

Loneliness and Social Support in Adolescent Boys with Autism Spectrum Disorders

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Abstract Loneliness and perceived social support were examined in 39 adolescent boys with autism spectrum disorders (ASD) by means of a self-labeling loneliness measure, the UCLA Loneliness Scale (third version), and the Social Support Scale for Children. Twenty-one percent of the boys with ASD described themselves as often or always feeling lonely. Compared with 199 boys from regular schools in a national probability study, ASD was strongly associated with often or always feeling lonely (OR: 7.08, $p < .0005$), as well as with a higher degree of loneliness ($F(1,229) = 11.1, p < .005$). Perceived social support from classmates, parents, and a close friend correlated negatively with loneliness in ASD. The study, therefore, indicates a high occurrence of loneliness among adolescent boys with ASD and points at perceived social support as an important protective factor.

Keywords Autism spectrum disorders · Loneliness · Social support · Peer relationships · Adolescence

Introduction

A hallmark of autism spectrum disorders (ASD) is poor social functioning, which acts as an impediment to the development of social relationships. According to the DSM-IV (American Psychiatric Association 2000), the social deficit in ASD is marked by impairment in the use of nonverbal behaviors, failure to develop peer relationships, a lack of seeking to share enjoyment, interests, or achievements with others, and a general lack of social or emotional reciprocity. Empirical evidence further suggests that children and adolescents with ASD are generally characterized by poor friendships, often lack social skills, and commonly experience peer rejection (Bauminger and Kasari 2001; Orsmond et al. 2004). Moreover, studies of general populations indicate that children who are rejected and lack friends in elementary school are more likely to be lonely in adolescence (Pedersen et al. 2007). Furthermore, lack of social integration and rejection by peers in adolescence is reflected in a higher degree of loneliness (Goswick and Jones 1982; Parkhurst and Asher 1992). The present study investigates whether adolescents with ASD are more likely to report feeling lonely than typically developing adolescents. Additionally, the study investigates the relationship between loneliness and perceived social support.

Loneliness

Loneliness is an aversive experience that affects an individual's social, affective, and cognitive functioning. The phenomenon has been defined in many ways, but most scholars agree that loneliness is a subjective, unpleasant, and distressing experience resulting from deficiencies in a person's social relationships (Peplau and Perlman 1982).

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Loneliness is typically measured by means of classic self-report inventories such as the UCLA Loneliness Scale (UCLA; Russell 1996). In these types of instruments, the terms ‘lonely’ and ‘loneliness’ are carefully avoided and the items probe for feelings associated with being lonely (e.g., feeling abandoned).

Loneliness is associated with mental health problems, for instance, depressive affect, anxiety, and suicide ideation, and recently there has been a growing interest in the clinical significance of loneliness (Cacioppo et al. 2006; Heinrich and Gullone 2006). It is particularly relevant to focus on loneliness and mental health in adolescence, because the available evidence suggests that loneliness increases and is most prevalent during this developmental period (Heinrich and Gullone 2006; Mahon et al. 2006). Furthermore, suffering from a mental health disorder which is marked by social difficulties in adolescence may be assumed to increase the risk of loneliness. Accordingly, it is relevant to investigate loneliness in adolescence as possible sequela of disorders such as ASD, Attention Deficit Hyperactivity Disorder (ADHD), and eating disorders. However, studies investigating these associations are rare. One exception is learning disabilities. A considerable number of studies have found that children and adolescents with learning disabilities display a higher degree of loneliness than average-achieving classmates (Margalit and Al-Yagon 2002). These studies indicate that suffering from a mental disorder in adolescence may increase the risk of loneliness.

Loneliness and Autism Spectrum Disorders

In his classic work on autism, Kanner (1943) described a group of children who often played alone, had few social relationships, and a desire for aloneness. Although the subjective experience of loneliness is distinct from aloneness (an objective condition), loneliness in autism has been a matter of speculation in clinical reports since these observations were reported by Kanner (Bauminger and Kasari 2000). Concerns about loneliness and poor social support, for instance, are often raised when children with autism are referred to an outpatient clinic (Barry et al. 2003). Nevertheless, very few studies have investigated the significance of loneliness in ASD.

