

Research Article

Differentiating Children with Specific Language Impairment and Children with Asperger Syndrome Using Parental Reports

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- Comorbidity

Abstract

Although traditionally regarded as separate disorders, children with specific language impairment (SLI) and children with Asperger syndrome (AS) may to some extent present with similar problems. The aims of the present study were to investigate if children diagnosed with SLI and children diagnosed with AS can be differentiated from each other based on parental evaluations of language and autistic symptoms. All together 43 children aged 6-15 years took part in the study. The SLI group consisted of 20 children (18 males) and the AS group consisted of 23 children (19 males). The parents completed two questionnaires assessing language and autistic symptoms; the Children's Communication Checklist Second Edition (CCC-2) and the Autism Spectrum Screening Questionnaire (ASSQ). The results showed that the two diagnostic groups were inseparable on an overall measure of communication; children with AS were as severely impaired as children with SLI. However, the AS group exhibited significantly more problems with pragmatic aspects of language than did the SLI group. Autistic symptoms were significantly more prominent in the AS group than in the SLI group. According to parent evaluations, all children in the AS group were language impaired and four children (out of 20) in the SLI group showed autistic symptoms in the clinical range. The findings of this study points to the importance of including language assessment to an initial AS assessment as well as to administer instruments sensitive to AS when assessing children with SLI.

ABBREVIATIONS

SLI: Specific Language Impairment, **AS:** Asperger Syndrome, **ASD:** Autism Spectrum Disorder, **CCC-2:** Children's Communication Checklist Second Edition, **GCC:** General Communication Composite, **PC:** Pragmatic Composite, **ASSQ:** Autism Spectrum Screening Questionnaire

INTRODUCTION

The present study focuses on communication problems and autistic features in children with Asperger syndrome (AS) and in children with specific language impairment (SLI). Mastering different aspects of language; form, content and use are crucial for communication and plays an important role in children's socialization and adjustment [1]. The form and content components characterize language structure while the use

component characterizes pragmatics [2]. According to Diagnostic and Statistical Manual of Mental Disorders (5.ed) [3] AS is no longer regarded an individual diagnosis but part of the Autism Spectrum Disorder (ASD); a complex neurodevelopmental condition with core symptoms including social skills deficits, repetitive and stereotyped patterns of behavior and problems in communication. However, the severity of communication deficits varies considerably [4] and AS are commonly considered a mild variant of ASD referring to the most highly functioning children without general language delay [5]. In the present study the term AS is used. Children with SLI are characterized by abnormal language abilities in the context of otherwise typical development, although no "gold standard" exist, a mismatch between language skills and other cognitive skills are commonly used to identify the condition [6]. Children with SLI constitute a rather heterogeneous group but difficulties mastering language

structure are particularly prominent findings [7]. The prevalence of SLI is considered about 7% [8] and it is suggested that ASD (including AS) may affect up to 1 % of the population [1]. Although traditionally regarded as separate disorders; children with AS and children with SLI may to some extent present with similar problems [9, 10], and thus it has been debated whether the disorders are differing only in severity or whether they are qualitatively distinct [11]. Furthermore, it has been questioned whether any natural boundaries between disorders exist [12]. Gillberg [13] points to the fact that sharing of symptoms across disorders is common in child psychiatry and that co-existing problems are the rule. He argues that depending of the training and interest of the professional first seeing the child, the child may be diagnosed with SLI, ASD or another developmental disorder and thus comorbid problems are likely to be missed. In a study of children diagnosed with SLI at age 2.5, more than 70 % was assigned a diagnosis of ASD, mental retardation, attention deficit hyperactivity disorder, learning disability or combinations of these five years later [14].

The first aim of the present study was to explore whether children with SLI and children with AS can be differentiated from each other in terms of their communicative competence and language profiles. As most accounts of SLI emphasize the problems these children experience with language structure, we hypothesized that they would do poorer than children with AS on measures of language and communication. The second aim was to investigate if children with SLI differ from children with AS regarding autistic features. Due to diagnostic criteria we hypothesized that autistic symptoms would be more prominent in the AS group than in the SLI group.

MATERIALS AND METHODS

Participants and procedures

All together 43 children aged 6-15 years took part in the present study. The AS group consisted of 23 children (19 males; 4 females; mean age 11.0; SD=2.4) and the SLI group consisted of 20 children (18 males; 2 females; mean age 8.9 years; SD=2.4). The children in the AS group were a combined sample recruited from an outpatient clinic, a Norwegian support system for special education and from a parent support group for autism. The SLI group was recruited from a Norwegian support system for special education. Through these institutions a package containing a letter of information, a letter of informed consent, a copy of the Norwegian adaptation [15] of the Children's Communication Checklist Second Edition (CCC-2)[16] and a copy of the Norwegian translation of the Autism Spectrum Screening Questionnaire (ASSQ) [17] to fill out was sent to the parents. All included children met the following criteria: a diagnosis of either AS or SLI; no mental retardation according to parental reports, speaking in sentences, Norwegian as their first language and no sensory neural hearing loss. A closer description of the recruitment procedure is presented in former publications [18, 19]. The study was approved by the Regional Committee for Medical and Health Research Ethics, University of Bergen, Norway and was conducted in accordance with the Helsinki Declaration.

