

IMPACT OF PHONOLOGICAL COMPLEXITY ON VERBAL SHORT-TERM MEMORY PERFORMANCE IN CHILDREN WITH SLI

Anne-Lise Leclercq^{1,2}, Christelle Maillart², Steve Majerus^{1,2}

¹Fund of Scientific Research-FNRS, Belgium

²University of Liege, Belgium

FNRS



INTRODUCTION

Nonword repetition (NWR) is typically used to measure verbal short-term memory (STM) capacity in children, and poor performance in NWR tasks has been shown to be a reliable behavioural marker of SLI (Dollaghan & Campbell, 1998; Gathercole, 2006). However, mechanisms underlying this deficit are not clear, as NWR not only assesses STM but also requires complex phonological processing (Marton, 2006).

AIM

→ This study explored the extent to which SLI children's poor performance in NWR is related to inherent phonological processing requirements rather than a basic impairment in STM. This was achieved by manipulating syllabic complexity, perceptual complexity and lexicality of verbal stimuli to be recalled in a STM task.

METHODS

Participants: 15 children with SLI, 15 IQ- and Age-matched controls (AC) and 15 lexical age-matched controls (LC)

Task: Perceptual complexity: concatenated vs. temporally segregated syllables

Lexical complexity: word vs. nonword syllables

Syllabic complexity: CV vs. CCV syllables

Number of syllables: L2→L7

Table 1. Examples for stimuli of length 4

	Word		Nonword	
	CV	CCV	CV	CCV
Concatenated stimuli	dosbaingoutta /dɔs/bɑ̃ŋ/ɡu/ta/	cléfrontblancpris /kle/frɔ̃/blɑ̃s/pʁi/	dabeguto /dabɛ/ɡy/to/	klonfreublopra /klɔ̃/frɛ/blo/pʁa/
Segregated lists of syllables 500 msec	dos bain goût ta /dɔ/ /bɛ/ /ɡu/ /ta/	clé front blanc pris /kle/ /frɔ̃/ /blɑ̃/ /pʁi/	da be gu to /da/ /bɛ/ /ɡy/ /to/	klon freu blo pra /klɔ̃/ /frɛ/ /blo/ /pʁa/

RESULTS

Main effects:

Perceptual complexity: Concatenated > Segregated, $F(1, 42)=95.43$, $p<.001$

Syllabic complexity: CV > CCV, $F(1,42)=328.53$, $p<.001$

Lexicality: words > nonwords, $F(1,42)=124.82$, $p<.001$

Length effect: $F(1,42)=1286.26$, $p<.001$

Group effect : SLI < LC, SLI < AC, $F(2,42)=15,25$, $p<.001$

Interaction effects:

Length x group: $F(2,42)=2.81$, $p=.07$

Lexicality x syllabic complexity x group: $F(2,42)=4.21$, $p<.05$

Control groups: lexicality effect significant for CCV syllables only

SLI group: lexicality effect significant for CV and CCV syllables

Figure 1. Number of syllables accurately repeated as a function of phonological complexity and lexicality



DISCUSSION

The results do not support an increased sensitivity towards phonological complexity as underlying poor performance in NWR tasks (see also Archibald & Gathercole, 2007; Majerus et al., 2009). They confirm a general weakness in short-term recall of verbal information. Children with SLI appear to partially compensate this weakness by an increased reliance on lexical knowledge.

REFERENCES

- Archibald, L. M., & Gathercole, S. E. (2007). Nonword repetition in specific language impairment: More than a phonological short-term memory deficit. *Psychon B Rev*, 14(5), 919-924.
- Dollaghan, C., & Campbell, T. (1998). Nonword repetition and child language impairment. *J Speech Lang Hear R*, 41, 1136-1146.
- Gathercole, S.E. (2006). Nonword repetition and word learning: The nature of the relationship. *Appl Psycholinguist*, 27(4), 513-543.
- Majerus, S., Leclercq, A.-L., Grossmann, A., Billard, C., Touzin, M., Van der Linden, M., et al. (2009). Serial order short-term memory capacities and specific language impairment: No evidence for a causal association. *Cortex*, 45(6), 708-720.
- Marton, K. (2006). Do nonword repetition errors in children with specific language impairment reflect a weakness in an unidentified skill specific to nonword repetition or a deficit in simultaneous processing? *Appl Psycholinguist*, 27(4), 569-573