

Behavioral and emotional problems in high-functioning girls and boys with autism spectrum disorders: Parents' reports and adolescents' self-reports

Autism
2017, Vol. 21(6) 738–748
© The Author(s) 2016



Reprints and permissions:
sagepub.co.uk/journalsPermissions.nav
DOI: 10.1177/1362361316675119
journals.sagepub.com/home/aut



Ewa Pisula¹, Monika Pudło¹, Monika Słowińska¹, Rafał Kawa¹,
Magdalena Strząska¹, Anna Banasiak² and Tomasz Wolańczyk³

Abstract

The purpose of this study was to investigate sex differences in behavioral and emotional problems in high-functioning girls and boys with autism spectrum disorder. The results obtained by adolescents with autism spectrum disorder were compared with those of typically developing girls and boys. Correlations between parents' and adolescents' ratings were also analyzed. Participants were 35 girls and 35 boys with autism spectrum disorder, aged 11–18 years, matched for chronological age and full-scale IQ. The control group consisted of 24 typically developing girls and 24 boys of the same age and IQ. The parents of adolescent participants were also included in the study. The measures used were the Child Behavior Checklist (4–18) completed by parents and Youth Self-Report (11–18) completed by adolescents. The adolescents with autism spectrum disorder presented higher levels of behavioral and emotional problems than the control group, according to both the parents' reports and the adolescents' self-reports. No sex differences were found in that respect. More differences between the assessments of adolescents and their parents occurred in the control group, and the effect size was larger.

Keywords

adolescents, autism spectrum disorders, behavioral and emotional problems, sex differences

Despite the large number of studies on behavioral and emotional problems in adolescents with autism spectrum disorders (ASDs) (for a review, see Mazzone et al., 2012), the issue of sex differences remains underexplored. Findings from research on other clinical groups have suggested the presence of certain sex differences in both the profile of behavioral and emotional problems and their severity (e.g. Oliva et al., 2014). This is an important avenue of research on individuals with ASD considering the significant proportion between males and females in this population, which ranges from 1.33:1 to 15.7:1 (Fombonne, 2009), and is even as high as 8:1 or even 9:1 among higher-functioning individuals (Mandy et al., 2011).

There are empirical reports on sex differences in the expression of ASD symptoms and developmental trajectories, as well as data indicating that girls with ASD are diagnosed later than boys (e.g. Rivet and Matson, 2011, for review). The results of reports on sex differences in the ASD population remain inconsistent, especially with respect to social and communication deficits. There is

evidence that girls may have greater difficulties with integrating non-verbal and verbal behaviors, and maintaining reciprocal conversation (Hiller et al., 2014), while boys show more repetitive and restricted interests and stereotypes (Bölte et al., 2011). There are also anecdotal findings suggesting that girls may be more aware of the need for social interaction and more willing to interact with other people (see Lai et al., 2015, for review). Therefore, it has been hypothesized that females may present a different autistic phenotype than males (Van Wijngaarden-Cremers et al., 2014). Behavioral and emotional problems (e.g. anxiety, depression, or aggressive behavior) may

¹University of Warsaw, Poland

²The Jan Długosz University in Częstochowa, Poland

³Medical University of Warsaw, Poland

Corresponding author:

Ewa Pisula, Faculty of Psychology, University of Warsaw, Stawki 5/7,
00-183 Warsaw, Poland.
Email: ewa.pisula@psych.uw.edu.pl

obscure the clinical presentation of the disorder and interfere with social adjustment of girls and boys with ASD (e.g. Kuusikko et al., 2008). Learning about sex differences in that regard may provide valuable information needed to describe the differences in autistic phenotype in girls and boys.

Gaining a better understanding of problems co-occurring with ASD is all the more important considering that they can develop into comorbid psychiatric disorders (Farrugia and Hudson, 2006). Furthermore, ASD symptoms can make it difficult to diagnose emotional problems (such as anxiety or depression), which means that individuals with ASD often do not receive the support they need (e.g. Stewart et al., 2006). The situation of girls is particularly unique in this context, since the majority of studies on psychiatric comorbidities in individuals with ASD are done on boys or on groups dominated by male subjects (e.g. Horiuchi et al., 2014; Khor et al., 2014; Maskey et al., 2013). The handful of studies on sex differences on the subject have reported inconsistent results. A study on emotional and behavioral problems in toddlers and preschoolers with ASD aged 20–51 months reported no sex differences in those areas (Herring et al., 2006). Another study found, however, that although in toddlers with ASD the overall profile of behavioral problems was similar in girls and boys, girls experienced more sleep problems and more anxious/depressed affect than boys (Hartley and Sikora, 2009). Similarly, a study on older children and adolescents (aged 4–16 years) found that girls with ASD demonstrated more behavioral difficulties than boys, while in typically developing children the score of total difficulties was higher in boys than girls (Horiuchi et al., 2014). On the other hand, Mandy et al. (2012), in a study of a large sample of high-functioning children and adolescents with ASD, reported that according to teachers, boys demonstrated more profound externalizing and social problems than girls.

Inconsistencies in findings from research on emotional and behavioral problems in children and adolescents with ASD may be associated with differences in age and developmental levels. As rightly noted by Mandy et al. (2012), IQ may be a potentially confounding factor in the analyses of sex differences in this population, since girls with ASD on average have lower IQ scores than boys. Moreover, the relationship between IQ and autistic symptomatology is inverse (Skuse et al., 2009), which, in turn, can significantly affect findings relating to sex differences in various aspects of ASD individuals' functioning. The nature of the relationship between IQ and the severity of emotional and behavioral problems in children and adolescents with ASD has not yet been unequivocally determined, perhaps due to the fact that the majority of studies in that area have been conducted on individuals with ASD with normal intelligence (Matson and Cervantes, 2014). Nevertheless, there is some evidence that emotional problems such as depression

or anxiety are more common among people with higher IQ (Witwer and Lecavalier, 2010). Therefore, studies on emotional and behavioral problems among girls and boys with ASD should properly control for IQ. Still, very little empirical research to date meets such criteria, and the results reported are ambiguous. In one study in which individuals with ASD were carefully matched for IQ and chronological age, girls presented more social withdrawal as well as social, attention, and thought problems than boys (Holtmann et al., 2007). In contrast, Mandy et al. (2012) found no such differences between girls with ASD and boys with ASD carefully matched for age and IQ.

