Third, although sex offenders, and particularly solo peer offenders and child molesters, were demonstrated to bear social-relational vulnerabilities, directionality of the findings is still unclear. As this study was cross-sectional, no conclusions can be drawn with regard to causal or time-related paths.

The occurrence of ASD symptoms is high among juvenile suspects of sex offenses compared to the general population. Because it was not feasible to use a diagnostic interview to determine an ASD diagnosis, the present findings are based on questionnaire data. With this limitation in mind, the proposed association between sex offending and developmental disorders clearly seems to apply.

Clinical Implications

When assessing juvenile suspects of sex offenses, diagnostic psychiatric assessment should be conducted, including the evaluation of disorders within the autistic spectrum. By means of instruments like the CSBQ, social impairments can be assessed systematically. Exploring various emotional and behavioral aspects of ASD may give direction to further diagnostic assessment and treatment programs. Eventually, not only may adequate care be provided, but rates of recidivism might be curtailed as well. Results of the present study indicate that symptoms of ASD may be associated with sexually offensive behavior. When considered with findings from studies in ASD subjects, this may support that sexual development should be an important topic in persons with ASD, especially in the adolescent phase. However, as we cannot make any definitive conclusions on the developmental relationships between these phenomena, further (longitudinal) research on this subject is needed. This research should also include studies of the occurrence of sexually offensive behavior in ASD subjects by means of standardized instruments.

REFERENCES

1. Smallbone SW. Social and psychological factors in the development of delinquency and sexual deviance. In: Barbaree HE, Marshall WL, eds. The Juvenile Sex Offender. 2nd ed. New York, NY: The Guilford Press; 2006:105–127
2. Realmuto GM, Ruble LA. Sexual behaviors in autism: problems of definition and management. J Autism Dev Disord 1999;29(2):121–127
3. American Academy of Pediatrics. Committee on Children with Disabilities. Sexuality education of children and adolescents with developmental disabilities. Pediatrics 1996;97(2):275–278
4. Van Bourgondien ME, Reichle NC, Palmer A. Sexual behavior in adults with autism. J Autism Dev Disord 1997;27(2):113–125
5. Ruble LA, Dalrymple NJ. Social/sexual awareness of persons with autism: a parental perspective. Arch Sex Behav 1993;22(3):229–240
6. Hellemans H, Colson K, Verbraecken C, et al. Sexual behavior in high functioning male adolescents and young adults with autism spectrum disorder. J Autism Dev Disord 2007;37(2):260–269
7. Wing L. Asperger's syndrome: a clinical account. Psychol Med 1981;11: 115–129
8. Baron Cohen S. Assessment of violence in a young man with Asperger's syndrome. J Child Psychol Psychiatry 1988;29:351–360
9. Chesterman P, Rutter SC. A case report: Asperger's syndrome and sexual offending. J Forensic Psychiatry 1994;4:555–562
10. Kohn Y, Fahum T, Ratzoni G, et al. Aggression and sexual offense in Asperger's syndrome. Isr J Psychiatry Relat Sci 1998;35(4):293–299
11. Milton J, Duggan C, Latham A, et al. Case history of co-morbid Asperger's syndrome and paraphilic behaviour. Med Sci Law 2002;42: 237–244
12. Scragg P, Shah A. Prevalence of Asperger's syndrome in a secure hospital. Br J Psychiatry 1994;161:679–682
13. Howlin P. Legal issues. In: Autism and Asperger Syndrome, Preparing for Adulthood. 2nd ed. London, England: Routledge, Taylor & Francis Group; 2004:300–312
14. van Wijk A, Vermeiren R, Loeber R, et al. Juvenile sex offenders compared to non-sex offenders: a review of the literature 1995–2005. Trauma Violence Abuse 2006;7(4):227–243
15. O'Brien M, Bera W. Adolescent sex offenders: a descriptive typology. News Letter of the National Family Life Education Network 1986;1:1–5
16. Barbaree HE, Marshall WL, McCormick J. The development of deviant sexual behavior among adolescents and its implications for prevention and treatment. Irish J Psychol 1998;1:1–31
17. Hsu LKG, Starzynski J. Adolescent rapists and adolescent child sexual assaulters. Int J Offender Ther Comparative Criminol 1990;34:23–30
18. Van Wijk AP, Blokland AA, Duits N, et al. Relating psychiatric disorders, offender and offence characteristics in a sample of adolescent sex offenders and non-sex offenders. Crim Behav Ment Health 2007;17(1):15–30
19. Hartman CA, Luteijn E, Serra M, et al. Refinement of the Children's Social Behavior Questionnaire (CSBQ): an instrument that describes the diverse problems seen in milder forms of PDD. J Autism Dev Disord 2006;36(3):325–342
20. Hartman CA, Luteijn E, Moorlag H, et al. Vragenlijst voor Inventarisatie van Sociaal gedrag van Kinderen (VISK). Herziene handleiding 2007. Amsterdam, the Netherlands: Harcourt Test Publishers; 2007
21. Cohen J. Statistical Power Analysis for the Behavioral Sciences. 2nd ed. Hillsdale, NJ: Erlbaum; 1988:24–26
22. Fombonne E, Zakarian R, Bennett A, et al. Pervasive developmental disorders in Montreal, Quebec, Canada: prevalence and links with immunizations. Pediatrics 2006;118(1):e139–e150
23. Dosreis S, Weiner CL, Johnson L, et al. Autism spectrum disorder screening and management practices among general pediatric providers. J Dev Behav Pediatr 2006;27(suppl 2):S88–S94
24. Myers SM, Plauché Johnson C. Council on Children with Disabilities. Management of children with autism spectrum disorders. Pediatrics 2007;120(5):1162–1182

Editor's Note: We encourage authors to submit papers for consideration as a part of our Focus on Childhood and Adolescent Mental Health section. Please contact Karen D. Wagner, M.D., Ph.D., at kwagner@psychiatrist.com.