



Research Paper

Emotional and behavioural needs in children with specific language impairment and in children with autism spectrum disorder: The importance of pragmatic language impairment

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ABSTRACT

Background: Language problems may negatively affect children's behaviour and have detrimental effects on the development of peer-relations.

Aims: We investigated and compared emotional and behavioural profiles in children with SLI and in children with ASD aged 6–15 years and explored to what extent pragmatic language problems contributed to the emotional and behavioural needs (EBN) in these clinical groups.

Methods and procedures: The ASD group consisted of 23 children (19 boys; 4 girls) and the SLI group consisted of 20 children (18 boys; 2 girls). In order to assess EBN and language abilities, the Strength and Difficulties Questionnaire (SDQ) and the Children's Communication Checklist – 2 (CCC-2) were filled out by parents.

Outcomes and results: Our main findings were that although EBN was common in both groups; the children in the ASD group were significantly impaired relative to the children in the SLI group. However, in both groups pragmatic language problems were found to be significantly associated with EBN.

Implications: A comprehensive assessment of EBN as well as pragmatic language abilities should be an integral part of the assessment procedure. Considering the substantial influence of pragmatic language abilities on social function and in resolving interpersonal conflicts with peers further development of therapy plans and interventions targeting pragmatics is strongly needed.

What this paper adds?

Emotional and behavioural needs (EBN) have been reported both in children with specific language impairment (SLI) and in children with autism spectrum disorders (ASD) to a larger extent than what is commonly found in their typically developing peers. However, few studies have directly compared these clinical groups with respect to their emotional and behaviour profiles or investigated the extent to which pragmatic language problems may contribute to EBN. This study contributes with information showing that as measured by the Strength and difficulties questionnaire (SDQ), children with ASD are significantly impaired relative to children with SLI on most scales as well as on the total difficulties score. In both groups peer-problems are prominent with the majority of children scoring in borderline/abnormal range. Furthermore, our findings indicate that pragmatic language impairment contributes significantly to the reported EBN in children with SLI as well as in children with ASD. Thus a broad assessment of mental health and pragmatic language abilities is considered crucial in the treatment and management of children in both groups.

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1. Introduction

Children with developmental disorders such as specific language impairment (SLI) and autism spectrum disorders (ASD) appear to be more vulnerable to emotional and behavioural difficulties than typically developing children (Conti-Ramsden, Mok, Pickles, & Durkin, 2013; Helland, Helland, & Heiman, 2014; Snowling, Bishop, Stothard, Chipchase, & Kaplan, 2006), and mounting evidence points to a strong association between language impairment and behaviour problems (Cross, 2011; Helland, Lundervold, Heiman, & Posserud, 2014). It has long been debated whether overlap in aetiology, language profiles and behavioural phenomenology exist between children with SLI and children with ASD (Bishop, 2008; Botting & Conti-Ramsden, 2003); reviews are presented in Bishop (2010) and Tomblin (2011). Although traditionally regarded as two distinct disorders, similarities between them are commonly reported and in some individuals different combinations of symptoms will present (Durkin, Conti-Ramsden & Simkin, 2012). However, studies directly comparing emotional and behaviour profiles in children with SLI and children with ASD are scarce. Socioemotional wellbeing link to communicative competence and children's ability to form friendships and develop good peer-relations relies heavily on their language competence (Im-Bolter & Cohen, 2007).

SLI is a neurodevelopmental disorder, affecting language skills with an estimated prevalence of 5–7% of the population (Leonard, 2014; Tomblin et al., 1997). Although no gold standard exists for diagnosing SLI, this is the most common term used to describe otherwise typically developing children exhibiting significant deficits in language abilities with no known cause (Bishop, 2014; Leonard, 2014). It is important to note however, that SLI constitute a rather heterogeneous category varying both in severity and profile of disorder (Bishop, 2006). Most cases of SLI are diagnosed in childhood, however, considerable evidence suggest that these children do not outgrow their language difficulties; rather the majority continue to have long-term difficulties persisting into adulthood (Conti-Ramsden et al., 2013). Although traditionally regarded as a “pure” language disorder, children with SLI have shown to be at elevated risk for social exclusion, academic failure and emotional and behavioural difficulties (Conti-Ramsden & Durkin, 2015). Prevalence rates of behaviour and emotional needs (EBN) as high as 35–50% has been reported in samples of SLI (Yew & O’Kearney, 2013). Thus compared to typically developing peers, adolescents with SLI present with clinically important increases in the severity of diverse emotional and behavioural symptoms and more often also show clinical levels of these problems (Yew & O’Kearney, 2013). Elevated rates of externalizing as well as internalizing difficulties have been found (Charman, Ricketts, Dockrell, Lindsay, & Palikara, 2015). In a longitudinal study of children with a history of SLI St Clair, Pickles, Durkin and Conti-Ramsden (2011) found that hyperactivity, conduct and emotional problems decreased from childhood to adolescence while problems with peer relations increased.