Research on coexisting problems in children or adolescents with ASD typically uses parent or teacher reports (e.g. Holtmann et al., 2007; Mandy et al., 2012). However, clinicians and researchers often emphasize the need to obtain information from multiple assessment sources in diagnostic evaluation of children and adolescents, including children's self-reports (Berg-Nielsen et al., 2003). A substantial body of research shows significant discrepancies between parents' and children's reports (e.g. Carlston and Ogles, 2009; Rey et al., 1992). Typically, in normally developing samples, parents tend to report lower levels of children's emotional and behavioral problems than the children report themselves, while in the clinical samples the trend is reversed (Barker et al., 2007). Consistency between parents' and children's ratings also depends on the child's gender. Girls seem to be more consistent with their parents' ratings than boys (Meer et al., 2008; Sourander et al., 1999; Vierhaus and Lohaus, 2008). Not all authors, however, have reported similar findings: for example, Carlston and Ogles (2009) found lower consistency between the ratings of parents and daughters in some areas of assessment, while the differences between the ratings of parents and sons were more pervasive yet less severe. It would therefore seem that the research on discrepancies between parents' and children's reports should address child gender as an important factor potentially influencing the results.

Problems in social and cognitive functioning typical for ASD may significantly affect the agreement between parents' and adolescents' reports. The reason is that these problems may seriously interfere with the ability of adolescents with ASD to identify emotions and diminish their capacity for self-referencing and engaging in retrospection, thus limiting their self-knowledge and self-understanding (Baron-Cohen, 2003; Losh and Capps, 2006; Schriber et al., 2014; Zahavi, 2010). Empirical findings suggest that there is moderate agreement between the assessments of children with ASD and their parents with respect to emotional and behavioral problems (Jamison and Schuttler, 2015; Jepsen et al., 2012). The degree of agreement may vary, however, depending on the specific problems being reported. Hurtig et al. (2009) stated that adolescents with ASD and their parents showed better

agreement in reporting social and externalizing problems, but poorer agreement when reporting anxious or depressive symptoms. The issue of sex differences in this field has not been investigated so far in adolescents with ASD, although considering the importance of the multi-informant approach in diagnosis of psychiatric problems in adolescents with ASD (Berg-Nielsen et al., 2003; Blakeley-Smith et al., 2012; Hurtig et al., 2009), the subject warrants closer examination. Comparing information provided by adolescents with ASD and their parents may improve our understanding of the clinical picture of psychiatric disorders in individuals with ASD.

The purpose of this study was to find out (1) how girls and boys with ASD, matched for age and IQ, assess the emotional and behavioral problems they experienced and whether they differed in that respect from their typically developing peers; (2) how these problems are rated by parents of girls and boys with ASD and by parents of typically developing girls and boys; and (3) what is the relationship between ratings made by adolescents and their parents. We expected greater severity of emotional and behavioral problems in adolescents with ASD than in typically developing adolescents. Since it has been previously suggested that girls with ASD may fail to demonstrate female-typical characteristics in the areas in which sex differences are apparent in the general population (e.g. Knickmeyer et al., 2008), we expected more differences between girls with ASD and their typically developing peers than between boys with ASD and typically developing boys. In addition, consistently with most earlier findings (e.g. Hartley and Sikora, 2009; Solomon et al., 2012), we expected that girls with ASD would demonstrate more internalizing problems than boys with ASD, and in particular more severe anxiety and depression. In the light of the results reported previously (Hurtig et al., 2009; Jamison and Schuttler, 2015; Jepsen et al., 2012), we also expected differences between the ratings of adolescents and parents. On the other hand, we have not formulated any hypotheses on the effects of the child with ASD sex on parent-child differences in ratings due to a lack of sufficient pre-existing evidence.

Method

Participants and procedure

The study included 35 girls and 35 boys with ASD, matched one-to-one within 3 months by chronological age, autism diagnosis (mostly Asperger's syndrome, and some high-functioning autism individuals, $n=63$ and $n=7$, respectively), and full-scale IQ (down to 1 standard deviation (*SD*)). The participants with ASD were selected from a larger sample that included a total of 139 high-functioning adolescents with ASD who took part in a research project on the social, communication, and cognitive functioning of girls with ASD. The inclusion criteria

for the whole group were as follows: psychiatric diagnosis of ASD based on International Classification of Diseases, 10th revision (ICD-10) criteria (WHO, 2002), chronological age (11–18 years), and IQ in normal range (score > 70). For 60% of the ASD group (21 girls and 21 boys), the Autism Diagnostic Observation Schedule (ADOS) (Lord et al., 1999) was used to confirm the presence of autism spectrum symptoms, and for other participants the Autism Quotient (Baron-Cohen et al., 2001) or the Social Communication Questionnaire (SCQ; lifetime version; Rutter et al., 2003) were employed. Only individuals meeting ADOS or SCQ diagnostic criteria for ASD were enrolled in the study. From the full dataset, the results of girls and boys who could be better matched one-to-one in terms of age and IQ scores were selected, blind to the results of the instruments measuring behavioral and emotional problems.

Information about the sex and age of the adolescents in the study and ADOS results in the ASD group are presented in Table 1.

The control group was selected from 89 typically developing individuals taking part in the whole research project, so as to be matched as closely as possible to ASD individuals in terms of age and IQ. The groups did not differ on age ($F(3, 117)=0.94$, $p<0.424$) nor on full-scale IQ ($F(3, 117)=1.10$, $p<0.349$).

The study also included parents of adolescents from both groups (35 girls with ASD-parent and 35 boys with ASD-parent dyads, and 48 parent-typically developing adolescent dyads). In both groups, the overwhelming majority were mothers (97% and 98%, respectively). The groups of parents were equivalent in terms of age, education, and place of residence. Over 80% had at least a secondary education and lived in large cities (population > 100,000).

