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Sexual Behavior in High-Functioning Male Adolescents and Young Adults with Autism Spectrum Disorder

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Abstract Group home caregivers of 24 institutionalized, male, high-functioning adolescents and young adults with Autism Spectrum Disorder, were interviewed with the Interview Sexuality Autism. Most subjects were reported to express sexual interest and to display some kind of sexual behavior. Knowledge of socio-sexual skills existed, but practical use was moderate. Masturbation was common. Many subjects were seeking physical contact with others. Half of the sample had experienced a relationship, while three were reported to have had sexual intercourse. The number of bisexual orientations appeared high. Ritual-sexual use of objects and sensory fascinations with a sexual connotation were sometimes present. A paraphilia was present in two subjects. About one third of the group needed intervention regarding sexual development or behavior.

Keywords Autism · Sexuality · Sexual behavior · Sexual problems · Paraphilia

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Introduction

The sexual development of children and adolescents with autism spectrum disorders (ASD) and the sexual behavior of persons with ASD remain a neglected scientific and clinical issue. Nonetheless individuals with ASD display sexual behavior and have sexual feelings and needs (D. Haracopos & L. Pedersen, unpublished; van Bourgondien, Reichle, & Palmer, 1997). As for typical persons sexuality can be a source of intense pleasure or the cause of problems and frustration. Clinicians with expertise in the field of ASD are frequently asked by institutions and parents to give advice on sexual behavior and sexual problems. Individuals with high-functioning autism (HFA) or Asperger syndrome (AS) frequently express concerns and frustrations in connection with sexuality and relations with other persons. The surveys by Ruble and Dalrymple (1993) and van Son-Schoones and van Bilsen (1995) of parents of children with autism showed that sexuality was high on the list of major concerns on which parents of individuals with autism sought help.

The few studies on sexuality and ASD (D. Haracopos & L. Pedersen, unpublished; Konstantareas & Lunsky, 1997; Ousley & Mesibov, 1991; Ruble & Dalrymple, 1993; van Bourgondien et al., 1997; van Son-Schoones & van Bilsen, 1995) demonstrate that persons with ASD display sexual interest and a wide range of sexual behaviors. Sexual needs are usually expressed by masturbation, which sometimes takes place in the presence of other persons. Person-oriented sexual activity occurs, but is usually limited to touching, holding hands and kissing. Often the ''partner'' regards these activities as undesired attentions. Intercourse is only rarely reported. These studies suggest that sexuality can lead to

problems for persons with ASD, including deviant forms of masturbation that sometimes entail self-mutilation or the use of unusual objects, hypermasturbation due to an inability to reach orgasm, undressing or masturbation in the presence of other people and the initiation of unwanted physical contact. A common shortcoming of these studies is that the samples were very diverse with regard to cognitive abilities (D. Haracopos & L. Pedersen, unpublished; Konstantareas & Lunsky, 1997; Ruble & Dalrymple, 1993; van Bourgondien et al., 1997; van Son-Schoones & van Bilsen, 1995). This makes it difficult to conclude which behaviors are related to ASD and which to mental retardation.

In the last 15 years, the care for persons with ASD in Flanders (the Dutch-speaking part of Belgium) has allowed to focus the attention on sexual matters. Seminars on this topic have been organized for parents and caregivers. Institutions and schools for children and adolescents with ASD organize sex education courses. Many institutions and schools have adopted mentorship (individual counseling) for persons with HFA and AS. Sexual topics are a regular feature of the counseling provided by the mentor. Adults with HFA and AS are enabled to seek help for their sexual and relational problems, and partners of persons with AS can meet to talk about these matters. The result is that a corpus of experience and knowledge has been established that has not yet been scientifically examined (Hellemans, 1989, 1996). Some clinical observations were done that need further investigation, such as the occurrence of paraphilias in high-functioning persons with ASD (fetishism, sexual orientation towards children, cross-dressing). This observation has received little attention in the literature (Kobayashi, 1996; Landén & Rasmussen, 1997; Realmuto & Ruble, 1999; Williams, Allard, & Sears, 1996).