Bauminger and Kasari (2001) attribute the lack of empirical attention with regard to loneliness in ASD to the diagnostic criteria that specify an inability to form satisfactory social relationships. However, the implications of the criteria are unclear. We do not fully understand whether the lack of friendships in some individuals with ASD is due to lack of skills or a lack of interest in the social world (Bauminger and Kasari 2000, 2001). However, inability and disinterest, which can both be a problem in ASD, can

be examined in empirical research. One may examine whether children and adolescents with ASD fully understand what it means to be lonely, whether they label themselves as being lonely, and whether they score higher than typically developing youngsters on self-report inventories of loneliness, such as the UCLA.

One study (Bauminger and Kasari 2000) asked the participants to give their own definition of loneliness (“describe what lonely means”) and to provide an example of a time when they felt lonely. Similar to typically developing children and adolescents, nearly all participants with autism identified social-cognitive dimensions of loneliness, indicating that loneliness involves unfulfilled relationships, exclusion, and dissatisfaction with social relationships. However, unlike the controls, only one out of three youngsters with autism included an emotional dimension in their definition of loneliness (e.g., being sad, afraid, or depressed). Another study (Bauminger et al. 2003) examined the understanding of the emotional aspect of loneliness in high-functioning children and adolescents with autism, using direct questions (e.g., “Can a child feel lonely when s/he is in the company of other children?”). When answering these questions, children and adolescents with autism revealed a complex understanding of the more emotional aspects of loneliness as did typically developing children and adolescents. Taken together, the findings indicate that high-functioning children and adolescents do understand the concept of loneliness, at least to a certain degree, but the results seem to depend on the method used. Thus, the understanding of loneliness in children and adolescents with ASD may be less comprehensive and coherent than among typically developing children and adolescents.

Moreover, using self-report inventories of loneliness, three studies on samples that spanned a large age range (8 to 17-year-olds) found that high-functioning children and adolescents with autism reported higher degrees of loneliness than typically developing children and adolescents (Bauminger and Kasari 2000; Bauminger et al. 2003, 2004). However, small sample sizes ($N = 16–22$) and broad age ranges limit these studies. Moreover, a recent study with pupils in regular classes in Grades 2 through 5 found that children with ASD did not report greater loneliness than a matched control group (Chamberlain et al. 2007).

Whether children and adolescents with ASD apply the label ‘lonely’ to themselves has not been explored as of yet. The use of direct reports or self-labeling indices could provide an estimate of the prevalence of loneliness in youngsters with ASD, which seems a relevant topic to investigate.

In sum, some understanding has been gained of the perception and experience of loneliness in youngsters with ASD, mainly through the use of interviews and indirect

reports as provided through self-report inventories. The findings and limitations of existing studies, however, call for further investigation of loneliness, particularly in the period of adolescence. Current knowledge about the occurrence of loneliness in adolescents with ASD is very limited, as is our knowledge about factors that may protect against loneliness, such as social support.

Perceived Social Support

A recent meta-analytic study of loneliness (Mahon et al. 2006) identified perceived social support as a reliable correlate of loneliness during adolescence, suggesting that when significant others are experienced as helpful, loyal, and supportive they may prevent experiences of loneliness. The value of social support seems particularly relevant with regard to adolescents with ASD who are in special need of help from parents, teachers, and peers. Whereas many researchers have studied the importance of social support in parents of children with ASD (e.g., Bishop et al. 2007; Luther et al. 2005), very little research has investigated the significance of social support in adolescents with ASD.

Children and adolescents with ASD usually have fewer friends than typically developing peers, and the quality of their friendships is lower in terms of companionship, security, and help (Bauminger and Kasari 2000). Nevertheless, individual variations in perceived social support from both classmates and friends outside the school may mediate feelings of loneliness in ASD. Moreover, parents of children with ASD play an important role in providing opportunities for their children to meet with other children, and in supporting the ongoing friendship processes (Bauminger and Kasari 2001). Also, support and help from teachers in an “autism-friendly” environment may decrease the risk of social difficulties and peer rejection. However, it is still unclear whether perceived support from parents and teachers decreases the risk of loneliness in adolescents with ASD.