Adolescents with ASD were recruited through diagnostic centers and at schools. Members of the control group were recruited at schools. Adolescents completed the Youth Self-Report (YSR) as part of a larger study on sex differences in individuals with ASD. No time limit was imposed. Participants had the support of researchers in the process. In one case, help was needed reading the questions in the report, but the participant provided answers in the questionnaire independently. The remaining participants were good enough readers to complete the questionnaire without assistance. Three participants (two aged 11 years and one aged 13 years) who started filling in the questionnaire but then refused to continue saying it was too difficult were withdrawn from the study. These participants rejected the experimenter's offer of help. Parents were not present during testing. They completed the questionnaires while waiting for their children participating in the study, or they were given the questionnaire to complete at home. The questionnaires were collected from parents by researchers.

Table 1. Characteristics of the sample by group and sex.

Characteristic	ASD group		Control group	
	Girls (n = 35)	Boys (n = 35)	Girls (n = 24)	Boys (n = 24)
Age (years)				
Mean age	14.1	13.54	13.22	13.91
SD	2.39	1.98	2.1	1.88
Full-scale IQ				
Mean IQ	102.46	103.94	101.44	107.42
SD	15.52	13.82	10.28	9.66
ADOS, M (SD)	(N = 21)	(N = 21)		
Reciprocal social interaction	6.32 (2.59)	7.51 (2.54)		
Communication	3.56 (1.39)	4.2 (1.47)		
Repetitive and stereotyped behavior	1.32 (1.22)	1.97 (1.58)		

ASD: autism spectrum disorder; SD: standard deviation; ADOS: Autism Diagnostic Observation Schedule; M: mean.

The study was approved by the Ethics Committee of the Faculty of Psychology at the University of Warsaw, Poland.

Measures

Parents completed the Polish version of the Child Behavior Checklist (CBCL/4–18; Achenbach, 1991a) and adolescents the YSR 11–18 (Achenbach, 1991b), in Polish adaptation by Wolańczyk (2003).

The CBCL/4–18 is a parent report checklist of child behavioral and emotional problems occurring within the last 6 months. The scale consists of eight narrow-band scales of syndromes: I Withdrawn, II Somatic Complaints, III Anxious/Depressed (which comprise the Internalizing Subscale), IV Social Problems, V Thought Problems, VI Attention Problems, VII Delinquent Problems, and VIII Aggressive Behavior (which make up Externalizing Problems). The total score can also be calculated. In this study, the Cronbach's alpha values for the total sample ($N = 118$) were between 0.67 and 0.92.

YSR contains the same scales and similar items as the CBCL, with small modifications meant to make the statements more comprehensible for adolescents. The similarities between CBCL and YSR make it possible to assess interagreement and discrepancies between adolescents' and their parents' ratings. Cronbach's alphas in the Polish version of the YSR used in the study ranged between 0.62 and 0.95.

Depending on the adolescent's age, IQ was measured using either the Wechsler Intelligence Scale for Children—Revised (WISC-R; Matczak et al., 2008) or the Wechsler Intelligence Adults Scale—Revised (WAIS-R; Brzeziński et al., 2004).

Statistical analyses

Statistical analyses were carried out using IBM SPSS version 21. Two-factor analysis of variance (ANOVA; the

“group” factor had two levels: ASD vs control group; the second factor was sex) was conducted for parents' reports and adolescents' self-reports. A correction for multiple comparisons (Sidak/Bonferroni) was applied (the level of significance: $p < 0.006$). In order to check for a potential relationship between adolescents' and parents' ratings, Pearson's product moment correlations were calculated for each group separately. Moreover, the ratings of adolescents and their parents in each scale were also compared using Student's t -test for dependent samples.

Results

Severity of emotional and behavioral problems as assessed by girls and boys with ASD and typically developing girls and boys

The results of comparisons of boys and girls with ASD and typically developing boys and girls are presented in Table 2.

The main effect of group was found in four scales in adolescents' self-reports (the higher scores of adolescents with ASD): Withdrawn, Anxious/Depressed, Social Problems, and Internalizing. There was no main effect of sex or group by sex interaction effect for any of the variables.

According to best practices in statistical analysis, with the lack of interaction effects in the above analyses, there were no grounds for conducting further comparisons between ASD girls and control girls or ASD boys and boys in the control group. However, with the intention to obtain a more complete picture of differences between girls with ASD and their typically developing peers and between the boys with and without ASD, we conducted direct comparisons of girls with ASD versus control girls and boys with ASD versus control boys. The results of these analyses are shown in Table 3. Sidak/Bonferroni correction for multiple comparisons was applied.

As is shown in Table 3, girls with ASD scored higher than girls in the control group in three YSR subscales: Withdrawn, Anxious/Depressed, and Social Problems.

Table 2. Descriptive statistics and analysis of variance results for YSR and CBCL/4–18 scales.^a