Instruments

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

The CCC-2 [16] is a parent completed screening questionnaire designed to distinguish children with communication impairments from typically developing children and also to identify pragmatic language impairment in children with communication problems. The instrument contains 70 items grouped into 10 subscales measuring different aspects of language: four scales (speech, syntax, semantics, coherence) assessing language structure, four scales assessing pragmatics (inappropriate initiation, stereotyped language, use of context, nonverbal communication) and two scales (social relations and interests) assessing behaviors that are found to be impaired in children with ASD. The frequency of the communicative behaviors described in each item is scored on a 4-point scale; a high raw score indicating more problems. The raw scores are converted into scaled scores with a normative mean of 10 and SD of 3 (higher scores indicating better performance). An overall measure of communication, the General Communication Composite (GCC) is derived by summing the scaled scores of the first eight subscales. The GCC discriminates children with communication impairments from typically developing children. Based on previous findings in a Norwegian sample, [15] cut-off at or below 64 (scaled scores) on the GCC was selected for identifying communication impairment. Additionally, although not included as part of the CCC-2, a pragmatic composite (PC) was calculated based on the scaled scores of the scales measuring coherence, inappropriate initiation, stereotyped language, use of context and nonverbal communication. Calculations of PC have been reported in several former studies [20, 21]. The questionnaires were scored by an automatic scoring program according to the guidelines given in the manual [16]. The Norwegian adaptation of the CCC-2 presents with good internal consistency; alpha values ranging from .73 to .89 and inter rater reliability ranging from .44 to .76[15]. A closer description of the questionnaire as well as the Norwegian adaptation process is presented in a former publication [15].

Autism Spectrum Screening Questionnaire (ASSQ)

The ASSQ (previously known as the Asperger Syndrome and high-functioning autism Screening Questionnaire) [17] is a screening instrument for higher functioning children with autism. The questionnaire is designed to be completed by parents or teachers and has been validated as to concurrent, content and discriminating validity [22]. It includes 27 items describing a wide range of symptoms predictive of ASD and is scored on a three point scale (0=not true; 1= somewhat true, 2=certainly true); higher scores indicating higher autistic symptomatology. The range of scores is 0-54 points and cut-off for a further evaluation of ASD is more than 18 points on the parent version and more than 21 points on the teacher version [23]. In the present study only the parent version was used.

Statistical analyses

Group differences were analyzed using Student's independent sample t-test. Tests were two-tailed with an alpha level of .05. To

evaluate effect sizes Cohen's *d* was computed (using the means and standard deviations of the two groups). According to general guidelines *d*'s of 0.20, 0.50 and 0.80 should be interpreted as small, medium and large respectively. The statistical analyses were run using SPSS, version 21.

RESULTS

Language and communicative abilities

CCC-2 composite scores: Descriptive statistics for all language variables are presented in (Table 1). The two groups were inseparable on the GCC. All children in the AS group and 16 out of 20 (80%) children in the SLI group were identified as language impaired on this measure. A comparison between the groups on the PC revealed that the AS group was significantly more impaired regarding pragmatic aspect of language than the SLI group ($t(41) = -3.03; p < .05$). The effect size (Cohen's *d*) was large (0.9).

CCC-2 scales: When the results on the separate CCC-2 scales (Table 1) were compared, significant differences between the groups were observed on seven out of ten scales. On the scales measuring speech and syntax (structural language aspects) the AS group outperformed the SLI group while the opposite was true for the scales measuring inappropriate initiation, stereotyped language nonverbal communication (pragmatic language aspects), social relations and interests. The effect sizes,

measured by Cohen's *d*, were medium for syntax (0.7) and large (ranging 0.8-2.1) for the other scales. No significant differences were found between the two groups on the scales measuring semantics, coherence and use of context.

Autism spectrum symptoms

ASSQ score: A comparison between the two groups showed that the AS group scored significantly higher (exhibiting more autistic symptoms) than the SLI group ($t(41) = 5.07; p < .001$). The effect size (Cohen's *d*) was large (1.6). In the AS group 15 children (65%) scored in the clinical range compared to 4 children (20%) in the SLI group (Table 2).

DISCUSSION

This study was designed to explore whether children with SLI and children with AS can be differentiated from each other in terms of their communicative competence and language profiles and also to investigate if the two groups are separable regarding autistic symptoms. The main findings were that, contrary to expectations, the two groups were inseparable on a general measure of communication (GCC); children with AS did as poorly as children with SLI. However, as hypothesized, the two groups showed different language profiles. The SLI group was most impaired on scales measuring language structure, whereas the AS group was most impaired regarding pragmatics. In line with expectations, children with AS were found to experience more autistic symptoms compared to children with SLI.