ASD is a neurodevelopmental disorder with an estimated prevalence of about 1% characterized by social-communication deficits and repetitive/restricted behaviour (American Psychiatric Association, 2013; Matson & Neal, 2010). However, considerably heterogeneity exists in children with ASD; with variability in symptoms presentation as well as in functional abilities (Nylander, Holmqvist, Gustafson, & Gillberg, 2013). Co-occurring conditions, including language and learning problems, are commonly reported in clinical as well as in population –based samples (Carlsson et al., 2013; Helland, Biringer, Helland, & Heiman, 2012; Posserud, Hysing, Helland, Gillberg, & Lundervold, 2016) and these problems are expected to contribute to impairment as well as to poor functional outcome. This is in line with The Early Symptomatic Syndromes Eliciting Neurodevelopmental Clinical Examination (ESSENCE) framework presented by Gillberg (2010), suggesting that a range of neurodevelopmental difficulties tend to appear together and that sharing of symptoms and co-existing problems across diagnostic groups are the rule rather than the exception in the field of child psychiatry. Behaviour problems negatively affecting family and school function are common among children with ASD (De Giacomo et al., 2016) and prevalence rates of EBN within this group ranging 50–75% have been reported (Charman et al., 2015; Totsika, Hasting, Emerson, Lancaster, & Berridge, 2011). In a total population sample Posserud et al. (2016) found that more than 92% of children screened positive for ASD had a minimum of two other co-existing problems. Language and learning problems, emotional problems and inattention/hyperactivity problems were most commonly reported.

The intersecting areas of language; form, content and use (pragmatics) are all crucial for communicative competence. Thus, problems within any of these areas may negatively affect children's behaviour (Spanoudis, Natsopoulos, & Panayiotou, 2007). Pragmatics may be defined as the ability to use and understand language in social context; beyond understanding and expressing word meaning in correct phonological and grammatical forms (Bloom & Lahey, 1978; Fujiki & Brinton, 2009; Turkstra et al., 2016). According to Gibson, Adams, Lockton and Green (2013) pragmatic language impairments may have detrimental effects on the development of peer-relations. Donno, Parker, Gilmour and Skuse (2010) argued that these problems should be considered a contributory factor to behavioural problems in primary school children. In line with this Ketelaars, Cuperus, Jansonius and Verhoeven (2010) identified a strong connection between pragmatic language impairment and behaviour problems in a Dutch community sample of preschool children and Helland, Lundervold et al. (2014) found that language-, emotional- and peer-problems in childhood significantly predicted pragmatic language impairments in a group of adolescents with behavioural problems. All these findings underline the close association between pragmatic abilities and social functioning. Pragmatic language abilities are considered universally impaired in ASD, but impaired structural language abilities have also been identified in the majority of these children (Gorman et al., 2016). Although impaired structural language abilities are commonly considered the area of most concern in SLI, these children and adolescents may also experience substantial difficulties with pragmatics (Bishop, 2003; Helland, Helland et al., 2014). In a study of 7–11 year old children with behaviour causing concern at school Mackie and Law (2010) found that approximately two thirds had significant pragmatic language difficulties whereas structural language difficulties on their own were not associated with EBN. A recent study by Charman et al. (2015) compared levels of EBN in 5–13-year-old children with ASD and children with language impairment (LI) using the Strength and Difficulties Questionnaire (SDQ; Goodman, 1997). They found that both diagnostic groups showed similar and highly elevated levels of emotional, conduct and hyperactivity problems, while the ASD

group was significantly impaired relative to the LI group on the subscales assessing peer problems and prosocial behaviour.

As evident from the body of research reviewed above, high frequencies of EBN have been found in samples of children with SLI as well as in samples of children with ASD. Against this backdrop the present study was launched to address the following two main research questions:

- 1) Are there significant differences in emotional and behavioural profiles in children with SLI and children with ASD?
- 2) To what extent do pragmatic language problems contribute to emotional and behavioural problems in children with SLI and children with ASD?

2. Method

2.1. Participants and procedure

Two clinical groups, children with ASD and children with SLI in the age range 6–15 years took part in the present study ($n = 43$). The ASD group was a combined sample consisting of 23 children (mean age 11, 0 years; $SD = 2, 4$; 19 boys, 4 girls) recruited from an outpatient clinic, a Norwegian support system for special education and from a parent support group for ASD. They were all diagnosed with Asperger syndrome; but as this category is now included in the Autism Spectrum Disorder (ASD) the latter term is used here (American Psychiatric Association, 2013). However; one should bear in mind that children who were given a diagnosis of Asperger syndrome were not expected to exhibit any general language delay. Thus, this study refers to high functioning children within the autism spectrum. The SLI group consisted of 20 children (mean age 8, 9 years; $SD = 2, 4$; 18 boys, 2 girls), recruited from the same support system for special education as the ASD group. These children were all diagnosed with SLI by specialized speech and language therapists and according to parental reports they had no intellectual disabilities.