Scale	ASD group				Control group				Group differences (<i>F</i> (1, 117), Cohen's <i>d</i>)	Effect description
	Girls		Boys		Girls		Boys			
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Adolescents' self-report (YSR)										
Withdrawn	8.29	3.61	7.09	3.22	5.08	2.50	4.87	2.62	<i>F</i> = 21.56**, <i>d</i> = 0.17	ASD > controls
Somatic Complaints	3.91	3.91	2.94	2.56	2.96	2.65	2.09	2.43	<i>F</i> = 2.44	n.s.
Anxious/Depressed	11.31	7.19	8.09	6.24	4.68	4.61	4.87	4.67	<i>F</i> = 18.88**, <i>d</i> = 0.15	ASD > controls
Social Problems	6.77	3.71	5.20	2.91	2.32	2.06	2.74	1.94	<i>F</i> = 40.26**, <i>d</i> = 0.28	ASD > controls
Thought Problems	4.23	3.69	3.69	3.36	2.36	2.66	2.26	2.75	<i>F</i> = 7.53	n.s.
Attention Problems	9.00	4.04	8.09	3.9	6.48	3.24	6.44	3.01	<i>F</i> = 9.32	n.s.
Delinquent Problems	3.17	2.57	2.89	2.93	2.72	1.90	3.22	2.04	<i>F</i> = 0.02	n.s.
Aggressive Behavior	10.54	5.79	8.89	6.57	7.60	6.51	7.26	4.33	<i>F</i> = 4.19	n.s.
Internalizing	23.51	13.10	18.11	10.46	12.48	8.10	11.57	7.40	<i>F</i> = 19.78**, <i>d</i> = 0.16	ASD > controls
Externalizing	13.71	7.74	11.77	9.20	10.32	8.09	10.48	5.59	<i>F</i> = 2.51	n.s.
Behavior Problems—Total	81.57	29.57	70.60	31.36	58.20	25.10	57.30	21.46	<i>F</i> = 12.24	n.s.
Parents' reports (CBCL)										
Withdrawn	8.14	3.45	7.26	3.63	1.56	2.27	1.48	1.53	<i>F</i> = 121.19**, <i>d</i> = 0.54	ASD > controls
Somatic Complaints	3.94	4.17	3.71	3.75	1.68	1.77	0.91	1.38	<i>F</i> = 17.51**, <i>d</i> = 0.15	ASD > controls
Anxious/Depressed	12.91	6.64	10.31	6.81	3.40	4.42	2.09	2.23	<i>F</i> = 68.07**, <i>d</i> = 0.40	ASD > controls
Social Problems	9.14	3.05	7.89	2.61	1.32	1.95	1.48	2.17	<i>F</i> = 217.10**, <i>d</i> = 0.67	ASD > controls
Thought Problems	3.66	3.58	3.97	3.16	0.24	0.66	0.35	0.71	<i>F</i> = 51.33**, <i>d</i> = 0.34	ASD > controls
Attention Problems	11.31	4.49	11.46	4.21	2.16	2.54	3.35	3.94	<i>F</i> = 137.35**, <i>d</i> = 0.56	ASD > controls
Delinquent Problems	3.86	3.36	3.66	2.79	0.96	1.1	1.70	1.85	<i>F</i> = 26.0**, <i>d</i> = 0.20	ASD > controls
Aggressive Behavior	12.86	7.83	13.00	8.16	5.92	6.41	4.83	5.23	<i>F</i> = 31.51**, <i>d</i> = 0.23	ASD > controls
Internalizing	24.34	11.37	20.74	11.42	6.56	7.17	4.39	3.82	<i>F</i> = 89.75**, <i>d</i> = 0.47	ASD > controls
Externalizing	16.71	10.43	16.66	10.26	6.88	7.32	6.52	6.54	<i>F</i> = 34.57**, <i>d</i> = 0.25	ASD > controls
Behavior Problems—Total	70.80	29.33	65.00	27.87	20.00	19.45	18.44	15.65	<i>F</i> = 110.51**, <i>d</i> = 0.51	ASD > controls

ASD: autism spectrum disorder; *M*: mean; *SD*: standard deviation; YSR: Youth Self-Report; n.s.: non-significant; CBCL: Child Behavior Checklist.

^aDue to multiple comparisons, the *p* level has been lowered (Sidak/Bonferroni correction) to 0.0064.

***p* < 0.001.

Table 3. Comparisons of adolescents' and parents' ratings by sex; the results of the Student's *t*-test for dependent samples^a with Cohen *d* as a measure of effect size.

Scale	Girls with ASD vs girls control		Boys with ASD vs boys control		Parents of girls with ASD vs parents of girls control		Parents of boys with ASD vs parents of boys control	
	<i>t</i>	<i>d</i>	<i>t</i>	<i>D</i>	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>
Withdrawn	4.05**	0.47	2.87	–	8.87**	0.76	8.31**	0.74
Somatic Complaints	1.55	–	0.72	–	2.99	–	3.81**	0.45
Anxious/Depressed	4.39**	0.50	2.18	–	6.52**	0.65	6.67**	0.66
Thought Problems	2.55	–	1.51	–	5.49**	0.59	6.59**	0.66
Social Problems	6.08**	0.63	3.74**	0.44	11.89**	0.84	10.39**	0.81
Attention Problems	2.88	–	1.6	–	9.88**	0.79	7.69**	0.71
Delinquent Problems	1.03	–	–0.69	–	4.92**	0.55	3.18	–
Aggressive Behavior	1.88	–	1.0	–	3.71**	0.44	4.67**	0.53
Internalizing	4.2	–	2.55	–	7.35**	0.70	7.56**	0.71
Externalizing	1.76	–	0.51	–	4.28**	0.49	4.59**	0.52
Behavioral Problems—Total	3.49	–	1.71	–	7.98**	0.73	8.17**	0.73

ASD: autism spectrum disorder.

^aDue to multiple comparisons, the *p* level has been lowered (Sidak/Bonferroni correction) to 0.0064.

***p* < 0.001.

Boys with ASD differed from controls in YSR at Social Problems.

Severity of emotional and behavioral problems as rated by parents

The results of the analyses are presented in Table 2. In parents' reports, the differences between groups occurred for all analyzed variables (higher scores in the ASD group than in the control group). Again, there was no main effect of sex or group by sex interaction effect.

Comparison of the ratings by parents of girls in both groups yielded significant differences in all scales except Somatic Complaints (Table 3). In the case of boys, significant differences were present in all scales except Delinquent Problems.

Comparison of adolescents' and parents' ratings of emotional and behavioral problems

The results of the comparisons of parents' and adolescents' ratings are presented in Table 4.

The ratings of girls with ASD and their parents were significantly correlated in Somatic Complaints and Anxious/Depressed, as well as in Internalizing and Behavioral Problems—Total. All correlations ranged between 0.64 and 0.76. There were no significant correlations between adolescents' and parents' ratings in the other groups.

For girls with ASD and their parents, differences in ratings were found in Social Problems. In the boys with ASD group, differences were present in Social Problems and Attention Problems. In the girl controls, there were differences in ratings of Withdrawn, Attention Problems, and

Delinquent Problems as well as Behavioral Problems—Total. For boy controls, differences in ratings between adolescents and parents included Withdrawn, Thought Problems, Attention Problems, Internalizing, and Behavioral Problems—Total.