The approach taken by this study is based on the above considerations. An intellectually relatively homogenous group of individuals with ASD was studied by means of a semi-structured, investigator-based interview. The purpose of this study was to make a descriptive examination of the theoretical knowledge and application of self-care and socio-sexual skills, the sexual behavior and the sexual problems of a group of high-functioning (Full Scale IQ above 70) male adolescents and young adults with ASD living in an institution.

Method

Subjects

Subjects were recruited from all institutions in Flanders offering residential care for high-functioning persons with ASD. Five institutions were involved. Adolescents with ASD in Flanders are sometimes institutionalized because of the severity of the ASD or because of behavior problems, but most often because of the superior care institutions can provide compared to schools. Schools tend to focus mainly on academic skills, while institutions have more means to provide training of daily living skills, leisure activities, social and communicative skills. The group of 6–8 adolescents (age 12–21 years) in which the individuals with ASD live, is used as a therapeutic-training environment. The adolescents stay in the institution during the week and spend the weekend at home. Sex education was on the curriculum of all the institutions concerned. Training in socio-sexual skills was given and individual counseling (mentorship) was available. The level of supervision in these groups is high. One to two caregivers are present during daytime and one during the night. A treatment schedule for each adolescent is updated once or twice a year. This schedule includes an evaluation of self-care and socio-sexual skills, and a definition of individual treatment goals. Staff members are informed about these goals. Each adolescent has a supervising caregiver who is responsible for the implementation of the rules. A psychologist is responsible for the general supervision of the treatment schedules. All the institutions provided many opportunities for socialization, both inside and outside the institution. Sexual policies of all the institutions allowed heterosexual interaction (walking hand-in-hand, kissing, caressing), with the exclusion of sexual intercourse. One institution allowed homosexual interaction with the exclusion of intercourse. No institution allowed sexual interaction between subjects and caregivers.

Exclusion criteria were a history of sexual abuse and the existence of other handicaps (motor, sensory). This yielded 37 potential subjects, of whom 12 were not investigated because their parents did not give permission. According to the caregivers of the institutions not investigated candidates were not different in sexual behavior or presence of sexual problems from investigated candidates. One subject was subsequently rejected because a prior history of sexual abuse came to light during the study, resulting in a final study group of 24 male adolescents. There were no other exclusions based on a history of sexual abuse. The mean age was 17 years (range 15–21). The mean Full Scale IQ (prior WISC-R results of all subjects were known) was 90 (ranging from 71 to 113). The mean Verbal IQ was 92 (64–116). The mean Performance IQ was 90 (61–122). All subjects had a pre-existing diagnosis of autistic disorder (AD), Pervasive Developmental

Disorder-Not Otherwise Specified (PDD-NOS) or AS from a variety of specialized centers. The first author (H.H.), a child psychiatrist who has extensive experience with diagnosing ASD made subtype diagnoses using the DSM-IV criteria (American Psychiatric Association, 1994) on the basis of an examination of the individual medical records and information from caregivers. Fourteen subjects got a diagnosis of AD, 6 of AS and 4 of PDD-NOS. Nine of the subjects (37%) were on medication: 5 atypical neuroleptics (risperidone), 1 neuroleptic (benperidol), 1 psychostimulant (methylphenidate) and 4 selective serotonin reuptake inhibitors (SSRI). Two of the subjects were taking medication because of their sexual problems: one was receiving a neuroleptic drug, the other an atypical neuroleptic drug and an SSRI. The neuroleptics were being given to diminish the libido. The SSRI was being given to diminish an obsessive sexual interest in young girls. In both cases the drugs were reported to have little effect.

No comorbid diagnoses that could affect sexual interest and behavior (e.g. temporal lobe seizures, PTSD or depression) were reported in the medical files of the subjects.