Through these institutions a letter of informed consent also including the parent report questionnaires the Children's Communication Checklist Second Edition (CCC-2; Bishop, 2003; Norwegian adaptation: Helland & Møllerhaug, 2006) and the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1999) were sent to the parents of the children. Children meeting the following criteria; a diagnosis of ASD or SLI, no mental retardation according to parental reports, Norwegian as first language (L1), being able to speak in sentences and having no sensory neural hearing loss were included in the study

2.2. Assessment tools

2.2.1. Strengths and difficulties questionnaire (SDQ)

SDQ is a brief screening questionnaire for emotional and behavioural problems intended for use with children 4–16 years. It has been extensively validated in various countries including Norway (Muris, Meesters, & van den Berg, 2003; Obel et al., 2004). Psychometric properties are satisfactory with mean internal consistency values of 0.70 (Cronbach's alphas) for the various scales, and test-retest stability showing intraclass correlation coefficients of 0.70 or above (Muris et al., 2003). In the present study internal consistency value for the total difficulties score was 0.77. Separate versions to be filled out by parents, teachers or self-report by children are available; and in the present study the parent version was used. SDQ contains 25 items, divided into five subscales (five items in each scale); the first four scales assess problems related to emotions, conduct, hyperactivity/inattention and peer problems and the fifth scale assesses prosocial behaviour. A total difficulties score is computed by adding the scores of the four problem scales. The items are scored on a three-point scale (not true = 0; somewhat true = 1; certainly true = 2). A high score indicates problems except on the pro-social behaviour scale, which is inverted, and here a high score indicates strength. The scores of each subscale are ranging from 0 to 10 and the total difficulties score are ranging from 0 to 40. SDQ scores are most often used as continuous variables. However, additionally the scores may also be classified categorially as "normal", "borderline" or "abnormal" according to the scoring instructions (www.sdqinfo.org). For use in the present study the two last categories were combined and presented as borderline/abnormal range. Cut-off scores for the different scales were; total difficulties 14 points or above; emotional symptoms 4 points or above, conduct problems 3 points or above, hyperactivity/inattention 6 points or above, peer-problems 3 points or above, prosocial behaviour 5 points or below (inverted scale).

2.2.2. The Children's Communication Checklist Second Edition (CCC-2)

The CCC-2 is a questionnaire designed to screen for communication impairment and to identify pragmatic language impairment in children aged 4–16 years. A total of 70 items are grouped into 10 subscales measuring various aspects of language and social functioning (A. speech, B. syntax, C. semantics, D. coherence, E. inappropriate initiation, F. stereotyped language, G. use of context, H. nonverbal communication, I. social relations, and J. interests). A closer description of the instrument is presented in Helland, Biringer, Helland and Heimann (2009). A pragmatic Composite (PC), calculated by summing the scaled scores of the scales D–H has been reported in several studies (Bignell & Cain, 2007; Geurts & Embrechts, 2008; Helland, Helland et al., 2014; Helland, Lundervold et al., 2014) and this composite was calculated and used in the present study. No Norwegian norms are available for the PC; however as a scaled score of 10 is the average of each of the five scales composing the PC, a score of 50 should be regarded as a putative mean (Selås & Helland, 2016). Psychometric properties reported for the Norwegian adaptation of the CCC-2 are satisfactory; with internal consistency values ranging from 0.73 to 0.89 and interrater reliability between parent and teachers ranging from 0.44 to 0.76 (Helland et al., 2009). The present study produced a reliability value of 0.93 for the PC.

Table 1
Means and standard deviations for SDQ- scales for the ASD and the SLI groups.^a

n	Range	ASD		Range	SLI		p	d
		M	SD		M	SD		
Emotional symptoms	0–10	4.00	3.28	0–8	3.0	2.58	ns	0.34
Conduct problems	0–8	2.35	1.82	0–77	1.65	1.98	ns	0.37
Hyperactivity/inattention	2–8	5.96	2.38	1–8	4.40	2.48	*	0.64
Peerproblems	0–10	5.30	2.24	0–8	2.90	2.53	**	1.00
Pro-social behaviour	0–10	5.61	2.48	3–8	7.55	1.99	**	0.86
Total difficulties	8–29	17.61	6.99	2–26	11.95	7.51	*	0.78

A high score indicates impairment (except for the pro-social behaviour scale which is inverted).