Discussion

In this study, we were looking for differences in the ratings of behavioral and emotional problems between adolescent girls and boys with ASD, both in the ratings of the adolescents themselves and in the ratings of their parents, in comparison with control adolescents. As expected, adolescents with ASD presented more behavioral and emotional problems than their typically developing counterparts. Specifically, girls with ASD scored higher in Social Problems, Withdrawn, and Anxious/Depressed scales when compared to typically developing girls matched for age and IQ. Boys with ASD reported similar behavioral and emotional problems compared to peers matched for age and IQ, with the exception of Social Problems (higher in boys with ASD). There were no differences in emotional and behavioral problems between girls and boys with ASD. Parents of boys and girls with ASD reported higher levels of emotional and behavioral problems than parents of age- and IQ-matched peers.

Significant differences found between the ASD and control groups are consistent with previous reports (e.g. Horiuchi et al., 2014; Mazzone et al., 2012). The result is hardly surprising, as frequent presence of emotional and behavioral problems in individuals with ASD has been well-documented (De Bruin et al., 2007). This research confirms differences in that respect between adolescents

Table 4. Relationship and comparison between adolescents' and parents' ratings: Pearson's *r* correlation coefficients and results of the Student's *t*-test for dependent samples^a with Cohen *d* as a measure of effect size.

Scale	Parent-girl with ASD dyads (<i>n</i> = 35)			Parent-boy with ASD dyads (<i>n</i> = 35)			Parent-girl in control group dyads (<i>n</i> = 24)			Parent-boy in control group dyads (<i>n</i> = 24)		
	<i>r</i>	<i>t</i>	<i>D</i>	<i>r</i>	<i>t</i>	<i>d</i>	<i>r</i>	<i>t</i>	<i>d</i>	<i>r</i>	<i>t</i>	<i>d</i>
Withdrawn	0.55	0.25	–	0.00	-0.21	–	0.34	6.17**	0.78	0.50	7.44**	0.84
Somatic Complaints	0.72**	-0.06	–	0.34	-1.22	–	0.05	1.76	–	0.10	2.41	–
Anxious/Depressed	0.69**	-1.72	–	0.42	-1.87	–	0.14	0.89	–	0.51	3.57	–
Thought Problems	0.56	0.99	–	0.02	-0.37	–	-0.08	3.54	–	0.53	4.0**	0.64
Social Problems	0.33	-3.55**	0.52	0.20	-4.55**	0.62	0.08	1.58	–	0.54	3.34	–
Attention Problems	0.34	-2.78	–	0.08	-3.62**	0.53	0.14	5.34**	0.74	0.43	4.18**	0.66
Delinquent Problems	0.50	-1.34	–	0.51	-1.61	–	0.33	4.46**	0.68	0.21	3.22	–
Aggressive Behavior	0.38	-1.76	–	0.32	-2.80	–	0.27	0.95	–	0.30	2.23	–
Internalizing	0.76**	-0.57	–	0.31	-1.21	–	0.18	2.77	–	0.47	5.57**	0.76
Externalizing	0.47	-1.85	–	0.38	-2.65	–	0.29	1.70	–	0.30	2.83	–
Behavioral Problems—Total	0.64**	2.55	–	0.23	0.90	–	0.21	6.38**	0.80	0.43	9.48**	0.89

ASD: autism spectrum disorder.

^aDue to multiple comparisons, the *p* level has been lowered (Sidak/Bonferroni correction) to 0.0064.

***p* < 0.001.

with ASD and typically developing peers when controlling for age and IQ. Adolescents with ASD reported more problems than their counterparts with respect to three of the eight YSR scales (Withdrawn, Anxious/Depressed, and Social Problems), and in the Internalizing scale. Differences between the ASD and control groups were more pronounced in the case of parental ratings. Across all the analyzed scales, parents of adolescents with ASD rated their children's behavioral and emotional problems higher relative to the parents of adolescents in the control group. The fact that parents tend to report higher levels of this type of problem in the functioning of their children with ASD than adolescents themselves is also well-documented (Salbach-Andrae et al., 2009). Comparisons of parents' and adolescents' ratings as well as the "group" effect size in this study confirmed that the differences between parental ratings in the ASD and control groups were much more pronounced than between the ratings of the adolescents from these groups. The effect size Cohen's *d* for the ANOVA of the adolescent self-reports ranged between 0.15 and 0.28, compared to 0.15 and 0.67 for the parent reports. We will revisit this finding later when discussing differences between parents' and adolescents' reports of behavioral and emotional problems.

Profound differences between the ASD and typical development groups in the study may have overshadowed sex differences, which have in fact been previously reported by other authors. Solomon et al. (2012) pointed out the greater severity of internalizing problems in adolescent girls than in boys with ASD and suggested that females with ASD are at increased risk for this type of problem. In this study, differences between girls and boys in that respect were below the level of statistical significance, but the means of girls with ASD were slightly higher in most scales than the means of boys, and significantly higher than the mean scores of girl controls. Not all researchers, however, have confirmed the presence of sex differences in this area in individuals with ASD, especially in the studies in which girls and boys with ASD were carefully matched for age and IQ (Mandy et al., 2012). This study provides further evidence suggesting that once these variables are controlled, differences between girls and boys with ASD are not detected.

As expected, direct comparisons of the scores of girls with ASD and controls revealed differences in several scales: Withdrawn, Anxious/Depressed, and Social Problems. This finding is consistent with the results of the study by Jamison and Schuttler (2015), who also reported differences in self-perception between girls with ASD and typically developing girls with respect to factors associated with social competence and internalizing symptoms. Similarly, Hurtig et al. (2009) found that when boys and girls were compared separately, boys with ASD scored significantly higher in Withdrawn and Social Problems scales than control boys and lower in Delinquent Problems. Girls

with ASD reported significantly higher levels of Withdrawn, social, thought, and Attention Problems than control girls. In our study, boys with ASD differed from boys controls only on the Social Problems scale. In the parents' reports, statistically significant differences between both groups were present in almost all the analyzed scales. Considering that no significant "group by sex" interaction effects were found in this study, any interpretations regarding potentially more differences in the expression of behavioral and emotional problems in girls with ASD than in boys with ASD are necessarily tentative. Nevertheless, it seems worthwhile to continue research on differences between girls with ASD and girls developing typically, in samples carefully matched for age and IQ, and larger than in this study. This research should improve our understanding of the situation of girls with ASD in peer groups.