Information about the subjects was obtained from the caregivers who supervised the subjects. For ethical and practical reasons, it was decided to interview caregivers and not directly subjects. Because it was the first study of this kind in Flanders, parents were expected to be reluctant to approve to a direct interview of their child. It was also easier to design an interview of caregivers, than an interview of persons with ASD, which would require specific interviewing methods. Seventeen caregivers (5 female, 12 male; mean age 36 years, range 23–51) were involved, with a diversity of professional training, mainly educational staff but also occupational therapists. All were being trained and monitored by the psychologist or the remedial educationalist of the institution. The caregivers knew the subjects for six months in two cases and for at least one year in all other cases (mean 3.8 years; range 0.5–11.00). Most of the caregivers were involved in giving education on socio-sexual skills. Some of the caregivers talked about sexual matters with the subjects, while other caregivers didn't, which may explain some of the inter-individual differences in knowledge about the sexuality of the subjects. Some caregivers knew a lot of details, while others had to give a lot of ''unknown'' answers.

Parents and adult subjects signed an informed consent for the interviews. The study design was approved by the local ethical committee.

Instrument

An investigator-based, semi-structured interview, the Interview about Sexuality in Autism (ISA, H. Hellemans & K. Colson, unpublished) was developed for this study. The first part of the ISA covers the theoretical knowledge and actual practice of self-care skills (washing the genitals; changing underwear; proper use of the toilet; hygiene after visiting the toilet) and socio-sexual skills (knowing whom one is allowed to touch or kiss; knowing where one can walk around naked and where not; knowing with whom and when one is allowed to talk about sex; knowing that it's not appropriate to touch the genitals in the presence of others; knowing where one can masturbate). The second part of the ISA covers the actual sexual behavior. The third part asks about the presence of specific autistic features in the sexual behavior. The presence of sexual problems is determined through open-ended questions throughout the interview.

Some questions (e.g. theoretical knowledge and actual practice of self-care and socio-sexual skills) had a five-point rating scale (1: very poor, 2: poor, 3: moderate, 4: good, 5: very good), and were recoded to a three-point scale (1: poor, 2: moderate, 3: good). Items from the self-care and socio-sexual skills scale were summed to yield total scores. Cronbach's α for the self-care skills scale were 0.75 (theoretical knowledge) and 0.61 (application in practice), and for the socio-sexual skills scale 0.82 and 0.83. Other questions (e.g. ''Does N. masturbate?'') were dichotomized (behavior present/not present). Because of the small sample size, an unequivocal interpretation of more extensive categorical scales was not possible. When necessary, the answers were also qualitatively explored.

Results

Self-Care and Socio-Sexual Skills

The theoretical knowledge of self-care and socio-sexual skills (Table 1) was rated adequate, while the actual practice (Table 2) was inadequate for a number of individuals. Most problems concerned a lack of intimate hygiene, talking too frankly about sexuality, touching the genitals in public and masturbation in the presence of others.

Sexual Behavior (see Table 3)

Sexual Interest

As reported by the caregivers, all subjects but one showed an interest in sexuality; 8 (33%) some and 15

Table 1 Theoretical knowledge of self-care and socio-sexual skills

	Poor		Moderate		Good		Unknown	
	N	%	*N*	%	*N*	%	*N*	%
Self-care skills								
Washing the genitals	0	0	3	13	18	75	3	13
Changing underwear	0	0	1	4	23	96	0	0
Proper use of the toilet	0	0	1	4	23	96	0	0
Hygiene after using the toilet	0	0	0	0	22	92	2	8
Socio-sexual skills								
Knowing whom it is allowed to touch and kiss	0	0	2	8	22	92	0	0
Suitable clothing	0	0	0	0	24	100	0	0
Talking about sex	1	4	6	25	16	67	1	4
Touching the genitals in public	1	4	5	21	16	67	2	8
Knowing where it's allowed to masturbate	0	0	3	13	18	75	3	13