The Present Study

The purpose of the present study was to contribute to our understanding of loneliness as a possible sequela of ASD in adolescence by: (a) investigating the prevalence of loneliness in boys with ASD, (b) comparing direct and indirect reports of loneliness of adolescent boys with ASD and adolescent boys from a national probability study with students attending regular schools, and (c) examining the value of multiple social support sources in relation to loneliness in boys with ASD.

Exploring whether loneliness is common among adolescents with ASD may further increase our understanding of the social impairments of this common childhood-onset

developmental disorder. Moreover, establishing the significance of different sources of social support in preventing loneliness may help to guide school interventions and parental supervision. Accordingly, the study has relevance to both clinical practice and theoretical issues, by challenging our understanding of the characteristics of adolescents with ASD. Due to the scarcity of previous research it was difficult to develop clear expectations regarding the results of the study. Based on the preceding review of the literature, however, it was hypothesized that:

- (a) Adolescents with ASD are significantly lonelier than adolescents from classes in regular schools on both direct and indirect reports.
- (b) Perceived social support from parents, a teacher, classmates, and a close friend protects against loneliness in adolescents with ASD.

Method

Participants

The participants were recruited at two special education schools in Aarhus County, Denmark. The schools accept adolescents with ASD or severe ADHD who have difficulties meeting the demands of education in regular classrooms. A total of 74 boys from Grades 7–9 participated in an investigation about loneliness and friendship (participation rate: 76%). To participate in the study, the students were required to be high functioning (i.e., be within or above the range of normal intellectual functioning and have fluent language [minimum five-word sentences]), although they could have specific scholastic difficulties. In all, 39 boys with ASD (pervasive developmental disorders; PDD) met these inclusion criteria and formed the ASD group in this study.

Prior to being referred to one of the schools, the boys had been thoroughly assessed and diagnosed by experienced clinicians, the gold standard for autism diagnosis (Volkmar et al. 2005). The diagnostic evaluations were conducted at different county hospitals, following the ICD-10 criteria (World Health Organization 1994). The majority of the participants received their diagnostic evaluation in a specialized department at a university hospital where the Autism Diagnostic Observation Schedule-Generic (ADOS-G) is used as a standard part of the evaluation. ADOS-G is a semi-structured assessment of communication, social interaction, and play in children suspected of having ASD or PDD. The diagnostic procedure includes a broad evaluation building on the contribution of psychiatrists, psychologists, nurses, and teachers. A consensus diagnosis is the standard.

The participants had the following autism subtypes: Childhood autism: 28%; atypical autism: 3%; Asperger’s syndrome: 21%; other PDD: 13%; subtype unspecified: 36% (subtype unspecified includes PDD unspecified [F84.9], and cases diagnosed with PDD, but with no note of the specific subtype [F84]). Because some students had specific scholastic difficulties, and loneliness has been associated with learning disabilities, a crude measure of scholastic difficulties was included by asking one primary teacher of each participant to rate the scholastic difficulties of the student on a scale from 1 (few difficulties) to 3 (many difficulties). Loneliness scores were not associated with the teachers’ rating within the sample (Tukey’s B posthoc, ns). Eighteen students with ASD had reading difficulties, for which reason some or all study questions were presented verbally. The students’ answers were not visible to the researcher. No differences in loneliness were found between this subgroup to which questions had to be presented verbally, and the other subgroup that did not need such assistance (ANOVA, ns).

The 39 boys with ASD included in the study were 13–17 years old. These boys were compared with 199 boys aged 13–16 from Grade 8 classes in regular schools, who participated in a Danish national probability study on loneliness. The procedure of the study is described in Lasgaard (2007). The demographic characteristics of both samples are summarized in Table 1.

The reported demographics of the two samples were compared using independent samples *t*-test. A significant difference in variance was found in relation to age, reflecting the fact that 82% of the Grade 8 students from regular schools were 14 years old, whereas most of the Grades 7–9 students with ASD were 13, 14 or 15 years old (31, 28, and 33%, respectively). Also, a significant difference in variance and mean was found in living arrangements. The finding reflects the fact that more boys with

ASD than boys from classes in regular schools did not live together with one or both parents (10 vs. 1%). This difference was expected and is most likely due to a high degree of behavioral problems in some participants with ASD.