Based on the results reported by Jamison and Schuttler (2015), in this study we also expected adolescents' and parents' ratings to differ. No hypotheses were formulated with regard to differences between the ratings of parents and children with ASD depending on the child's sex due to insufficient premises. Statistically significant correlations between parents' and adolescents' ratings occurred only in girls with ASD-parent dyads. The results of comparisons of parents' and adolescents' ratings in individual scales indicated that in the case of girls with ASD, differences were present only in Social Problems. Parents assessed these problems higher than the girls. The same discrepancies were found in boys, who additionally differed from their parents in their ratings of Attention Problems. In girl controls, discrepancies occurred in Withdrawn, Attention Problems, and Delinquent Problems, as well as in Behavioral Problems—Total. In this case, however, girls rated their problems as more severe compared to their parents' ratings. The greatest number of discrepancies with parents' ratings arose in boy controls. They appeared in three of the eight scales (Withdrawn, Thought Problems, and Attention) plus Internalizing and Behavioral Problems—Total. Similarly to girl controls, parents viewed their sons' problems as less severe than the adolescents themselves did. Relevant findings in this context were reported by Jamison and Schuttler (2015), who found more discrepancy between the assessments made by girls with ASD and their parents than between typically developing girls and their parents. However, girls in that study were on average older (mean age about 16 years) than our participants (mean age about 13 years), which may have affected the results. Adolescents' age is one of the key factors affecting the discrepancy between the reports of mothers and adolescents on internalizing disorders (Berg-Nielsen et al., 2003).

Especially interesting is the fact that adolescents with ASD see their problems as less severe compared to their parents, while the reverse is true of typically developing adolescents. The results suggesting that parents reported more emotional problems in their adolescents with ASD

than did the adolescents themselves were also reported by Blakeley-Smith et al. (2012). These findings may plausibly be explained by typical ASD-related problems with introspection, mindreading, and identifying emotions not only of others but also one's own (Baron-Cohen, 2003; Losh and Capps, 2006; Zahavi, 2010). These problems may lead to limited insight into their own difficulties, especially with respect to Social Problems. Problems experienced by individuals with Asperger's syndrome are to some extent similar to difficulties typical of individuals with alexithymia, which is also associated with limited capacity for self-insight (Fitzgerald and Bellgrove, 2006). Moreover, as demonstrated by Schriber et al. (2014) in research on self-insight, individuals with ASD tend to self-enhance, whereas typically developing adolescents tend to self-diminish. This difference may have also affected the adolescents' reports in this study. It should be noted, however, that the tendency of adolescents to rate their problems as less severe than they appear to their parents is not unique to adolescents with ASD. Salbach-Andrae et al. (2009) showed in a large sample of psychiatric patients aged 11–18 years tested with CBCL and YSR that adolescents reported lower levels of behavioral problems, especially internalizing, compared to their parents. Similarly, Barker et al. (2007) found that adolescents in a community sample tended to report more behavioral problems than did their parents, while the clinical sample exhibited the opposite trend. It should also be mentioned that consistency between adolescent and parent ratings may vary depending on country and cultural differences (Rescorla et al., 2013). While this subject is beyond the scope of this article, it should be taken into account when comparing findings from research on individuals with ASD conducted in different countries.

Overall, the results of this study show that the differences between adolescent girls and boys with ASD with respect to behavioral and emotional problems are minor: in our study, they failed to reach statistical significance. It should be noted, however, that the sample size was relatively small. In addition, the dataset used in the study was compiled in one of the first research projects on girls with ASD in Poland. Many families of these girls volunteered for participation. These were families with relatively high socioeconomic status, and the overwhelming majority of participating parents were mothers who spoke of a need to learn more about their daughters' psychological functioning. We can therefore assume that they were particularly committed to understanding their children's behavior, which, in turn, may have had an impact on the results (especially the correlation and lack of differences between the ratings of girls with ASD and their parents). It should be stressed that the sample was not representative for the population of girls with ASD in Poland. Moreover, ratings of behavioral and emotional problems in the study were exclusively questionnaire-based.

At the same time, the study had undeniable strengths thanks to its multi-informant approach and matching adolescents for chronological age and IQ. The majority of the data confirm previous findings, and although they are inconclusive with respect to the issue of sex differences in behavioral and emotional problems in adolescents with ASD, they do improve our knowledge about the psychological situation of girls with ASD.

This study provided information that may chart potential directions for further research. One such direction concerns self-perception in girls with ASD as compared with their typically developing peers. This is because our findings may suggest that girls with ASD perceive more problems with themselves than their peers, while boys are less different in that respect from their peers. It would be worthwhile to examine a larger sample to see whether such differences are indeed present and what their determinants and consequences are. Supporting evidence could come from patterns found in the emotional functioning of adolescents in the general population, according to which girls have superior capacities for perspective taking and empathy than boys (Van der Graaff et al., 2014). Although no sex differences in recognizing emotions were found in adolescents with ASD, participants were predominantly male (Oerlemans et al., 2013), and the issue needs to be explored further. Another possibility is that girls experience more problems in social functioning than boys. Hiller et al. (2014) found that, compared to boys, girls presented poorer ability to maintain a reciprocal conversation and to maintain friendships and relationships. Girls may also tend to assess themselves more harshly due to experiencing more disapproval from their peers. To our knowledge, this issue has not been studied in adolescents with ASD; however, in adolescents with emotional disorders, girls demonstrated more impairments in social activity participation and lower peer acceptance (Riley et al., 1998).

