

Language and analogical reasoning in children with Specific Language Impairment:

The effect of articulatory suppression

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Introduction

- Analogical reasoning (i.e. the ability to map situations or structures that share relational similarities) maintains a **mutual influence with language development**: analogical reasoning is improved by labelling analogical items with words describing the relations that they contain. Conversely, structural alignment, a core mechanism of analogical reasoning, allows the acquisition of novel words and the development of grammar (Gentner, 2010).
- Children with Specific Language Impairment (SLI) **perform worse than age-matched control in linguistic or non-linguistic analogical reasoning tasks** (Leroy et al., 2014).
- Children with SLI have a **poor productivity in language** that could be explained by a deficit in generalization (Conti-Ramsden & Jones, 1997). This deficit could be caused by their analogical reasoning impairment. However, it is also possible that the analogical reasoning impairment observed in children SLI is due to their language disorders and a difficulty to use language in order to solve analogical reasoning tasks.

Do children use verbal strategies to solve non-verbal analogies?



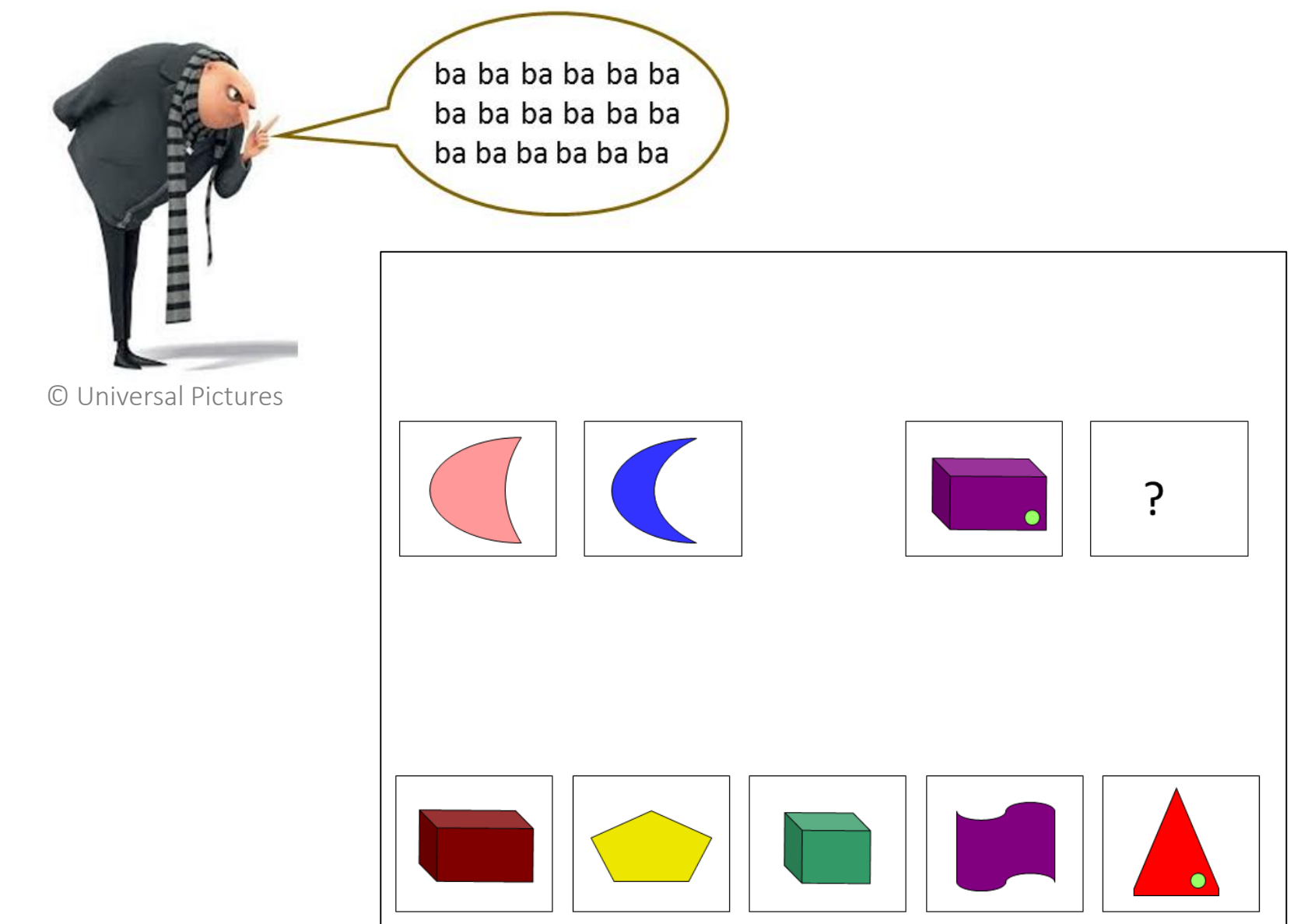
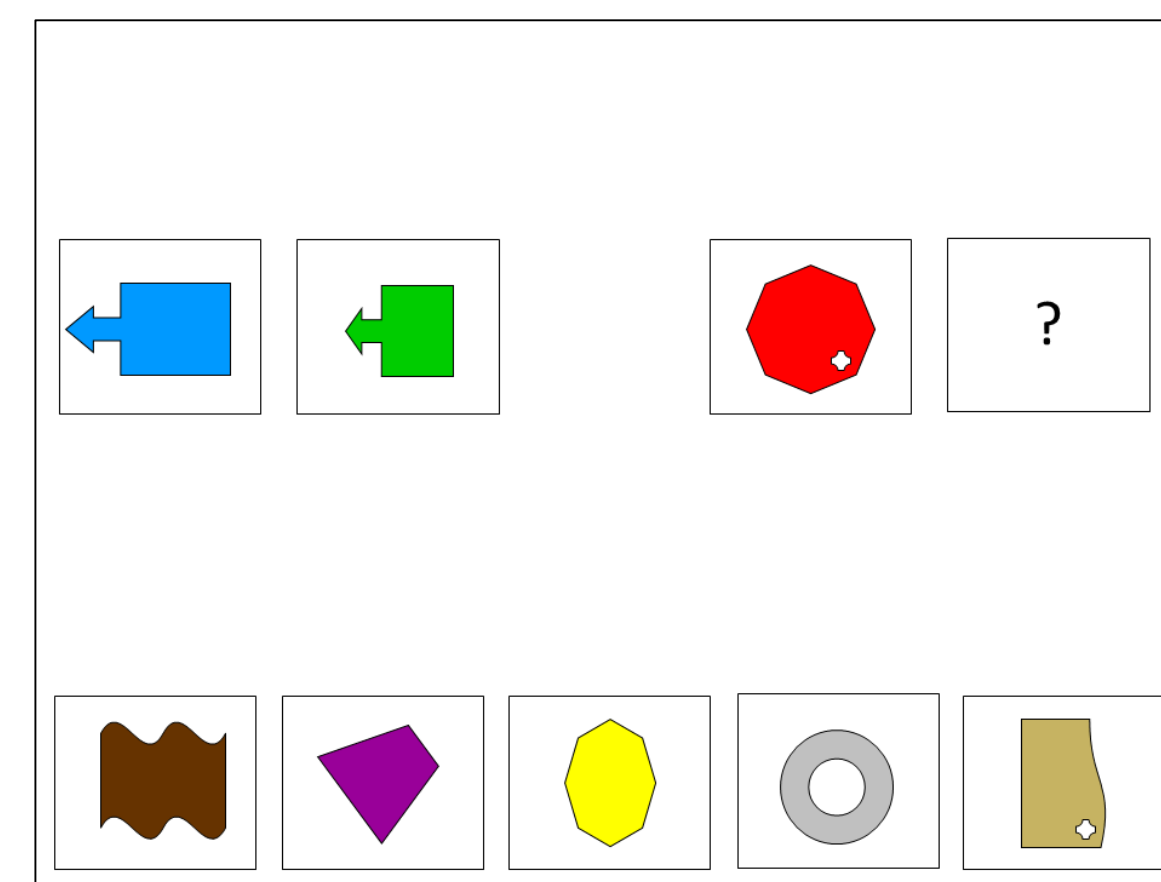
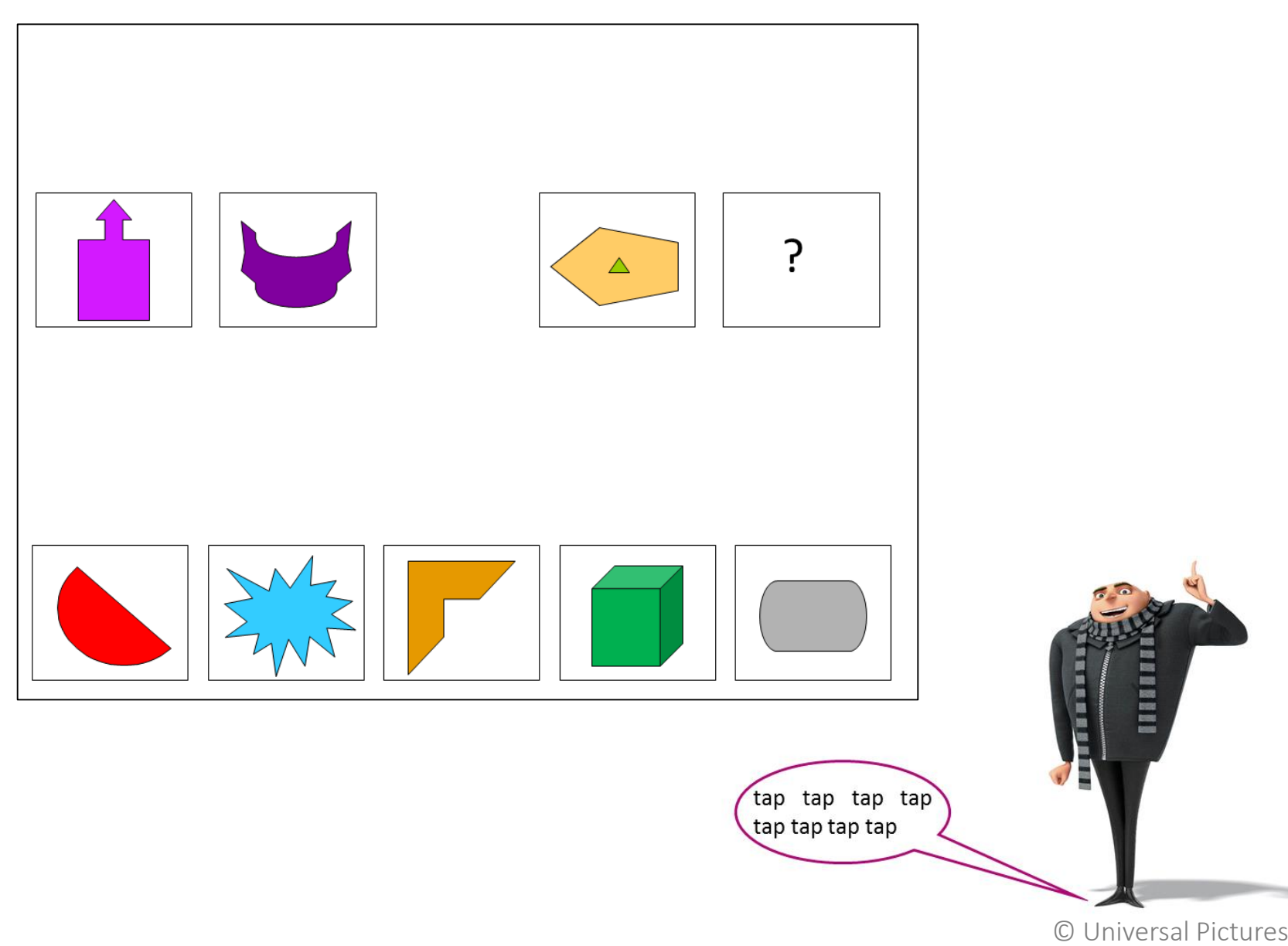
Are children with SLI as susceptible as control children to use verbal strategies efficiently to solve non-verbal analogies?