Measures

The degree of loneliness was assessed using a Danish version of the UCLA (third version; Lasgaard 2007; Russell 1996), the most frequently used standardized self-report scale for measuring loneliness in adolescent populations (Shaver and Brennan 1991). The scale consists of 20 items (11 positive and 9 negative) describing subjective feelings of loneliness, none of which refer specifically to loneliness (e.g., “How often do you feel part of a group of friends?”, and “How often do you feel that you lack companionship?”). The items are rated on a 4-point Likert scale according to the rate of frequency, ranging from *never* (1) to *always* (4). Higher scores reflect greater loneliness. Using data from the national youth probability study, the Danish version of the scale showed satisfactory psychometric properties (Lasgaard 2007). In the present study, the scale demonstrated high internal consistency for the sample of boys with ASD ($\alpha = .85$) and for the sample of boys from regular schools ($\alpha = .91$).

To provide an estimate of the prevalence of loneliness the self-labeling single-item “I feel lonely” was used to measure to what degree the students considered themselves lonely (“never”, “sometimes”, “often”, “always”). Analyses on loneliness are based on the UCLA, except from the estimate of the prevalence of loneliness, which is based on the self-labeling item.

Social support was measured using the Social Support Scale for Children (SSSC; Harter 1985). The scale consists of four subscales (each containing six items) assessing perceived social support and positive regard from parents, a

Table 1 Sample characteristics

Variable	ASD (N = 39)	Controls (N = 199)
Sociodemographic		
Age, mean (SD)	14.2(1.03)	14.1(.43)
Grade	7–9	8
Two-parent family/single parent, n (%)	35 (90)	197 (99)
Two or more siblings, n (%)	16 (41)	101 (51)
Psychological		
UCLA, mean (SD)	43.54 (8.84)	37.65 (10.30)
SSSC-parents, mean (SD)	20.06 (2.99)	–
SSSC-classmates, mean (SD)	17.64 (3.84)	–
SSSC-teacher, mean (SD)	18.30 (3.99)	–
SSSC-close friend, mean (SD)	19.16 (3.40)	–
UCLA UCLA Loneliness Scale, Often/always feeling lonely, n (%)	8 (21)	7 (4)
SSSC Social Support Scale for Children Difficulties in making friends, n (%)	20 (51)	30 (15)

teacher, classmates, and a close friend. By including diverse possible sources of support, we hoped to determine the extent to which the perception of support from different significant others may decrease the risk of loneliness. Each item is scored on a scale from 1 to 4 with 1 representing the lowest level of social support. In accordance with the manual, clear instructions on how to answer the questions were given to the students with ASD. The scale was not included in the study with students from regular schools. Harter (1985) reported satisfactory psychometric properties of the scale in samples of Grade 6–8 students. Prior to data collection, the scale was adapted to Danish using a translation/back-translation procedure and feedback from students in a pilot study (see below). The adapted scale demonstrated good internal consistency (parents $\alpha = .75$; classmates $\alpha = .81$; teacher $\alpha = .83$; close friend $\alpha = .75$).

To allow for the possibility that the ability to establish peer relations outside the special education school also may protect against loneliness, we included a single-item measure to estimate how often the participants were in contact with peers outside school. The amount of contact was rated on a 6-point scale, ranging from *never* (1) to *daily* (6). Finally, the students were asked if they experienced difficulties in making friends, rated on a 4-point Likert-scale that ranged from *strongly disagree* (1) to *strongly agree* (4). By including experiences of difficulties in making friends, we aimed to explore one aspect of poor social functioning that may increase the risk of loneliness in ASD.

For all the UCLA and SSSC variables the percentage of missing values was small (0.0–7.7% in the ASD group; 2.5–5.0% in the control group). The Expectation Maximization Algorithm, which has been demonstrated to be an effective method of dealing with missing data (Bunting et al. 2002), was performed to impute missing data on cases missing less than 10% of the items on a scale.