^a ** $p < 0.01$; * $p < 0.05$; ns = non- significant; Student's independent samples t -test. ASD = autism spectrum disorder; SLI = specific language impairment; PC = pragmatic composite; SDQ = Strength and Difficulties Questionnaire.

2.3. Statistical analyses

The SLI group was somewhat younger than the ASD group. However; preliminary analyses between age and PC and between age and the total difficulties score (SDQ) revealed no significant correlations; this indicating no impact of the age difference. Group differences were analysed using Students independent samples t -tests (two tailed) with an alpha level of 0.05. Cohen's d is reported as a measure of effect size; according to general guidelines a d of 0.20 is considered small; 0.50 moderate and 0.80 is considered large. Correlation analyses (Pearson product moment correlation) between the PC and the total difficulties score were run to investigate a possible association between pragmatic language abilities and EBN. Additionally, correlation analyses between prosocial behaviour and PC were run. Furthermore, linear regression analyses (enter) were conducted to investigate the influence of pragmatic language abilities on EBN, as measured by the SDQ total difficulties score, in the two groups. All statistical analyses were performed by using SPSS version 23.0. The study was approved by the Norwegian Regional Ethical Committee on Medical Health Research, University of Bergen.

3. Results

3.1. Emotional and behavioural problems; SDQ

Descriptive statistics for SDQ subscales and total difficulties scores are presented in Table 1. As can be seen, significant group differences were found except for the subscales measuring emotional symptoms and conduct problems. On the subscales measuring hyperactivity/inattention; peer problems and prosocial behaviour as well as on the total difficulties score, the ASD group was significantly more impaired than the SLI group. Effect sizes; as measured by Cohen's d were medium to large (ranging 0.64–1.00).

When inspecting the distribution of children in each group scoring in the borderline/abnormal range on the total difficulties score; this applied to 30.0% of the SLI group compared to 65.2% of the ASD group (see Table 2). The subscale measuring peer problems identified most children, 87% of the ASD group and 60% of the SLI group, followed by the subscale measuring hyperactivity/inattention which identified 87% and 40% respectively. On the subscale measuring prosocial behaviour only 15% of the children in the SLI group scored in the borderline/abnormal range compared to 47.8% of the ASD group.

3.2. Pragmatic language abilities (PC)

As evident from Table 3 there was a significant negative correlation between PC and the total difficulties score in both groups with children scoring higher (more impaired) on the total difficulties score scoring lower (more impaired) on the PC. The ASD group ($M = 19,91$; $SD = 11.05$) also scored significantly lower than the SLI group ($M = 32,05$; $SD = 14,69$) on the PC; $t(41) = -3.03$;

Table 2
Percentage of children in the SLI and the ASD groups scoring in the borderline/abnormal range on the SDQ (n).

n	SLI	ASD
	20	23
	Borderline/abnormal	Borderline/abnormal
Emotional symptoms	30.0 (6)	56.5 (13)
Conduct problems	20.0 (4)	34.8 (8)
Hyperactivity/inattention	40.0 (8)	87.0 (14)
Peer problems	60.0 (12)	87.0 (20)
Pro-social behaviour	15.0 (3)	47.8 (11)
Total difficulties	30.0 (6)	65.2 (15)

SLI = specific language impairment; ASD = Autism spectrum disorder; SDQ = Strength and difficulties questionnaire.

Table 3
Correlation between PC and the total difficulties score in the ASD group and the SLI group.

	PC
ASD group (n = 23)	
Total difficulties	−0.76*
SLI group (n = 20)	
Total difficulties	−0.66*

ASD = autism spectrum disorder; SLI = specific language disorder; PC = pragmatic composite.

* $p < 0.01$.

$p = 0.005$. In the total sample a significant positive correlation, ($r = .44$) was found between pro social behaviour and the PC.

In order to examine to what extent pragmatic language abilities predicted EBN linear regression analysis were run for each group separately; including the PC as predictor and the total difficulties score as the criterion variable. See Table 4. In the ASD group a significant regression equation was found; $F(1, 21) = 29.21, p = 0.000$, with an R^2 of 0.582. Thus the predictor accounted for 58.2% of the variance in the total difficulties score. The PC had a significant effect on the total difficulties score; with beta value of $-0.76, p = 0.000$. Likewise in the SLI group a significant regression equation was found; $F(1, 18) = 13.53; p = 0.002$, with an R^2 0.429. Thus the predictor accounted for 42.9% of the variance in the total difficulties score. The PC had significant effect on the total difficulties score; with beta value of $-0.66, p = 0.002$.

4. Discussion

The aims of the present study were to compare emotional and behavioural profiles in children with ASD and children with SLI and to explore to what extent pragmatic language problems contributed to EBN in the separate groups. The main findings were that the ASD group was significantly impaired on measures of EBN relative to the SLI group. Furthermore, pragmatic language impairment was found to be significantly associated with EBN both in children with ASD and in children with SLI accounting for a substantial part of the variance in the total difficulties score.