Equally worthy of further investigation are relationships between self-perception and the severity of ASD symptoms in girls. Another potentially interesting avenue of research could be to explore the agreement between the ratings of parents and adolescents with ASD ratings, for which this study may serve as an interesting starting point.

Acknowledgements

The authors would like to thank the adolescents and parents who participated in the study. They would also like to thank Agnieszka Rynkiewicz, Joanna Grochowska, Marta Liśniewska, Joanna Burgieł, Linda Grześkiewicz-Strumidło, and Monika Grześ for their assistance with data collection.

Funding

The study was supported by a grant from the Polish National Science Centre (grant no. N N106 352940) and by the State Fund for Rehabilitation of Disabled Persons (PFRON) and University of Warsaw.

References

- Achenbach TM (1991a) *Manual for the Child Behavior Checklist/4–18 and 1991 profile*. Burlington, VT: Department of Psychiatry, University of Vermont.
- Achenbach TM (1991b) *Manual for the Youth Self-Report and 1991 Profile*. Burlington, VT: Department of Psychiatry, University of Vermont.
- Barker ET, Bornstein MH, Putnick DL, et al. (2007) Adolescent-mother agreement about adolescent problem behaviors: direction and predictors of disagreement. *Journal of Youth and Adolescence* 36: 950–962.
- Baron-Cohen S (2003) *The Essential Difference: Men, Women and the Extreme Male Brain*. London: Penguin Books.
- Baron-Cohen S, Wheelwright S, Skinner R, et al. (2001) The Autism Spectrum Quotient (AQ): evidence from Asperger syndrome/high functioning autism, males and females, scientists and mathematicians. *Journal of Autism and Developmental Disorders* 31: 5–17.
- Berg-Nielsen TS, Vika A and Dahl AA (2003) When adolescents disagree with their mothers: CBCL-YSR discrepancies related to maternal depression and adolescent self-esteem. *Child: Care, Health & Development* 29: 207–213.
- Blakeley-Smith A, Reaven J, Ridge K, et al. (2012) Parent–child agreement of anxiety symptoms in youth with autism spectrum disorders. *Research in Autism Spectrum Disorders* 6: 707–716.
- Bölte S, Duketis E, Poustka F, et al. (2011) Sex differences in cognitive domains and their clinical correlates in higher-functioning autism spectrum disorders. *Autism* 15: 497–511.
- Brzeziński J, Gaul M, Hornowska E, et al. (2004) *WAIS-R (PL)—Skala Inteligencji Wechslera dla Dorosłych—Wersja Zrewidowana. Renormalizacja 2004*. Warszawa: Pracownia Testów Psychologicznych Polskiego Towarzystwa Psychologicznego.
- Carlston DL and Ogles BM (2009) Age, gender, and ethnicity effects on parent–child discrepancy using identical item measures. *Journal of Child and Family Studies* 18: 125–135.
- De Bruin EI, Ferdinand RF, Meester S, et al. (2007) High rates of psychiatric co-morbidity in PDD-NOS. *Journal of Autism and Developmental Disorders* 37: 877–886.
- Farrugia S and Hudson J (2006) Anxiety in adolescents with Asperger syndrome: negative thoughts, behavioral problems, and life interference. *Focus on Autism and Other Developmental Disabilities* 21: 25–35.
- Fitzgerald M and Bellgrove MA (2006) The overlap between alexithymia and Asperger’s syndrome. *Journal of Autism and Developmental Disorders* 36: 573–576.
- Fombonne E (2009) Epidemiology of pervasive developmental disorders. *Pediatric Research* 65: 591–598.
- Hartley SL and Sikora DM (2009) Sex differences in autism spectrum disorder: an examination of developmental functioning, autistic symptoms, and coexisting behavior problems in toddlers. *Journal of Autism and Developmental Disorders* 39: 1715–1722.
- Herring S, Gray L, Taffe J, et al. (2006) Behaviour and emotional problems in toddlers with pervasive developmental disorders and developmental delay: association with parental mental health and family functioning. *Journal of Intellectual Disability Research* 50: 874–888.
- Hiller RM, Young RL and Weber N (2014) Sex differences in autism spectrum disorder based on DSM-5 criteria: evidence from clinician and teacher reporting. *Journal of Abnormal Child Psychology* 42: 1381–1393.
- Holtmann M, Bölte S and Poustka F (2007) Autism spectrum disorders: sex differences in autistic behaviour domains and coexisting psychopathology. *Developmental Medicine & Child Neurology* 49: 361–366.
- Horiuchi F, Oka Y, Uno H, et al. (2014) Age- and sex-related emotional and behavioral problems in children with autism spectrum disorders: comparison with control children. *Psychiatry and Clinical Neurosciences* 68: 542–550.
- Hurtig H, Kuusikko S, Mattila ML, et al. (2009) Multi-informant reports of psychiatric symptoms among high-functioning adolescents with Asperger syndrome or autism. *Autism* 13: 583–598.
- Jamison TR and Schuttler JO (2015) Examining social competence, self-perception, quality of life, and internalizing and externalizing symptoms in adolescent females with and without autism spectrum disorder: a quantitative design including between-groups and correlational analyses. *Molecular Autism* 6: 53.
- Jepsen MI, Gray KM and Taffe JR (2012) Agreement in multi-informant assessment of behaviour and emotional problems and social functioning in adolescents with Autistic and Asperger’s Disorder. *Research in Autism Spectrum Disorders* 6: 1091–1098.
- Khor AS, Melvin GA, Reid SC, et al. (2014) Coping, daily hassles and behavior and emotional problems in adolescents with high-functioning autism/Asperger’s disorder. *Journal of Autism and Developmental Disorders* 44: 593–608.
- Knickmeyer RC, Wheelwright S and Baron-Cohen SB (2008) Sex-typical play: masculinization/defeminization in girls with an autism spectrum condition. *Journal of Autism and Developmental Disorders* 38: 1028–1035.
- Kuusikko S, Pollock-Wurman R, Jussila K, et al. (2008) Social anxiety in high-functioning children and adolescents with autism and Asperger syndrome. *Journal of Autism and Developmental Disorders* 38: 1697–1709.
- Lai MC, Lombardo MV, Auyeung B, et al. (2015) Sex/gender differences and autism: setting the scene for future research. *Journal of the American Academy of Child and Adolescent Psychiatry* 54: 11–24.
- Lord C, Rutter M, DiLavore P, et al. (1999) *Autism Diagnostic Observation Schedule: Manual*. Los Angeles, CA: Western Psychological Services.
- Losh M and Capps L (2006) Understanding of emotional experience in autism: insights from the personal accounts of high-functioning children with autism. *Developmental Psychology* 42: 809–818.
- Mandy W, Charman T, Gilmour J, et al. (2011) Toward specifying pervasive developmental disorder-not otherwise specified. *Autism Research* 4: 121–131.
- Mandy W, Chilvers R, Chowdhury U, et al. (2012) Sex differences in autism spectrum disorder: evidence from a large sample of children and adolescents. *Journal of Autism and Developmental Disorders* 42: 1304–1313.
- Maskey M, Warnell F, Parr JR, et al. (2013) Emotional and behavioural problems in children with autism spectrum