Procedure

Difficulties associated with ASD (e.g., problems with generalization, conceptual understanding, communication, and executive functioning, and a tendency for literal and concrete understanding) do not harmonize well with the requirements of participating in research and raise the need to be cautious when studying adolescents with ASD (Eriksen 2005). However, a recent study of emotion regulation abilities concluded that the possibility of using self-report measures to understand adults with high-functioning ASD proved promising (Berthoz and Hill 2005). Moreover, children and adolescents with ASD have been found to provide reliable and valid self-reports of their social and emotional status (Sutton et al. 2005).

As stressed by Eriksen (2005), taking the specific characteristics of ASD into consideration in the research

design increases the validity of the information gathered. Thus, the design of the study and the format of the questionnaire were developed to overcome some of the specific problems associated with ASD, particularly with regard to organization and conceptual understanding. The questionnaire was presented as four small tasks and colors helped the students to remember and distinguish between the response categories. Additionally, a small pilot study was conducted with four students from Grade 10, which led to minor changes in the instructions and the wording of a few items.

Prior to data collection informed consent was obtained from the parents, who received a letter that explained the purpose of the study and the procedures securing confidentiality. Participants in the study were given 1 week's notice prior to the data collection in order to facilitate their preparation with regards to a change in the daily schedule. To increase the familiarity of the new setting, and to maximize the success of the interaction, a letter described the time and purpose of the study, gave examples of the questions, and introduced the researcher attending the data collection.

At the beginning of the data collection, the students were introduced to the use of questionnaires and to the confidentiality procedures. Moreover, loneliness was explained as a concept, mentioning various situations that may lead to loneliness. The comments and questions of the participants gave the impression that the boys with ASD understood the concept of loneliness. The first or second author of the study administered the survey and supported the students by clarifying questions and encouraging participation. No differences in loneliness were found between the two groups of students who worked with the different researchers. Based on observations during data collection, it was the researchers' impression that the study succeeded in overcoming some of the problems associated with using self-report scales in ASD research. The fact that the scales used showed adequate internal consistency, and that all the participating students filled out the questionnaire, seems to support that impression.

Results

Twenty-one percent of the adolescents with ASD described themselves as often or always feeling lonely and another 38% reported that they feel lonely sometimes. Four percent of the controls described themselves as often or always feeling lonely and another 19% reported feeling lonely sometimes. Logistic regression analysis, comparing the two groups (ASD vs. controls) on the self-labeling single-item, revealed that feeling lonely (often or always) was strongly associated with ASD (OR: 7.08 [95% CI: 2.40–20.91],

$p < .0005$). The same applied to difficulties in making friends (agree or strongly agree; OR: 6.15 [95% CI: 2.92–12.97], $p < .0001$).

To examine group differences on the UCLA score, univariate ANOVAs were conducted with group as the independent variable and loneliness score as the dependent variable. In comparison to adolescent boys from regular schools, adolescent boys with ASD reported higher feelings of loneliness ($F(1,229) = 11.1, p < .005$). The self-reported prevalence of loneliness and the UCLA correlated highly in either sample (ASD: $r = .64, p < .0001$; controls: $r = .60, p < .0001$). Autism subtype (childhood autism; Asperger’s syndrome; other or unspecified subtype) was not associated with loneliness (Tukey’s B posthoc, ns).

The correlations between the UCLA and the SSSC in the ASD group are shown in Table 2. As expected, loneliness correlated negatively with perceived social support from classmates ($r = -.52, p < .005$), parents ($r = -.43, p < .01$), and a close friend ($r = -.40, p < .05$). Perceived social support from a teacher was not significantly associated with loneliness. Moreover, no association was found between loneliness and the amount of contact with peers outside school.

Boys with ASD who had two or more siblings reported significantly less loneliness than boys with ASD who had one sibling or were an only child (Tukey’s B posthoc, $F(2,36) = 8.0, p < .005$). Controlling for the effect of siblings on correlations between the UCLA and the SSSC, using partial correlations, the moderate association between loneliness and perceived social support from a close friend no longer proved significant ($r = -.24, ns$). Loneliness in boys from classes in regular schools was not associated with the number of siblings.