Overall the ASD group presented with significantly more severe problems than the SLI group. Except for the subscales assessing emotional and conduct problems, in which the groups were inseparable, the ASD group performed poorer than the SLI group on all SDQ measures. These findings are in line with those reported by Charman et al. (2015) who also found more severe peer-problems, less prosocial behaviour and similarly elevated levels of emotional and conduct problems in children with ASD compared to children with SLI. However, contrary to their findings, our results showed that the ASD group also presented with significantly more severe problems than the SLI group on the subscale measuring hyperactivity/inattention.

In the present study about two thirds of the ASD group and one third of SLI group scored in the borderline/abnormal range on an overall measure of EBN (total difficulties score). Although most common in the ASD group; problems in the borderline/abnormal range on the separate SDQ subscales were also evident in children with SLI; and both groups displayed elevated levels of EBN compared to population norms. Peer-problems were most prominent in both groups; with 87.0% of the ASD group and 60.0% of the SLI group scoring in borderline/abnormal range on this subscale. Moreover hyperactivity/inattention problems within borderline/abnormal range were identified in the vast majority of the ASD group (87.0%) compared to 40.0% of the SLI group. This finding is in line with previous research pointing to comorbidity among disorders (Gillberg, 2010; Miniscalco, Nygren, Hagberg, Kadesjö, & Gillberg, 2006). According to Posserud et al. (2016) very few children with ASD present with autism traits alone; additional language and learning problems, emotional problems and inattention/hyperactivity problems are commonly found. However, it should not be overlooked that in the present study there were subjects that were *not* impaired in both groups. A significant positive correlation was identified between prosocial behaviour and pragmatic abilities, and it is an interesting finding that when it comes to prosocial behaviour; the SLI group outperformed the ASD group. While almost half of the ASD group was identified with problems in borderline/abnormal range on this scale the same applied to only 15% of the SLI group. This finding of prosociality as an area of relative strength in children with SLI is in line with the results recently reported by Toseeb, Pickles, Durkin, Botting and Conti-Ramsden (2017). Thus prosociality might be considered a protective factor when it comes to social functioning and also an area of strength that should be built upon when therapy is planned. The impaired pragmatic abilities of the ASD group probably reflect the communication problems characterizing children on the autism spectrum. However, although being less impaired than the ASD

Table 4
Linear regression analyses (enter) measuring the contribution of the PC to the total difficulties score (SDQ) in the ASD and SLI groups.

	B	SE	Beta	Sign
ASD	−0.48	0.09	−0.76	0.000
SLI	−0.34	0.09	−0.66	0.002

ASD = autism spectrum disorder; SLI = specific language impairment; PC = pragmatic composite; SDQ = Strength and Difficulties Questionnaire.

group, compared to general population means the SLI group also displayed impaired pragmatic abilities. Both in children with ASD and in children with SLI pragmatic language abilities were significantly associated with EBN. The PC accounted for 58% and 43% of the variance in the total difficulties score respectively. These findings underline the importance of pragmatic competence for emotional and behavioural functioning and are in line with previous research in which development of successful peer-relations have been found closely associated with pragmatic language abilities (Gibson et al., 2013; Helland, Helland et al., 2014; Helland, Lundervold et al., 2014; Leonard, Milich, & Lorch, 2011). However, as EBN may restrict children's abilities to form positive peer relations resulting in less practice to develop their pragmatic language skills, the relationship between social difficulties and pragmatic language deficits is likely to be bidirectional (Helland, Lundervold et al., 2014).

As pointed out by Bishop (2008, 2010) SLI and ASD have traditionally been regarded as distinct conditions; co-occurring at above chance levels suggesting shared aetiology. Bishop (2008) points to the lack of a clear dividing line between language disorder and ASD and it has been debated whether SLI and ASD should be regarded as being qualitatively distinct or differing only in severity. The findings of the present study may lend some support to the latter view with the ASD group being more severely impaired relative to the SLI group although presenting with similar profiles of EBN; and as pragmatic language abilities significantly contributed to the total difficulties score in both diagnostic groups.

4.1. Limitations

We acknowledge several limitations to the current study and considerations for the interpretation of our findings. This was a cross-sectional study and supplementing the present results with evidence from a longitudinal design would have been desirable. Our investigation made use of parental reports and did not include any objective measures obtained by standardized tests. Thus it is possible that a more nuanced picture would have appeared if the children had undergone additional individual assessment. As overlapping symptoms exists between children with SLI and children with ASD; our groups may not be mutually exclusive. However; in the present study peer-problems were significantly impaired in the ASD group relative to the SLI group whereas no significant differences were found regarding emotional symptoms. This is in line with Durkin et al. (2012) who found friendship, and not emotional health, associated with higher ASD symptoms in adolescents with SLI.

