

AUDITORY ATTENTION SHIFTING IN CHILDREN WHO STUTTER

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Introduction

The current study investigates if previously found differences between children who stutter (CWS) and typically developing children (TDC) on attention-related functioning can be confirmed by a neuropsychological task: a computerized auditory attention-shifting task. A temperament questionnaire-based study by Eggers, De Nil and Van den Bergh (2009, 2010) showed that CWS, compared to TDC, scored significantly lower on the scale of 'attentional shifting'.

This suggested that CWS were less able to transfer their attentional focus from one activity to another. A subsequent study (Eggers et al., 2011), using the Attention Network Test, also indicated a lower efficiency of the attentional orienting network in CWS. The current study is aimed at investigating if the previously found differences in attention-related functioning can be confirmed by an experimental neuropsychological task directly aimed at measuring auditory attention shifting.

Subjects and Methods

Subjects

- 10 children who stutter (aged: 6;10 -10;0, mean 8;15)
- 18 typically developed children (aged: 6;05 – 9;11, mean 7;94)

All were native Finnish speakers, with no known/reported neurological, psychological, developmental or language problems but stuttering in the group of CWS. All children had normal or corrected to normal vision and they passed a screening test for normal hearing. All children scored within the normal intelligence range on the WISC Vocabulary and Block Design subtests. There was no significant difference in the mean age of the children between the groups.

Amsterdam Neuropsychological Tasks (de Sonneville, 1999)

- Baseline speed, a measure of simple reaction time (RT)
- Auditory set-shifting:
 - 1st block: The child heard either one or two low tones (200 Hz). Instruction was to click the button once when hearing one tone, and to click twice when hearing two tones (compatible part).
 - 2nd block: The child heard either one or two high tones (400 Hz). Instruction was to click the button twice when hearing one tone, and to click once when hearing two tones (incompatible part).
 - 3rd block: The above two blocks were combined into a common block (mixed part).

Results

Our preliminary results showed that there were no significant between-group differences in simple reaction time (Baseline speed task). Similarly, no significant differences were found between the groups in either RTs or error percentages in response to compatible tones in block 1 or to incompatible tones in block 2 (Fig. 1).

However, in block 3, CWS made significantly more errors than their controls [ANOVA main group effect $F(4.472)=1,26$, $p=.044$; Fig. 1, Table 1]. Furthermore, CWS had more premature (too early) responses in block 3 (Fig. 2).

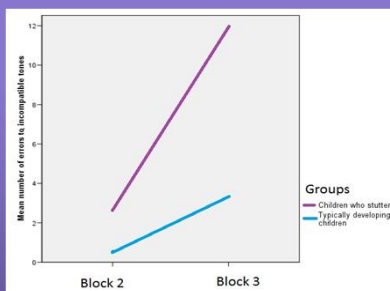


Fig. 1. Errors in response to incompatible tones in blocks 2 and 3

Table 1. Mean of errors to incompatible tones in block 3

	Groups		Between-group difference	
	CWS mean	TDC mean	F	p
Errors to 1 incompatible	5	1,28	5.197	.031
Errors to 2 incompatible	6,9	2	5.709	.024
All errors to incompatible tones	11,9	3,28	5.888	.022

CWS= children who stutter, TDC= typically developing children

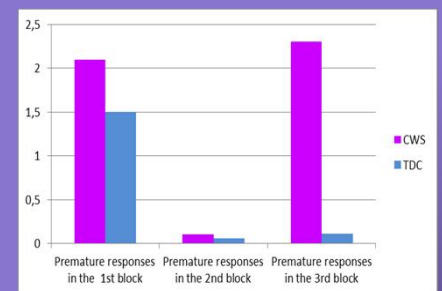


Fig. 2. Number of premature responses in children who stutter (CWS) and in typically developed children (TDC)

Conclusions

Our results, based on the auditory attention shifting task, showed that CWS have difficulties in self-regulatory behaviors, as shown earlier by Eggers et al. (2009, 2010). Difficulties manifested when the task put high demands on the attentional processes. Therefore, it is possible that CWS have problems in speech planning and execution, especially in situations that demand increased attentional resources, and that atypical auditory attentional processing thus contribute to developmental stuttering.

References

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