Table 2 Application of self-care and socio-sexual skills

	Poor		Moderate		Good		Unknown	
	N	%	*N*	%	*N*	%	*N*	%
Self-care skills								
Washing the genitals	2	8	5	21	10	42	7	29
Changing underwear	2	8	4	17	18	75	0	0
Proper use of the toilet	0	0	3	13	21	88	0	0
Hygiene after using the toilet	0	0	0	0	23	96	1	4
Socio-sexual skills								
Knowing whom it is allowed to touch and kiss	3	13	7	29	14	58	0	0
Suitable clothing	0	0	3	13	21	88	0	0
Talking about sex	3	13	5	21	15	62	1	4
Touching the genitals in public	7	29	4	17	13	54	0	0
Knowing where it's allowed to masturbate	3	13	3	13	15	62	3	13

Table 3 Sexual behavior

	No		Yes		Unknown		Not applicable	
	N	%	*N*	%	*N*	%	*N*	%
Shows interest in sexuality	1	4	23	96	0	0	–	–
Masturbates	1	4	10	42	13	54	–	–
Masturbation technique has been instructed	7	29	7	29	10	42	–	–
Has a peculiar masturbation technique	3	13	2	8	19	79	–	–
Masturbates in a compulsive way	4	17	4	17	16	67	–	–
Caresses other persons	11	46	11	46	2	8	–	–
Cares whether other person likes caressing	4	17	7	29	2	8	11	46
Kisses other persons	17	71	5	21	2	8	–	–
Cares whether other person likes kissing	2	8	3	13	2	8	17	71
Displays sexually intended touching	17	71	4	17	3	13	–	–
Cares whether other person likes sexually intended touching	4	17	0	0	3	13	17	71
Talks about need for relationship	14	58	10	42	0	0	–	–
Has had a close affective/physical relationship	8	33	13	54	3	13	–	–
Has attempted sexual intercourse	0	0	3	13	21	88	–	–
Has had sexual intercourse	16	67	3	13	5	21	–	–
Has expressed frustration about not being able to establish or maintain a relationship	19	79	5	21	0	0	–	–

(63%) a definite interest. One person was completely lacking interest. He was described as mentally very childish despite a normal physical and cognitive development.

Masturbation

As reported by the caregivers, the number of subjects about whom it was not known whether they masturbated was high (13, 54%). About one person it was definitely known that he did not masturbate, because he was taught how to masturbate, but was not interested in doing so. Ten (42%) subjects were definitely known to masturbate. Seven (29%) were taught a masturbation technique. This took place during individual counseling with the aid of verbal instruction, photographs and/or videotapes. Two subjects were instructed because they did not spontaneously discover how to masturbate and because attempts to masturbate were ineffective. This failure caused considerable frustration and led to repeated, unsuccessful attempts to masturbate (so-called ''hypermasturbation'', D. Haracopos & L. Pedersen, unpublished). Peculiar masturbation techniques and a repeated use of objects were reported for both. The first one had an obsessive interest in shoes and leather. Occasionally, he injured himself during masturbation by strapping himself up tightly with leather belts. The second one rubbed his penis against some pillows that he kept for this purpose. The other five subjects received instruction in masturbation as part of the usual sex education course. Masturbation usually took place in the bedroom (for all 10 subjects known to masturbate) or in the bathroom (2). Three adolescents occasionally masturbated in the presence of others. For four subjects masturbation had compulsive characteristics. One individual was compelled to masturbate whenever he was naked, leading to masturbation in the changing room of the swimming pool in the presence of others. Another subject was compelled to masturbate whenever he took a shower, while another masturbated obsessively several times a day. The last one had an obsessive interest in sexuality in general, including masturbation.

Person-Oriented Behavior

As reported by the caregivers, 11 subjects (46%) caressed or cuddled other persons; four (17%) did not care whether the other person enjoyed this or not. Five (21%) subjects sometimes kissed other persons; two (8%) did not care whether the ''partner'' liked the contact or not. For one kissing was a repetitive behavior towards the parents. For the other person, the kissing was sometimes provoked by others and had to do with social naivety. When his fellows in the group asked ''Why don't you give that girl a kiss?,'' he did so and got into trouble.

As reported by the caregivers, sexually intended touching outside of a relationship occurred for four subjects (17%). All of them were reported sometimes to touch persons who did not like this.

