Are suspected auditory processing disorders in children aged 8-12 years related to attention, working memory, nonverbal intelligence and communication abilities?

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Results

Children with suspected APD have significantly poorer communication performance (parent report), poorer listening skills (teacher report), and poorer working memory and auditory and visual skills (Table 1 and Figure 1-3). No differences were found between groups in age, nonverbal IQ, and total scores of the auditory processing tests.

Table 1. Demographic and behavioral characteristics of the participants.

	Suspected APD Mean (SD)	Typically developing children Mean (SD)	*P*
Gender #Males:#Females	7:2	7:14	**0.025**
Age (months)	114.4 (13.5)	118.8 (13.8)	0.436
Nonverbal IQ[a]	106.7 (12)	114.6 (9)	0.055
CHAPPS total score[b]	-55 (22.7)	5.1 (16.6)	**0.000**
GCC score CCC-2-NL[c]	101.6 (14.2)	69.6 (16.9)	**0.000**
Working Memory Index (CELF-4-NL)[a]	83.3 (15.7)	109.2 (10.6)	**0.001**
SN -2dB[d]	71.9 (10.5)	76.4 (10.3)	0.279
Filtered Speech[d]	69.4 (13.9)	76.2 (11.2)	0.171
Binaural Fusion[d]	68.2 (14.6)	76.7 (14.4)	0.169
Dichotic Speech[d]	64.4 (14.3)	71.7 (10.7)	0.132

CHAPPS: Children's Auditory Processing Performance Scale; GCC: General Communication Composite; CCC-2-NL: Children's Communication Checklist 2nd edition; CELF-4-NL: Clinical Evaluation of Language Fundamentals 4th edition; SN: Speech-in-Noise.
[a] Test mean 100, SD 15; [b] Pass range: +36 to -11, At-risk range: -12 to -180; [c] Score ≥104 = percentile score <10; [d] %correct score

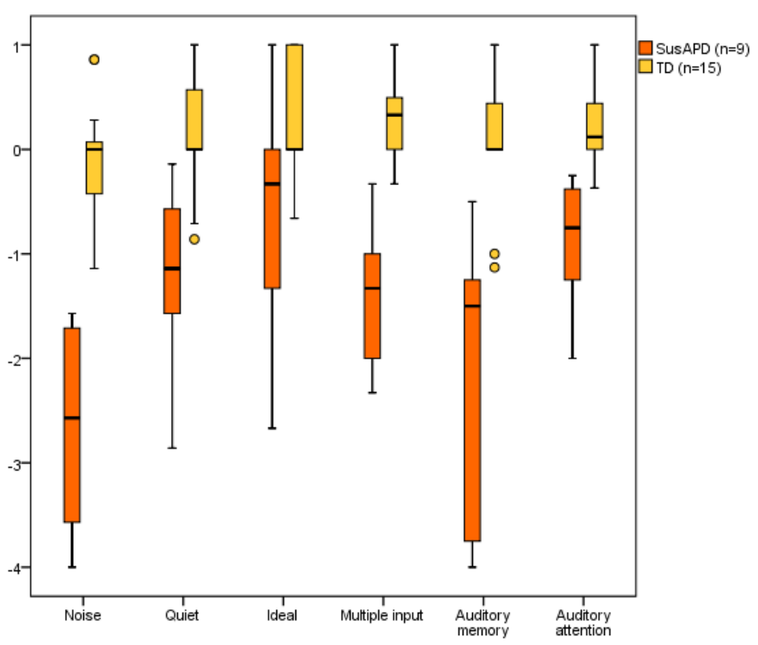

Figure 1. Mean subscale scores CHAPPS.
Pass range: >-1; At-risk range: between -1 and -5.

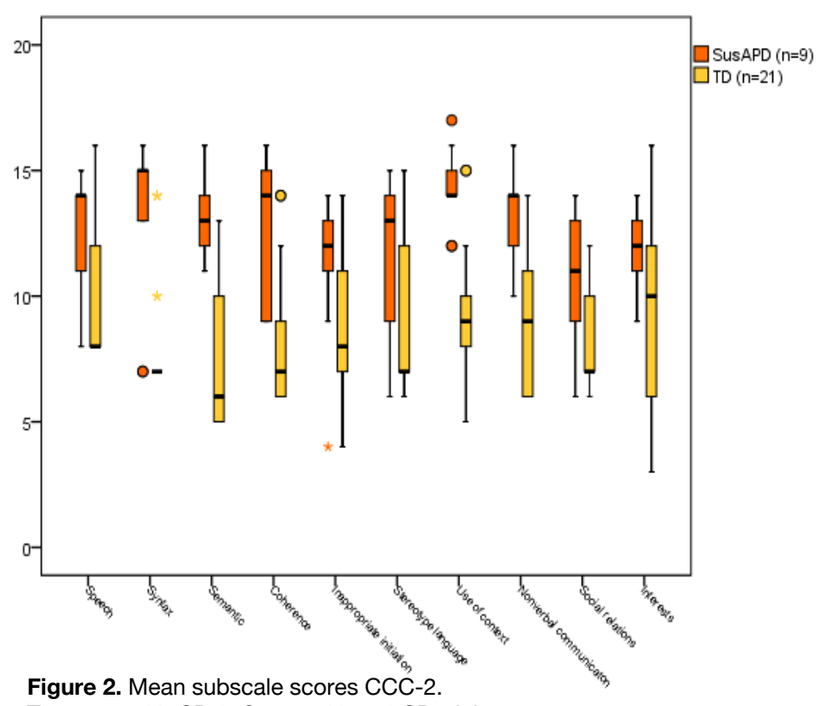

Figure 2. Mean subscale scores CCC-2.
Test mean 10, SD 3; Score >13 = -1 SD of the mean

