Unimpaired Implicit Learning abilities in Children with Specific Language Impairment.

Audrey Gabriel, Leslie Fauconnier, Thierry Meulemans, & Christelle Maillart

Department of Cognitive Science, University of Liège, Belgium.

ABSTRACT

Previous studies (Lum et al., 2009; Tomblin et al., 2007; Ullman & Pierpont, 2005) have suggested that difficulties in the procedural learning system could contribute, in part, to the language difficulties observed in children with SLI. However, we have recently shown, with a classical serial reaction time (SRT) task, that children with SLI are able to learn implicitly non-linguistic statistical regularities (Gabriel et al., 2010). The aim of the present study was to explore whether children with SLI could learn similar statistical regularities with non-linguistic auditory stimuli. For this purpose, we compared performance of children with SLI and controls in two adapted SRT tasks: a visual SRT task and a non-verbal auditory SRT task.

METHODS

Participants

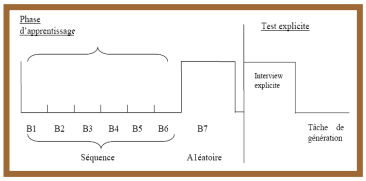
Experimental group:
- 15 children with SLI (6-12 years)
- Monolingual French speakers
- Nonverbal IQ (WISC IV) > 82
- Language skills below 1.25 SD from the mean in 2 or more of 5 language areas

Control group:
- 15 normal language controls (6-12 years)
- Monolingual French speakers
- Nonverbal IQ (WISC IV) > 86
- No history of language disabilities

The participants in the 2 groups are paired for:
- Chronological age
- Nonverbal IQ
- Gender
- Social level

Experimental Tasks

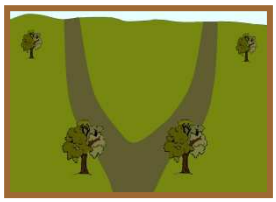
Serial Reaction time (SRT) Tasks



- 8 blocks including 64 trials
- SOC
- Eight stimuli: "4-2-1-3-2-4-3-1"
- **Touch screen** responding

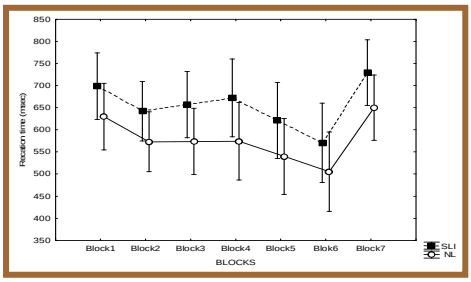
Visual modality

Auditory modality



RESULTS

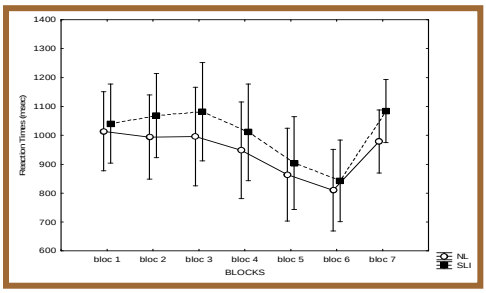
SRTT (visual modality)



- No significant Group effect, $F < 1$
- Significant Block effect $F(1, 30) = 33.33$, $p < .001$
- No Group x Block interaction

To summarize: Sequence learning was observed in both groups, and performance of SLI children was similar to performance of control children.

SRTT (auditory modality)



- No significant Group effect, $F < 1$
- Significant Block effect $F(1, 26) = 33.63$, $p < .001$
- No Group x Block interaction

To summarize: Sequence learning was observed in both groups, and performance of SLI children was similar to performance of control children.

CONCLUSION

- These results confirm our previous study (Gabriel et al., 2010) by showing normal SRT performance in SLI children with a visual SRT task.
- Moreover, normal performance is also observed with an auditory SRT task.
- These results challenge the hypothesis of a general procedural learning deficit in SLI children (Lum et al., 2009; Tomblin et al., 2007).
- They also rule out the hypothesis of a procedural impairment which would be more specifically related to auditory material.

13th Meeting of the International Clinical Phonetics and Linguistics Association (ICPLA) June 23-26, 2010

Audrey Gabriel
Department of Cognitive Science, University of Liège,
Rue l'Aunaie, 31, B38, 4000 Liège, BELGIUM
E-mail: audrey.gabriel@ulg.ac.be

REFERENCES

Dominey, P. F. (1998). A shared system for learning and temporal structure of sensori-motor sequences? Evidence from simulation and human experiments. *Cognitive Brain Research, 6*(3), 163-172.

Evans, J. L., Saffran, J. R., & Robe-Torres, K. (2009). Statistical learning in children with specific language impairment. *Journal of Speech, Language, and Hearing Research, 52*(2), 321-335.

Lum, J. A. G., Gelgec, C., & Conti-Ramsden, G. (2009). Procedural and declarative memory in children with and without specific language impairment. . *International Journal of Language & Communication Disorders*, 1-19.

Plante, E., Gomez, R., & Gerken, L. (2002). Sensitivity to word order cues by normal and language/learning disabled adults. *Journal of Communication Disorders, 35*(5), 453-462.

Tomblin, J., Mainela-Arnold, E., & Zhang, X. (2007). Procedural learning and adolescents with and without specific language impairment. *Language Learning and Development, 3*(4), 269-293.

Ullman, M. T., & Pierpont, E., I. (2005). Specific language impairment is not specific to language the procedural deficit hypothesis. *Cortex, 41*, 399-433.