Ten subjects (42%) talked with the caregivers about the need for a close affective and/or sexual relationship. Various reasons were given for this need: ''to be like normal young people'' (60% of these ten subjects); the sexual aspect of the relationship (60%); the affective aspect of the relationship (60%); the desire ''to do things together'' (30%), and ''to have someone to look after me'' (20%). As reported by the caregivers, 13 subjects (54%) had already had a close affective and/or physical relationship at least once before, ranging from a brief ''holiday romance'' to a sexual relationship with intercourse. According to caregiver reports the sexual developmental level of these relationships broke down as follows: sexual level unknown (4% of the sample); walking hand-in-hand (8%); kissing (13%); sitting on the other's lap (4%); mutual petting (8%). As reported by caregivers three subjects (13%) had already made attempts to have sexual intercourse, unknown to be successful, while three (13%) had effectively had intercourse (one heterosexual, two homosexual). Three of these six subjects had a girlfriend outside the residential group. The other three had had homosexual contacts within their residential group. Two subjects currently had a relationship with each other involving oral sex and mutual masturbation. One of the two had already had two other homosexual relationships with sexual intercourse. Two attempts to have undesired homosexual relations (once with attempted anal penetration) were reported.

Five subjects (21%) expressed their frustration about not being able to establish a relationship.

Sexual Orientation

As reported by the caregivers, 18 subjects (75%) had a pronounced hetero-, homo-, or bisexual orientation (Table 4). The homosexually oriented subject was

Table 4 Sexual orientation

	N	% of entire group	% of group with a clear sexual preference
Unclear	6	25	–
Heterosexual (including heterosexual pedophiliac)	14	58	78
Homosexual	1	4	6
Bisexual	3	13	17

primarily interested in boys who were a few years younger, but not prepubescent. A bisexual preference was reported for three adolescents, in which the specific preference depended on the circumstances. They displayed sexual behavior towards group members and caregivers of both sexes.

Specific Autistic Features: Influence of Repetitive Patterns and Sensory Fascinations on Sexual Behavior

A specific interest in particular objects was noted for six subjects. Two persons used these objects during masturbation. For another person the nature of the object (i.e. lingerie) had an obvious sexual connotation. In the three other cases it was unknown whether the object was used in a sexual way. Fascinations with a potentially but unknown sexual connotation were common. Five subjects were fascinated by hair (their own and others), which was expressed by a frank staring at hair. One individual had a tendency to stroke the hair of others. Another person had a tendency to look very closely at heads and faces. In all cases the fascinations were not associated with obvious signs of sexual excitement, but they certainly gave rise to problems in social interaction. In two subjects sensory fascinations were accompanied by obvious signs of sexual excitement. One person sometimes became sexually aroused by certain smells, while for another subject ''hardcore house'' music evoked sexual arousal.

There were two reports of sexual preference based on idiosyncratic characteristics. One individual was attracted to persons with a tic in the eye or a pronounced smell. The other appeared to be drawn to strikingly unattractive women.

Ten subjects (42%) were interested in photographs and videotapes featuring nude women. Two subjects showed this interest with a striking lack of modesty: one examined the pornographic magazines in the magazine rack of a petrol station in the presence of his mother, and another subject made no attempt to conceal his collection of pornographic pictures.

Paraphilia

Two of the heterosexual subjects were primarily attracted to young, prepubescent girls. One had a platonic interest in young girls. The other one had an intense sexual desire for young girls and met the criteria for a DSM-IV-diagnosis of pedophilia. This subject received specialized treatment in a center for sexual perpetrators, and was legally prosecuted because of a large number of child pornographic pictures that were found on his computer.

One of the persons with a specific interest in particular objects met the DSM-IV-criteria for fetishism.

Sexual Problems

Sexual problems were described as severe for 7 subjects (29%). These included masturbation in the presence of others, deviant masturbation, unwanted sexual touching, unwanted attempts to intercourse, pedophilia, fetishism, and anxiety states in connection with sexuality. Two subjects displayed anxiety with regard to ejaculation. One panicked during his first nocturnal emission and developed an aversion to sperm. The other evolved bizarre fantasies concerning the quantity of fluid lost during ejaculation. One person, although interested in sex, seemed to be repelled by sexuality. He used to make denigrating remarks about other members of the group who showed an interest in sex.