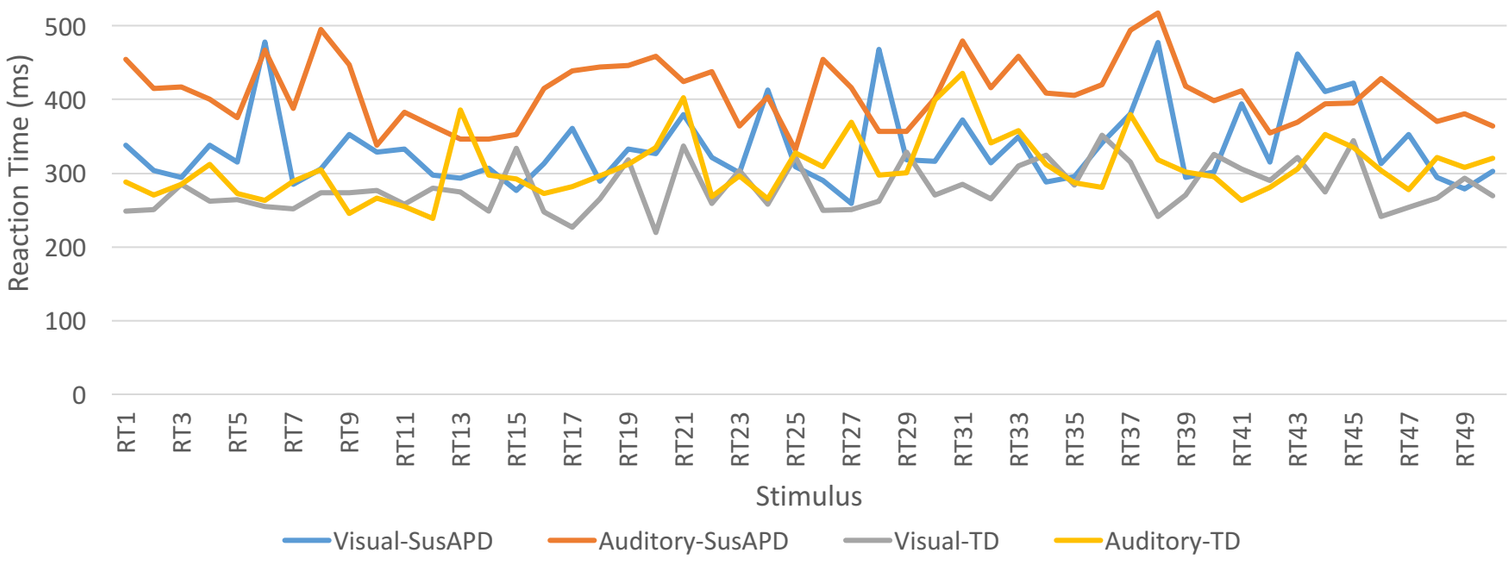

Figure 3. Visual and Auditory Attention, mean reaction time (ms) per stimulus for each group.

Background and aim

Children with difficulties in listening and understanding speech despite normal peripheral hearing, can be diagnosed with Auditory Processing Disorder (APD). However, there are doubts about the validity of this diagnosis. The aim of this study is to examine the differences in performance between children with suspected APD and TD children on tests of communication, auditory processing, nonverbal intelligence, working memory, and visual & auditory attention.

Methods

In a case-control study we examined 9 children who reported listening difficulties in spite of normal peripheral hearing (suspected APD group) and 21 typically developing (TD) children, ages 8.0 to 12.0 years. In this study we assessed:

- History, behavioral symptoms of ADHD, and communication skills (CCC-2-NL) with parental questionnaires.
- Listening skills with a teachers questionnaire (CHAPPS-NL).
- Auditory processing (Speech-in-Noise, Filtered Speech, Binaural Fusion, Dichotic Listening).
- Nonverbal Intelligence (Raven's Coloured Progressive Matrices).
- Working Memory (CELF-4-NL).
- Auditory and Visual Attention (WAF test, Vienna Test System; Schuhfried).

Conclusion

There is a difference between children with suspected APD and TD children. Children with suspected APD perform insufficient on tests of working memory, and have a slower response to auditory and visual attention tasks. Parents of children with suspected APD report difficulties in communication and teachers assess the children of being at risk for listening difficulties. There is lack of evidence for the validity of a pure auditory deficit.

Healthy ageing

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