Furthermore, information about the severity of the children's clinical symptoms would have strengthened our findings as the criteria by which children were diagnosed with SLI may have varied among the clinicians. However, the fact that the children in the SLI group were all referred to a national support system for special education and diagnosed by specialized speech and language therapists indicates that their language abilities were significantly impaired. Individual measures of general cognitive abilities would have been desirable; however according to parental report the children had no intellectual disabilities this supporting that they were within typical range on cognitive abilities. The fact that males constituted the vast majority of participants in both groups may restrict the generalization of our findings. As the present study presents data from a relatively small sample our ability to draw conclusions is limited and future large- scaled studies are needed in order to obtain more knowledge about the research questions.

4.2. Conclusions and clinical implications

In sum this study provides evidence that children with SLI as well as children with ASD present with significant EBN although the problems of the latter group are more severe. In both groups pragmatic language impairment was strongly associated with EBN. Bearing in mind that the findings from this Norwegian study (representing a different language and to some extent a different culture) fit with previous studies mainly performed in English speaking countries add strength to the results.

These findings have some important clinical implications. First; assessment of EBN as well as pragmatic language abilities should be administered as an integral part of the assessment procedure whether children are referred to mental health services or to speech language therapy. The fact that these children often present with complex problems underline the need for combined expertise and multidisciplinary teamwork. Second, considering the substantial influence of pragmatic language impairment on social function and resolving interpersonal conflicts with peers, further development of interventions and therapy plans targeting pragmatic skills are strongly needed and should be given priority in both groups.

Conflict of interest

The authors declare no conflicts of interest.

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References

- American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington DC: American Psychiatric Association [Author].
- Bignell, S., & Cain, K. (2007). Pragmatic aspects of communication and language comprehension in groups of children differentiated by teacher ratings of inattention and hyperactivity. *British Journal of Developmental Psychology*, 25, 499–512.

