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ADHD and communication difficulties: a meta-analysis based on parental CCC reports

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Introduction

Several scholars have suggested that SLI and ADHD show overlapping symptoms. [1,4,7,11,13,14] Children with ADHD are often neither assessed for language problems nor treated for such, potentially increasing the risk for negative outcomes[3] and being a barrier for the effectiveness of classical non-pharmacologically therapies such as parent-training programs.

The few studies comparing expressive language use by children with SLI, ADHD and typically developing children (TD) show that children with ADHD produce more "mazes" – disfluencies, false starts ect. compared to the children with SLI and TD children, and are more challenged in sentence recall compared to TD children.[12]
Tense/agreement difficulties in combination with sentence recall difficulties have showed to distinguish SLI children from children with ADHD.[11]

Overall aim:
The aim of this study is to systematically review studies comparing communicative abilities of children with ADHD to their typically developing peers and carry out a meta-analysis in order to gain better knowledge of the boundaries between these two groups.

Methods and Materials

Two databases; PsycINFO & PubMed searched from November 6th, 2014 to November 11th, 2014 using combinations of the specific keywords (ADHD, language, speech, communication, pragmatic, language disorder, SLI, Children's communication checklist and CCC). Reference lists of retrieved articles were also examined.

The most used tool for assessing communication abilities of children with ADHD was the Children's Communication Checklist, version 1 and 2. Our meta-analysis therefore focused on results that included this tool and reported by parents.

Both checklists have 70-item that cover children's communication behaviors across respectively 9 and 10 subscales. The checklists are noted as an objective measure with acceptable levels of reliability (r = .80)[2,4,10] and validity (J = 0.85). [4,10]

The meta-analysis was performed using a random-effect, standardized mean differences (SMD), 95% confidence intervals (95% CI) and interpretation of effect size as small effect ≥ 0.2; medium effect ≥ 0.5; large effect ≥ 0.8.

See Table 1. for specific criteria used in the study

Inclusion criteria	Exclusion criteria
Participants ≥ 5 – 17 ≥ years	Non peer-reviewed studies
At least one clinical diagnosed ADHD group compared with a group of typical developed children	Dyslexia, stuttering, speech disorder, aphasia
Use CCC / CCC-2	IQ < 85
Primary studies	No report of means and standard deviations

Table 1. Criteria used in the CCC / CCC2 literature search

Results

- Six unique studies
- A total of 171 children with a clinical diagnosis of ADHD
- Age 5 - 17 years (mean age 9.8 years)
- All studies included a TD control group

Description of included studies
- 3 studies used 1st version of CCC[2,5,6]
- 3 studies used the 2nd edition [4,7,15]

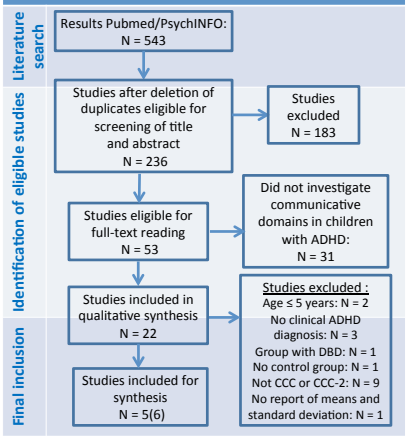
The results of the synthesized studies indicate that children diagnosed with ADHD have significantly more language problems compared to peers on all 10 subscales of CCC with a large overall effect size (d = .86, z = 5.48, p = < .001).

The largest effects sizes were found on the scales Inappropriate Initiation (d = 1.82), Use of Context (d = 1.86) and Social Relations (d = 1.92). These scales are all related to the pragmatic aspect of language thereby indicating that children with ADHD have pragmatic language problems.

Scale	SMD	95 % confidence Lower limit	Interval Upper limit	Z-value	p-value
A: Speech output	0.88	0.55	1.20	5.29	< .001
B: Syntax	0.82	0.61	1.04	7.88	< .001
C: Semantic	1.26	0.91	1.62	6.94	< .001
D: Coherence	1.60	1.15	2.04	7.09	< .001
E: Inappropriate initiation	1.82	1.39	2.25	8.31	< .001
F: Stereotyped language use	1.35	0.98	1.73	7.02	< .001
G: Use of context	1.86	1.38	2.33	7.68	< .001
H: Nonverbal communication	1.21	0.65	1.77	4.25	< .001
I: Social relations	1.92	1.48	2.35	8.68	< .001
J: Interests CCC	0.70	0.32	1.08	3.62	< .001
J: Interests CCC-2	1.55	0.91	2.18	4.78	< .001

Table 2. Summary of indices obtained in the meta-analysis

Flowchart



Discussion

ADHD & SLI two of a kind?

Our results show that children with ADHD are reported as having significantly more language problems than TD children, and that they particularly show problems initiating speech and using context correctly. These disabilities are characterized as pragmatic disabilities and the findings are consistent with previous research. The relatively high difficulties reported for Social Relations could be due to these pragmatic difficulties. Together these challenges could be explained related to the executive functioning problems characterizing ADHD as proposed by Leonard.[8]

According to the guidelines for clinical interpretation of the CCC2 children with SLI are expected to show profiles reflecting least challenges on scales E to H, which include Inappropriate initiation and Use of context; the two scales that were most challenging for children with ADHD. Children with a pragmatic language disorder on the other hand are also characterized with these same type of problems.

Whether CCC2 could be used as an additional clinical tool for identifying pragmatic deficits among children with ADHD, as well as identifying children holding a double deficit (ADHD + SLI) warrants further investigation.

Conclusions

Our meta-analysis shows that children with ADHD possess challenges on all ten domains of the CCC compared to TD peers, while adequate pragmatic skills might be the most challenging area. However children with ADHD are exclusively offered treatment for behavioral problems alone, whereas pragmatic treatment should be an additional option.

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