- disorder. *Journal of Autism and Developmental Disorders* 43: 851–859.
- Matczak A, Piotrowska A and Ciarkowska W (2008) *WISC-R—Skala Inteligencji Wechslera dla Dzieci—Wersja Zmodyfikowana*. Warsaw: Pracownia Testów Psychologicznych Polskiego Towarzystwa Psychologicznego.
- Matson JL and Cervantes PE (2014) Commonly studied comorbid psychopathologies among persons with autism spectrum disorder. *Research in Developmental Disabilities* 35: 952–962.
- Mazzone L, Ruta L and Reale L (2012) Psychiatric comorbidities in Asperger syndrome and high functioning autism: diagnostic challenges. *Annals of General Psychiatry* 11: 16.
- Meer M, Dixon A and Rose D (2008) Parent and child agreement on reports of problem behaviour obtained from a screening questionnaire, the SDQ. *European Child & Adolescent Psychiatry* 17: 491–497.
- Oerlemans AM, van der Meer MJM, van Steijn DJ, et al. (2013) Recognition of facial emotion and affective prosody in children with ASD (+ADHD) and their unaffected siblings. *European Child and Adolescent Psychiatry* 23: 257–271.
- Oliva A, Parra Á and Reina MC (2014) Personal and contextual factors related to internalizing problems during adolescence. *Child and Youth Care Forum* 43: 505–520.
- Rescorla LA, Ginzburg S and Achenbach TM (2013) Cross-informant agreement between parent-reported and adolescent self-reported problems in 25 societies. *Journal of Clinical Child & Adolescent Psychology* 42: 262–273.
- Rey JM, Schrader E and Morris-Yates A (1992) Parent child agreement on children's behaviours reported by the child behaviour checklist (CBCL). *Journal of Adolescence* 15: 219–230.
- Riley AW, Ensminger ME, Green B, et al. (1998) Social role functioning by adolescents with psychiatric disorders. *Journal of American Academy of Child and Adolescent Psychiatry* 37: 620–628.
- Rivet TT and Matson JL (2011) Review of gender differences in core symptomatology in autism spectrum disorders. *Research in Autism Spectrum Disorders* 5: 957–976.
- Rutter M, Bailey A and Lord C (2003) *The Social Communication Questionnaire Manual*. Los Angeles, CA: Western Psychological Services.
- Salbach-Andrae H, Klinkowski N, Lenz K, et al. (2009) Agreement between youth-reported and parent-reported psychopathology in a referred sample. *European Child & Adolescent Psychiatry* 18: 136–143.
- Schriber RA, Robins RW and Solomon M (2014) Personality and self-insight in individuals with autism spectrum disorder. *Journal of Personality and Social Psychology* 106: 112–130.
- Skuse DH, Mandy W, Steer C, et al. (2009) Social communication competence and functional adaptation in a general population of children: preliminary evidence for sex-by-verbal IQ differential risk. *Journal of the American Academy of Child and Adolescent Psychiatry* 48: 128–137.
- Solomon M, Miller M, Taylor SL, et al. (2012) Autism symptoms and internalizing psychopathology in girls and boys with autism spectrum disorders. *Journal of Autism and Developmental Disorders* 48: 48–59.
- Sourander A, Helstela L and Helenius H (1999) Parent-adolescent agreement on emotional and behavioral problems. *Social Psychiatry and Psychiatric Epidemiology* 34: 657–663.
- Stewart ME, Barnard L, Pearson J, et al. (2006) Presentation of depression in autism and Asperger syndrome: A review. *Autism* 10: 103–116.
- Van der Graaff J, Branje S, De Wied M, et al. (2014) Perspective taking and empathic concern in adolescence: gender differences in developmental changes. *Developmental Psychology* 50: 881–888.
- Van Wijngaarden-Cremers PJJ, van Eeten E, Groen WB, et al. (2014) Gender and age differences in the core triad of impairments in autism spectrum disorders: a systematic review and meta-analysis. *Journal of Autism and Developmental Disorders* 44: 627–635.
- Vierhaus M and Lohaus A (2008) Children and parents as informants of emotional and behavioural problems predicting female and male adolescent risk behaviour: a longitudinal cross-informant study. *Journal of Youth and Adolescence* 37: 211–224.
- WHO (2002) *The ICD-10 Classification of Mental and Behavioural Disorders: Diagnostic Criteria for Research*. Geneva: WHO.
- Witwer AN and Lecavalier L (2010) Validity of comorbid psychiatric disorders in youngsters with autism spectrum disorders. *Journal of Developmental and Physical Disabilities* 22: 367–380.
- Wolańczyk T (2003) *Zaburzenia emocjonalne i behawioralne dzieci i młodzieży w Polsce* [Behavioral and emotional problems of children and adolescents in Poland]. Warszawa: Akademia Medyczna w Warszawie.
- Zahavi D (2010) Complexities of self. *Autism* 5: 547–551.