- Bishop, D. V. M. (2003). *The Children's Communication Checklist (CCC-2)* (2nd ed.). London: The Psychological Corporation.
- Bishop, D. V. M. (2006). What causes specific language impairment in children? *Current Directions in Psychological Science*, 15(5), 217–221.
- Bishop, D. V. M. (2008). Specific language impairment, dyslexia, and autism: Using genetics to unravel their relationship. In C. F. Norbury, J. B. Tomblin, & D. V. M. Bishop (Eds.), *Understanding developmental language disorders* (pp. 67–78). New York: Psychology Press.
- Bishop, D. V. M. (2010). Overlaps between autism and language impairment: Phenomimicry or shared etiology? *Behavior Genetics*, 40, 618–629.
- Bishop, D. V. M. (2014). Ten questions about terminology for children with unexplained language problems. *International Journal of Language and Communication Disorders*, 49(4), 381–397. <http://dx.doi.org/10.1111/1460-6984.12101>.
- Bloom, L., & Lahey, M. (1978). *Language development and language disorders*. New Jersey: Wiley & Sons.
- Botting, N., & Conti-Ramsden, G. (2003). Autism, primary pragmatic difficulties, and specific language impairment: Can we distinguish them using psycholinguistic markers? *Developmental Medicine and Child Neurology*, 45(8), 515–524.
- Carlsson, L. H., Norrelgen, F., Kjellmer, L., Westerlund, J., Gillberg, C., & Fernell, E. (2013). Co-existing disorders and problems in preschool children with autism spectrum disorders. *The Scientific World Journal*, 1–6. <http://dx.doi.org/10.1155/2013/213979>.
- Charman, T., Ricketts, J., Dockrell, J. E., Lindsay, J., & Palikara, O. (2015). Emotional and behavioural problems in children with language impairments and children with autism spectrum disorders. *International Journal of Language and Communication Disorders*, 50(1), 84–93. <http://dx.doi.org/10.1111/1460-6984.12116>.
- Conti-Ramsden, G., & Durkin, K. (2015). What factor influence language impairment? Considering resilience as well as risk. *Folia Phoniatrica et Logopaedica*, 67, 293–299. <http://dx.doi.org/10.1159/000444750>.
- Conti-Ramsden, G., Mok, P., Pickles, A., & Durkin, K. (2013). Adolescents with a history of specific language impairment (SLI): Strengths and difficulties in social, emotional and behavioral functioning. *Research in Developmental Disabilities*, 34, 4161–4169. <http://dx.doi.org/10.1016/j.ridd.2013.08.043>.
- Cross, M. (2011). *Children with social, emotional and behavioural difficulties and communication problems*. London, UK: Jessica Kingsley Publishers.
- De Giacomo, A., Craig, F., Terenzio, V., Coppola, A., Campa, M. G., & Passeri, G. (2016). Aggressive behavior and verbal communication skills in autism spectrum disorders. *Global Pediatric Health*, 3, 1–5. <http://dx.doi.org/10.1177/2333794X16644360>.
- Donno, R., Parker, J., Gilmour, J., & Skuse, D. H. (2010). Social communication deficits in disruptive primary-school children. *The British Journal of Psychiatry*, 196, 282–289. <http://dx.doi.org/10.1192/bjp.bp.108.061341>.
- Durkin, K., Conti-Ramsden, G., & Simkin, Z. (2012). Functional outcome of adolescents with a history of specific language impairment (SLI) with and without autistic symptomatology. *Journal of Autism and Developmental Disorders*, 42, 123–138. <http://dx.doi.org/10.1007/s10803-011-1224-y>.
- Fujiki, M., & Brinton, B. (2009). Pragmatics and social communication in child language disorders. In R. G. Schwartz (Ed.), *Handbook of child language disorders* (Hove: Psychology press [pp. 406–423]).
- Geurts, M., & Embrechts, M. (2008). Language profiles in ASD, SLI and ADHD. *Journal of Autism and Developmental Disorders*, 38, 1931–1943.
- Gibson, T., Adams, C., Lockton, E., & Green, J. (2013). Social communication disorder outside autism? A diagnostic classification approach to delineating pragmatic language impairment, high functioning autism and specific language impairment. *Journal of Child Psychology and Psychiatry*, 54(11), 1186–1197. <http://dx.doi.org/10.1111/jcpp.12079>.
- Gillberg, C. (2010). The ESSENCE in child psychiatry: Early symptomatic syndromes eliciting neurodevelopmental clinical examination. *Research in Developmental Disabilities*, 31, 1543–1551. <http://dx.doi.org/10.1016/j.ridd.2010.06.002>.
- Goodman, R. (1997). The strengths and difficulties questionnaire: A research note. *Journal of Child Psychology and Psychiatry*, 38(5), 581–585.
- Goodman, R. (1999). The extended version of the Strengths and Difficulties Questionnaire as a guide to child psychiatric caseness consequent burden. *Journal of Child Psychology and Psychiatry*, 40, 791–799.
- Gorman, K., Olson, L., Hill, A. P., Lunsford, R., Heeman, P. A., & van Santen, J. P. (2016). Uh and um in children with autism spectrum disorders or language impairment. *Autism Research*, 9, 854–865.
- Helland, W. A., & Møllerhaug, L. (2006). *Sjekkliste for barns kommunikasjon 2 (CCC-2)*. Bergen, Norway: University of Bergen.
- Helland, W. A., Biringer, E., Helland, T., & Heimann, M. (2009). The usability of a Norwegian adaptation of the Children's Communication Checklist Second Edition (CCC-2) in differentiating between language impaired and non-language impaired 6 to 12-year-olds. *Scandinavian Journal of Psychology*, 50, 287–292.
- Helland, W. A., Biringer, E., Helland, T., & Heimann, M. (2012). Exploring language profiles for children with ADHD and children with Asperger syndrome. *Journal of Attention Disorders*, 16(1), 34–43. <http://dx.doi.org/10.1177/1087054710378233>.
- Helland, W. A., Helland, T., & Heimann, M. (2014). Language profiles and mental health problems in children with specific language impairment and children with ADHD. *Journal of Attention Disorders*, 18(3), 226–235. <http://dx.doi.org/10.1177/1087054712441705>.