Loneliness was not associated with the experience of having difficulties in making friends (agree or strongly agree) in boys with ASD ($F(1,36) = 2.4, ns$), but this association proved significant in boys from regular schools ($F(1,188) = 47.6, p < .0001$). Finally, loneliness scores were not associated with age (13, 14, and 15+ years old) or different living arrangements in either sample (Tukey’s B posthoc, ns).

Discussion

Loneliness

In line with previous studies that included both children and adolescents (Bauminger and Kasari 2000; Bauminger et al. 2003, 2004), the results of the present study support the hypothesis that adolescent boys with ASD generally feel lonelier than adolescent boys from regular schools. The earlier finding that children with ASD did not report greater loneliness (Chamberlain et al. 2007) may reflect the fact that children with ASD do not feel lonelier than typically developing children, and that the association between loneliness and ASD reported in earlier studies solely echoes an increased risk of loneliness in adolescence.

Our finding that many adolescent boys with ASD feel lonely seems to imply that they do not lack an interest in human interaction. As children in the higher-functioning group grow older, they may become aware that other people are of interest and want to join in, make friends, and enjoy human company (Wing 1992). So, in contrast to Kanner’s (1943) conclusion, many adolescents with ASD do have a desire for social involvement and seem to be aware when the desire is not met. It is indeed important to acknowledge and incorporate such notions into our understanding of ASD and clinical practice.

To the best of our knowledge, no previous studies have aimed to estimate the prevalence of loneliness in adolescents with ASD by asking to what degree they consider themselves lonely. The prevalence of loneliness was found to be considerable. Twenty-one percent of the adolescents with ASD described themselves as often or always feeling lonely. Examining self-competence and emotional understanding, Capps et al. (1997) stated that the pain one feels in response to visions of the isolated, autistic child is greatly magnified when one imagines that the child feels lonely and rejected, rather than detached and unaware. These authors added that such responses are not necessarily an accurate index of the way the children feel themselves. This caution raised is essential. Children with and without ASD may understand the concept of friendship differently (Chamberlain et al. 2007). Likewise, our general knowledge of

Table 2 Correlation matrix

Scale	SSSC-parents	SSSC-teacher	SSSC-classmates	SSSC-close friend
UCLA	-.43**	-.19	-.52***	-.40*
SSSC-parents		.50***	.36*	.12
SSSC-teacher			.36*	.07
SSSC-classmates				.26

UCLA UCLA Loneliness Scale, SSSC Social Support Scale for Children

* $p < .05$, ** $p < .01$, *** $p < .005$

loneliness may not be an accurate standard for understanding loneliness in ASD, and the desire for social involvement of adolescents with ASD may be different from any such desire in typically developing adolescents.

More than half of the boys with ASD reported having difficulties in making friends. Yet, in the present study these difficulties were not associated with feelings of loneliness. Therefore, we assume that despite the recognition of their difficulties many adolescents with ASD do manage to develop social relations that they find satisfactory. Additionally, it is possible that some do not wish to have friends. Another explanation may be that some of the participants have been taught that ASD is associated with difficulties in making friends. Therefore, they may simply replicate this statement rather than describe their own abilities.

Social Support

Our knowledge about factors that may protect against loneliness in persons with ASD is very limited. However, the present study indicates that perceived social support from parents, classmates, and a close friend is protective against loneliness. This finding and the estimated high prevalence of loneliness underline the need for interventions that may identify and promote multiple sources of social support and encourage social activities and training in the school and family environment. In particular, social skills training has become widely accepted in the treatment of adolescents with ASD. Although the empirical support for the approach is incomplete, available studies indicate that it has some potential in limiting the social difficulties associated with the disorder (White et al. 2007). Moreover, social skills training may not only strengthen the quality of social interactions but also decrease loneliness and improve perceptions of social support in adolescents with ASD (Barry et al. 2003).

Moreover, parents may support the personal and social development of their children. Because adolescents with ASD often find it difficult to make friends, and often do not know the rules for social interaction, parents may play the role of facilitator by helping their children in creating and maintaining a social network and thereby increasing their children's self-esteem. Thus, creating a positive self-image, increasing self-knowledge, and strengthening resources may also help towards compensating the social impairments in adolescents with ASD.