Most of these problems were dealt with within the institution by means of individual counseling, sex education courses, and training in socio-sexual skills. As reported before, two of the subjects were taking medication because of sexual problems.

Discussion

Earlier studies alike (D. Haracopos & L. Pedersen, unpublished; Konstantareas & Lunsky, 1997; Ousley & Mesibov, 1991; Ruble & Dalrymple, 1993; van Bourgondien et al., 1997; van Son-Schoones & van Bilsen, 1995) this study shows that the majority of high-functioning adolescents and young adults with ASD express sexual interest and display a variety of sexual behaviors. Respondents reported a wider array of sexual behavior than in earlier studies, mainly with respect to the interest in relationships and the establishment of relationships.

Normal, age-appropriate sexual behavior was reported to be present in many of the subjects. Masturbation occurred frequently in the present sample, but the reported frequency was lower than in the normal population. Masturbation occurs in 80% of male adolescents in the age group of 14–15 years and 90% in the age group of 16–19 years (Vogels & van der Vliet, 1990). The lower reported frequency is probably due to the method being used. Frequency numbers in the normal population typically are obtained through self-report questionnaires. The number of persons about whom it was not known whether they masturbated was

higher than in other studies of persons with ASD (D. Haracopos & L. Pedersen, unpublished; Ruble & Dalrymple, 1993; Van Bourgondien et al., 1997). A possible explanation may lie in the normal level of intellectual development, which may have resulted in a more concealed sexual expression. Also, the institutions where these adolescents lived, offered respectful privacy to the residents, e.g. the majority of the individuals stayed in single bedrooms. The majority masturbated in the privacy of bedroom and bathroom.

As reported by caregivers, many had also taken some developmental steps towards the establishment of an intimate, sexual relationship. Half of the group expressed a wish for an intimate or sexual relationship and endeavored to make this happen. Half ever had a close affective and/or physical relationship, although the sexual developmental level of these relationships tended to be limited. The data on the developmental steps towards a relationship in the present study are not detailed enough to make comparison with normal development possible. Also, the method being used makes comparison difficult (interview of caregivers vs. self-report questionnaires). Three subjects already had (homo)sexual intercourse. The frequency of coital experience is lower than in the normal population, but higher than in other studies of people with ASD. The three subjects with coital experience all were in the age range 18–21 years. In the normal population 49% of the 18-year olds (Brugman, Goedhart, Vogels, & Van Zessen, 1995) to 73% of the 20-year olds have had coital experience (Vanhove & Matthijs, 2003). In the present sample none of the subjects in the age range 16–17 ever had coital experience. Frequencies in the normal population are 35% at the age of 16 (Brugman et al., 1995) and 45% (Brugman et al., 1995) to 47% (Vanhove & Matthijs, 2003) for 17-year olds. In their study group of persons with ASD, van Bourgondien et al. (1997) reported only one person who had successfully had sexual intercourse. Ruble and Dalrymple (1993) made no mention of persons with ASD who ever had sexual intercourse. In the D. Haracopos and L. Pedersen study (1992, unpublished), one woman had had intercourse with a normal adolescent that clearly took advantage of her. Some subjects of the Konstantareas and Lunsky study (1997) reported experience with intercourse, but it is not evident if the subjects fully understood what was meant by the term intercourse. It appears that the need for a sexual relationship and the ability to establish a relationship is higher in a group of institutionalized high-functioning persons with ASD than in the populations described earlier in literature. The open-minded climate in Flemish institutions, where it is usually accepted that persons with autism have a right to a sexual relationship, may play a role. It may also be an increasing phenomenon in the western world to allow more sexual freedom to adolescents overall and to accept sexual needs of adolescents and adults with developmental disorders. This last tendency may well result in a more open reporting of such behavior. Nevertheless, not all subjects could translate their need into an actual relationship. Some of the interviewees described the expression of frustration in the subjects about the difficulties in establishing and maintaining relationships.