- Helland, W. A., Lundervold, A., Heimann, M., & Posserud, M. (2014). Stable associations between behavioral problems and language impairments across childhood- The importance of pragmatic language problems. *Research in Developmental Disabilities*, 35(5), 943–951. <http://dx.doi.org/10.1016/j.ridd.2014.02.016>.
- Im-Bolter, N., & Cohen, N. J. (2007). Language Impairment and psychiatric comorbidities. *Pediatric Clinics of North America*, 54, 525–542.
- Ketelaars, M. P., Cuperus, J., Jansonius, K., & Verhoeven, L. (2010). Pragmatic language impairment and associated behavioural problems. *International Journal of Language and Communication Disorders*, 45(2), 204–214. <http://dx.doi.org/10.1080/13682820902863090>.
- Leonard, M. A., Milich, R., & Lorch, P. (2011). The role of pragmatic language use in mediating the relation between hyperactivity and inattention and social skills problems. *Journal of Speech, Language, and Hearing Research*, 54, 567–579. [http://dx.doi.org/10.1044/1092-4388\(2010/10-0058\)](http://dx.doi.org/10.1044/1092-4388(2010/10-0058)).
- Leonard, L. B. (2014). In L. B. Leonard (Ed.). *Children with specific language impairment* (2nd ed.). London, England: The MIT Press.
- Mackie, L., & Law, J. (2010). Pragmatic language and the child with emotional/behavioural difficulties (EDB): a pilot study exploring the interaction between behaviour and communication disability. *International Journal of Language and Communication Disorders*, 45(4), 397–410.
- Matson, L. J., & Neal, D. (2010). Differentiating communication disorders and autism in children. *Research in Autism Spectrum Disorders*, 4, 626–632. <http://dx.doi.org/10.1016/j.rasd.2009.12.006>.
- Miniscalco, C., Nygren, G., Hagberg, B. S., Kadesjö, B., & Gillberg, G. (2006). Neuropsychiatric and neurodevelopmental outcome of children at age 6–7 years who screened positive for language problems at 30 months. *Developmental Medicine and Child Neurology*, 48, 361–366.
- Muris, P., Meesters, C., & van den Berg, F. (2003). The Strengths and Difficulties Questionnaire (SDQ). Further evidence for its reliability and validity in a community sample of Dutch children and adolescents. *European Child & Adolescent Psychiatry*, 12, 1–8. <http://dx.doi.org/10.1007/s00787-003-0298-2>.
- Nylander, L., Holmqvist, M., Gustafson, L., & Gillberg, C. (2013). Attention-deficit/hyperactivity disorder (ADHD) and autism spectrum disorder (ASD) in adult psychiatry. A 20-year register study. *Nordic Journal of Psychiatry*, 67(5), 344–350 [10.1177/1362361304042718].
- Obel, C., Heiervang, E., Rodriguez, A., Heyerdal, S., Smedje, H., Sourander, A., et al. (2004). The strength and difficulties questionnaire in the nordic countries. *European Child & Adolescent Psychiatry*, 13(Suppl. 2) [II/33-II/39].
- Posserud, M., Hysing, M., Helland, W. A., Gillberg, C., & Lundervold, A. J. (2016). Autism traits: the importance of co-morbid problems for impairment and contact with services. Data from the Bergen Child Study. *Research in Developmental Disabilities*. <http://dx.doi.org/10.1016/j.ridd.2016.01.002> in press. Available online January 27.
- Selås, M., & Helland, W. A. (2016). Pragmatic language impairment in children with Noonan syndrome. *Clinical Linguistics & Phonetics*, 30(11), 899–910. <http://dx.doi.org/10.1080/02699206.2016.1188422>.
- Snowling, M. J., Bishop, D. V. M., Stothard, S. E., Chipchase, B., & Kaplan, C. (2006). Psychosocial outcomes at 15 years of children with a preschool history of speech-language impairment. *Journal of Child Psychology and Psychiatry*, 47(8), 759–765.
- Spanoudis, G., Natsopoulos, D., & Panayiotou, G. (2007). Mental verbs and pragmatic language difficulties. *International Journal of Language and Communication Disorders*, 42(4), 487–504.
- St Clair, M. C., Pickles, A., Durkin, K., & Conti-Ramsden, G. (2011). A longitudinal study of behavioral, emotional and social difficulties in individuals with a history of specific language impairment (SLI). *Journal of Communication Disorders*, 44, 186–199. <http://dx.doi.org/10.1016/j.jcomdis.2010.09.004>.
- Tomblin, J. B., Records, N. L., Buckwalter, P., Zhang, X., Smith, E., & O'Brien, M. (1997). Prevalence of specific language impairment in kindergarten children. *Journal of Speech, Language, and Hearing Research*, 40, 1245–1260.
- Tomblin, B. (2011). Co-morbidity of autism and SLI: Kinds, kin and complexity. *International Journal of Language and Communication Disorders*, 46, 127–137.
- Toseeh, U., Pickles, A., Durkin, K., Botting, N., & Conti-Ramsden, G. (2017). Prosociality from early adolescence to young adulthood: A longitudinal study of individuals with a history of language impairment. *Research in Developmental Disabilities*, 62, 148–159.
- Totsika, V., Hastings, P., Emerson, E., Lancaster, G. A., & Berridge, D. M. (2011). A population-based investigation of behavioural and emotional problems and maternal mental health: Associations with autism spectrum disorder and intellectual disability. *Journal of Child Psychology and Psychiatry*, 52, 91–99.
- Turkstra, L. S., Clark, A., Burgess, S., Hengst, J. A., Wertheimer, J. C., & Paul, D. (2016). Pragmatic communication abilities in children and adults: Implication for rehabilitation professionals. *Disability and Rehabilitation*, 1–12.
- Yew, S. G. K., & O'Kearney, R. (2013). Emotional and behavioral outcomes later in childhood and adolescence for children with specific language impairment: Metaanalyses of controlled prospective studies. *Journal of Child Psychology and Psychiatry*, 4(5), 516–534 [10.1111/jcpp.12009].