According to the present study, having two or more siblings decreases the risk of loneliness in adolescent boys with ASD and, as reported, the association between loneliness and perceived social support from a close friend disappeared when controlling for the number of siblings. Typically developing siblings provide a high

level of frequency and complexity of social interaction (Knott et al. 1995) and may therefore function as close friends. In addition, they may also decrease the risk of loneliness by giving siblings with autism an opportunity to learn about social interaction and supporting their social development (Tsao and Odom 2006). Noteworthy, the positive effect of sibling relations seems to depend on having two or more siblings. This may be explained by the fact that a large number of siblings appears to facilitate healthy psychosocial adjustment in siblings of children with autism (Kaminsky and Dewey 2002). Also, adolescents with ASD with two or more siblings may engage in social interactions in the family without playing an active part.

Limitations

The present study has several limitations. It is cross-sectional and offers no knowledge about the development and stability with regards to feelings of loneliness. The relationship between perceived social support and loneliness may also be bidirectional with loneliness affecting the perception of social support. In addition, social support always has an objective component, which was not properly assessed by our subjective measure of the construct. Our exclusive reliance on this subjective measure may have inflated the negative correlation between the constructs of loneliness and social support. In future research, therefore, it is essential to include an objective measure of available social support resources as well.

Furthermore, impaired emotional processing has been reported in studies of individuals with ASD (Hill et al. 2004). Therefore, it is possible that loneliness was under-reported because some participants were not able to identify and express this feeling, or over-reported because difficulties with emotion processing caused a lack of emotional differentiation. However, the self-labeling loneliness measure and the UCLA correlated highly, indicating accordance between the self-description of loneliness and a validated measure of loneliness. Nevertheless, the self-reported prevalence of loneliness in the study should be considered a tentative estimate of the scale of the problem.

It should further be stressed that we investigated adolescents with ASD attending special education schools that accept students with severe symptomatology and behavioral problems, which may have influenced the estimated prevalence of loneliness. Moreover, boys with ASD attending special education schools may differ from boys with ASD enrolled in inclusive regular classes, irrespective of the severity of symptoms. Finally, our knowledge about the cognitive and adaptive functioning of the participants is limited.

Suggestions for Future Research

The heterogeneity of the disorder and the heterogeneity in social interest and functioning of people with ASD are increasingly recognized. Therefore, there is a profound need to understand variations in the expression of symptoms, differing levels of social interest and insight, social and cognitive ability, and the implications of these variations on loneliness and other social factors. Although social and communicative difficulties are characteristic of ASD, not all children and adolescents with the disorder seem to feel lonely. This raises the need to understand why some individuals experience loneliness whereas others do not. This could be examined by investigating factors normally associated with developmental variation in ASD (e.g., intellectual abilities, adaptive functioning, and symptom severity). Most importantly, some participants in the present study suffered from specific scholastic difficulties. Given that learning disabilities have been associated with loneliness in previous studies, it remains possible that the strong association between feeling lonely and ASD can be explained by scholastic difficulties or learning disabilities. Future studies need to examine more closely whether the high prevalence of loneliness in ASD is independent of learning disabilities.

Future studies also need to investigate whether the high prevalence of loneliness is unique to ASD, or rather a central characteristic of developmental disorders, or adolescent psychopathology in general. On the one hand, studies of loneliness in ADHD have not found that the impaired social functioning associated with this disorder increases the risk of loneliness (Diamantopoulou et al. 2005; Heiman 2005; McNamara et al. 2005), which could indicate that the high prevalence of loneliness reported in this study may be specifically associated with ASD rather than developmental disorders in general.

Finally, the high prevalence of loneliness among adolescents with ASD is a cause of concern. As mentioned, loneliness and depression are associated in typically developing adolescents, and it is difficult to see that this should not be the case in high-functioning adolescents and adults with ASD who are already susceptible to high rates of depression and suicide ideation (Ghaziuddin et al. 1998; Shtayermman 2007). As a consequence, it seems likely that feelings of loneliness, poor social support, and general social dysfunction in adolescents with ASD increase the risk of depression and suicidal behavior. Furthermore, the value of perceived social support from classmates tells us that experiences of loneliness and isolation are likely to increase when adolescents with ASD leave the school system.

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