Although age-appropriate sexual interests and behaviors were reported, some inappropriate or deviant, potentially harmful sexual behaviors cannot be ignored in this study group. While socio-sexual skills were reported to be fairly well known in theory, they were often not used in practice. In some cases this was reported to result in problematic behavior, such as masturbation in the presence of others. Problems relating to a lack of modesty were also reported, such as touching the genitals in public and an excessively frank discussion of sex. The relative frequency of masturbation in public was lower than reported by D. Haracopos and L. Pedersen (unpublished), who found a 53% prevalence of masturbation in public. The large number of mentally retarded individuals in their study group may explain this higher percentage. The results of the present study suggest that although the majority of the subjects have learned to conceal their sexual behavior, a substantial minority has not mastered this skill.

The results also demonstrate that persons with ASD, even when normally intelligent, do not always discover spontaneously how to masturbate. Difficulties in achieving orgasm and/or incorrect masturbation techniques occasionally provoked stress and hypermasturbation.

Many subjects were seeking physical contact, sometimes in a frankly sexual way. They often failed to make a satisfactory distinction between desired and undesired contacts, which could be related to the lack of social and emotional reciprocity.

The number of bisexual orientated persons appeared rather high, compared to figures of bisexuality in normal male adolescents and young adults (Vogels & van der Vliet, 1990: 1.3%; Bagley & Tremblay, 1998: 7.7%). D. Haracopos and L. Pedersen (unpublished) also found a high number (14%) of persons with autism expressing interest in both sexes. It is not clear to what extent living in a largely male community has affected the development of a bisexual orientation. Further longitudinal research should also investigate the sexual orientation of the bisexual subjects when they have

reached adulthood. Since many of the subjects were still adolescent, it may be that their sexual orientation was in an immature state.

As earlier studies have suggested, the results confirm that the presence in individuals with ASD of repetitive behavior, stereotyped interests, and sensory fascinations may influence the sexual development. Specific features in our sample in line with this suggestion were the presence of compulsive masturbation, ''autistic'' fetishism with the ritual use of objects, fascinations with a sexual connotation and strange fears associated with sex. It should be noted that the number of ''unknown'' answers in this section of the study was high. It is therefore not possible to make statements about the true prevalence of these behaviors. A DSM-IV-diagnosis of paraphilia was present in two subjects (one pedophilia, one fetishism) and a tendency to pedophilia was present in one subject. These numbers appear to be high, although the prevalence of paraphilias in the normal population of male adolescents and young adults is unknown (Frenken, 2002; Maletzky, 1998).

In about one third of the study group, the sexual development was considered problematical and intervention seemed justified. Two subjects were receiving medication for their sexual problems, and one person was being treated in a specialized center. Overall the results of the present study suggest that institutionalized, male, high-functioning adolescents with ASD are at risk for inappropriate and even deviant sexual behavior. The concept of counterfeit deviance (Hingsburger, Griffiths, & Quinsey, 1991; Realmuto & Ruble, 1999) has been proposed to explain deviant sexual behavior in individuals with developmental disorders. This concept means that deviant behavior may arise from living in a system in which appropriate sexual knowledge and relationships are not supported (Hingsburger et al., 1991). Since the subjects of the present sample were living in an environment where sex education was on the curriculum, training in socio-sexual skills was being given and individual counseling (mentorship) on sexuality was available, counterfeit deviance doesn't seem to be the explanation for the findings. The results should call for adequate diagnostic attention being given to the presence of sexual problems in individuals with ASD.