Table 1: Means and standard deviation for CCC-2 scaled scores (higher scores indicating better performance) for the AS group and the SLI group^a.

	AS group N=23		SLI group N=20		t(41)	Effect size <i>d</i>	p
	M	SD	M	SD			
A.Speech	9.04	3.34	2.30	3.05	6.93	2.1	.000
B. Syntax	7.00	3.46	4.30	4.28	2.52	0.7	.030
C. Semantics	4.83	2.93	4.50	3.86	0.31	0.0	.760
D. Coherence	4.13	2.42	4.95	3.09	-0.98	0.4	.332
E. Inappropriate initiation	4.26	1.89	7.30	2.72	-4.12	1.3	.000
F. Stereotyped language	4.89	3.09	7.70	3.73	-2.69	0.8	.011
G. Use of context	3.57	3.31	4.85	3.57	-1.22	0.4	.231
H. Nonverbal communication	3.09	2.33	7.25	3.60	-4.43	1.4	.000
I. Social relations	2.86	3.02	6.40	4.01	-3.19	1.0	.003
J. Interests	4.30	2.08	8.80	3.24	-5.33	1.7	.000
GCC	40.78	17.21	43.15	23.03	-0.38	0.1	.708
PC	19.91	11.05	32.05	14.69	-3.03	0.9	.005

Abbreviations: AS=Asperger syndrome; SLI=specific language impairment; GCC= General Communication Composite; PC= Pragmatic composite

^aStudent's Independent sample t-test

Table 2: Means and standard deviations for the ASSQ (higher scores indicating poorer performance) for the AS group and the SLI group^a.

	AS group		SLI group		Effect size <i>d</i>	p
	M	SD	M	SD		
ASSQ	24.48	9.12	10.30	9.17	1.6	.000

Abbreviations: AS=Asperger syndrome; SLI=specific language impairment; ASSQ=Autism Spectrum Screening Questionnaire

^aStudent's Independent sample t-test

The finding that all children in the AS group were identified with clinical significant language impairments was somewhat surprising, as a diagnosis of AS are commonly given to children judged as having unimpaired language development [5]. When inspecting the separate CCC-2 scales, it became evident that the AS group showed relatively unimpaired speech and syntax. This could be a possible explanation of why they have been regarded as having unimpaired language in spite of their pragmatic language impairment. Although children with AS were most severely impaired on measures of pragmatics, they experienced substantial problems on some structural aspects of language as well as no significant differences were found between the groups on the scales measuring semantics and coherence. The findings of the AS group scoring significantly lower (poorer performance) than the SLI group on the scales assessing social relations and interests align well with the fact that these scales are reported to be sensitive to autistic behaviors [16]. Contrary to expectations, the CCC-2 did not identify all children in the SLI group as language impaired. This might be due to the lack of a “gold standard” for diagnosing SLI resulting in some cases being false positives, or that some parents judged their children’s language problems to be resolved at the time the questionnaire was completed.

Autistic symptoms were, not unexpectedly, most prominent in the AS group. However, it is an important finding that on the ASSQ four children (20%) in the SLI group scored above cut-off for further ASD evaluation. The ASSQ failed to identify all children in the AS group as being in the clinical range, and one can only speculate what might be the reason for this. However, the fact that ASSQ, as well as CCC-2, build on parent reports may explain some of the mismatch observed between the clinical diagnosis and the evaluations carried out by parents.

Some methodological limitations should be considered when interpreting the results from the present study. Children recruited from the support system for special education often represent the more severely affected cases, and thus some caution is needed when generalizing the findings. The fact that the majority of the participants were males may be a potential problem. However, no significant differences were found between males and females neither on the GCC nor on the ASSQ. It might have strengthened the study if individual assessment, including objective measures obtained by standardized tests, had been included in addition to the parent reports. Likewise combining parent’s and teacher’s reports could have been beneficial. Due to a strong genetic component children with language impairments are more likely to have parents with similar problems, and thus completing questionnaires may have been a demanding task to some parents. The lack of information regarding socioeconomic status may have influenced the findings presented. However, in Norway most residents have a high standard of living and a universal social security system and high employment rates leads to few residents being poor [24].

CONCLUSION

The findings of this study indicate that although children are usually diagnosed with either SLI or AS, the two disorders may co-exist. Considering the fact that the AS group and the SLI group were equally impaired on a general measure of communication this should lead to ASD assessment including standardized tests

designed to assess language, and special attention should be paid to pragmatic aspects of language. On the other hand, as language impairment is usually not an isolated phenomenon, instruments sensitive to ASD should also be administered as part of the assessment procedure for children with SLI.

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