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INTRODUCTION

Recent studies on specific language impairment (SLI) have suggested that language deficits could be partly explained by the Procedural Deficit hypothesis (PDH; Ullman & Pierpont, 2005). Tomblin et al. (2007) and Lum et al. (2009; 2011) obtained data supporting this interpretation with the serial reaction time (SRT) task, as well as Evans et al. (2009) and Plante et al. (2002) with artificial grammar tasks. Recently, Gabriel et al. (2011) obtained contrasting results, showing that children with SLI were able to detect non linguistic regularities during a SRT task. The aim of this study was to assess the PDH by using a non-linguistic artificial grammar learning tasks in order to mimic real conditions of language acquisition. Twenty-three children with SLI and their typically developing (TD) peers are compared on a task in which the incidental learning sequence was presented through visual shapes via a laptop.

METHODS

Participants

Experimental group:

- 23 children with SLI (6-12 years)
- Monolingual French speakers
- Nonverbal IQ (WISC IV) > 86
- Language skills below 1.25 SD from the mean in 2 or more of 5 language areas

TD peers are paired for:

- Chronological age
- Nonverbal IQ
- Gender
- Socioeconomic background

Artificial grammar tasks (Majerus et al., 2004)

Learning Phase:

Simultaneously an attentional task in order to reduce the likelihood of any explicit detection of the regular associations.



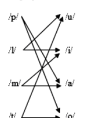
Regular associations between phonemes and syllables of linguistic condition (Majerus et al., 2004) were replaced by regular associations between **shapes and colours** such as the **consonants** were represented by **shapes** (p = round, l = triangle, m = star, t = diamond) and the **vowels** were represented by **colours** (u = blue, i = green, a = yellow, o = red)

Test phase:

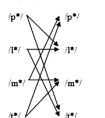
Recognition task: Four nonwords lists ranged from 3 to 5 CV syllables

- 36 colour shape -legal nonwords,
- 12 colour-legal nonwords,
- 12 shape-legal nonwords,
- 12 colour shape-illegal nonwords

Legal phoneme-level rules



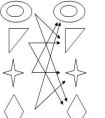
Legal syllable-level rules



Legal phoneme-level rules



Legal syllable-level rules

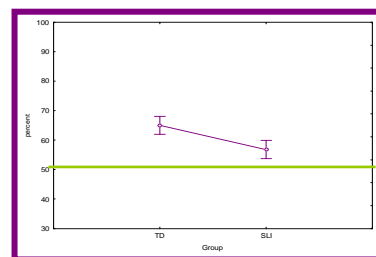


RESULTS

The performance of both groups differ from chance level: - SLI: $t(22) = 4.15, p < .001$
- TD: $t(22) = 10.94, p < .001$

Group effect,

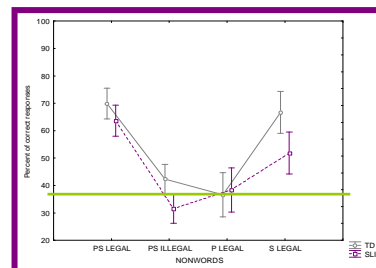
$F(1, 44) = 14.7, p < .05$



Nonwords effect,

$F(3,132) = 38.85, p < .05$

No Group by Nonwords interaction



A significant difference between the legal condition and each illegal condition observed (violation of the colour-level rule: $p < .05$; violation of the shapes-level rule: $p < .001$; violation of both colours-and-shapes-level rules, $p < .001$).

CONCLUSION

- These results confirm our previous study (Gabriel et al., 2011) by showing that children with SLI detect the rules in non-linguistic conditions.
- So, contrary to results of previous studies (Evans et al., 2009; Lum et al., 2009; 2011; Plante et al., 2002; Tomblin et al., 2007), this study does not confirm the PDH in children with SLI, or at least suggests that, if present, the deficit of the procedural system in SLI is not going beyond the language system.

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