The present study suggests some educational and treatment implications. Since the majority of the subjects are reported to have expressed sexual interest and to have displayed sexual behavior, it may be concluded that sex education is important in high-functioning individuals with ASD. The finding that some subjects are reported to have difficulties in achieving orgasm and/or to be using incorrect masturbation techniques, suggests that sexual education for individuals with ASD must be practical and must include masturbation techniques and socio-sexual skills concerning masturbation practices. Because the interest and actual behavior in about half of the sample includes intimate and sexual relationships, sex education programs for high-functioning adolescents with ASD should cover sexual intercourse, contraception and sexually transmitted diseases. The finding that the subjects often failed to make a satisfactory distinction between desired and undesired contacts, which could be related to the lack of social and emotional reciprocity, suggests that, apart from sexual education teaching knowledge and skills, attention should be given to the education of empathic and perspective-taking skills. Since in the present sample socio-sexual skills were often not used in practice in spite of a lot of training and supervision, specific sex education modules have to be developed. In this regard it has to be mentioned that the literature on sex education programs for people with ASD is very limited (Ford, 1987; Gray, Ruble, & Dalrymple, 2000; Koller, 2000; Meister, Norlock, Honeyman, & Pierce, 1994; Melone & Lettick, 1983). Sex education programs for adolescents with mental retardation have been developed (Craft, 1994; Kempton, 1999a, 1999b, 2003), but they may not be applicable to the educational needs of adolescents with ASD (Melone & Lettick, 1983). No research has been done on the use of sex education programs intended for normal adolescents (e.g. SIECUS, 1996) in persons with ASD.

This study has a number of limitations. First, the study focuses on a very small sample of institutionalized individuals, which does not allow to draw conclusions about the general group of high-functioning persons with ASD. It is likely that persons with more severe autistic symptoms and associated psychosocial problems tend to be institutionalized more frequently and at an earlier age, which may interfere with the socio-sexual development and behavior. Institutional life itself may also affect sexual development and behavior, e.g. because of peer influence. Second, due to the small number of female residents in specialized institutions, an exclusively male study group was investigated. A third limitation lies in the study method. As van Bourgondien et al. (1997) indicated, it may be that the use of questionnaires and interviews with caregivers results in an underestimate of the frequency of sexual behavior. The number of ''unknown'' replies in this study is indeed rather high. A fourth limitation lies in the fact that only residential caregivers and no parents were interviewed. The study should therefore be supplemented with interviews with parents of adolescents with

ASD living at home. Interviewing non-family caregivers well acquainted with the individuals with autism may also have advantages because sexual development is a sensitive issue, especially when deviant behavior is involved. Third party interviewees may well be more willing to report such behavior than informants who belong to the family. A fifth limitation relates to a methodological problem in the theoretical knowledge of socio-sexual skills section of the instrument being used (ISA). The intensity of contact between caregivers and subjects was different, and only the caregivers who discussed these issues with the subjects could reliably answer these questions. For some of the caregivers, there could be a social desirability bias, since they were also responsible for teaching socio-sexual skills. Future research should address this issue by directly interviewing individuals with ASD. Sixth, the subscale application in practice of self-care skills had a low Cronbach's α. It may be that items of this scale have a low internal consistency, although from a theoretical point of view, we are apt to think that the items suit together. A final limitation lies in the lack of a normal control group and the lack of the possibility of comparison with normal population norms especially on the presence of inappropriate and deviant behaviors in this age group.

Much research still needs to be done: e.g. on the sexuality of girls and women with ASD; on the sexual behavior of persons with ASD and mental retardation; on the sexual behavior of adults with ASD; on the actual relationships of adults with HFA and AS and their partners; on safety issues such as the vulnerability to sexual abuse and the occurrence of sexually transmitted diseases and unwanted pregnancy in individuals with ASD.

The current study has shown that sexual issues are important in persons with ASD, and that problematic sexual behavior occurs frequently. Therefore, careful diagnostic evaluation of the sexual development is an important aspect of the assessment of individuals with ASD. It is necessary to develop sex education courses for persons with ASD and to investigate their effect on the sexual development. Sexual education should be given on a regular basis and be individualized, since individuals with ASD may encounter diagnosis-specific problems with respect to the sexual development. Finally, further research should evaluate the necessity of developing specific treatment interventions for those persons with ASD who develop inappropriate or deviant sexual behavior.

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