Method

Group	SLI (N=21)	Age-matched (N=21)	Language-matched (N=21)
Age	10;2 years (1;10)	10;6 years (1;8)	8;6 years (1;9) **
ECOSSE	13 errors (8.4)	-	15 errors (6.9)
NVIQ	94 (10.5)	99 (8.2)	101 (8.0) *

Analogical reasoning task varying along two conditions:

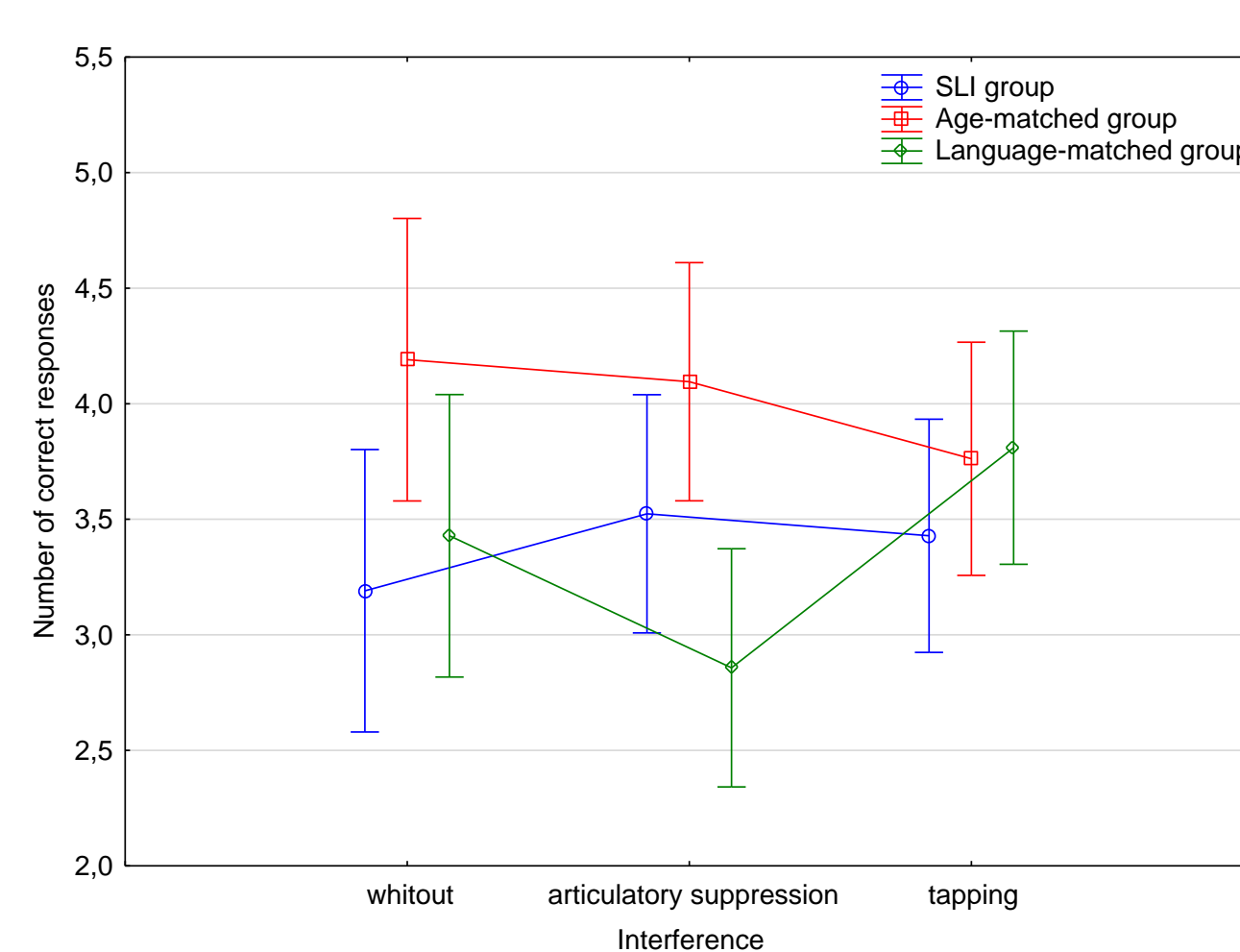
- **Interference**: without interference, with articulatory suppression, with motor interference
- **Distractor**: none, one, or three perceptual distractors in the solutions proposed



Results

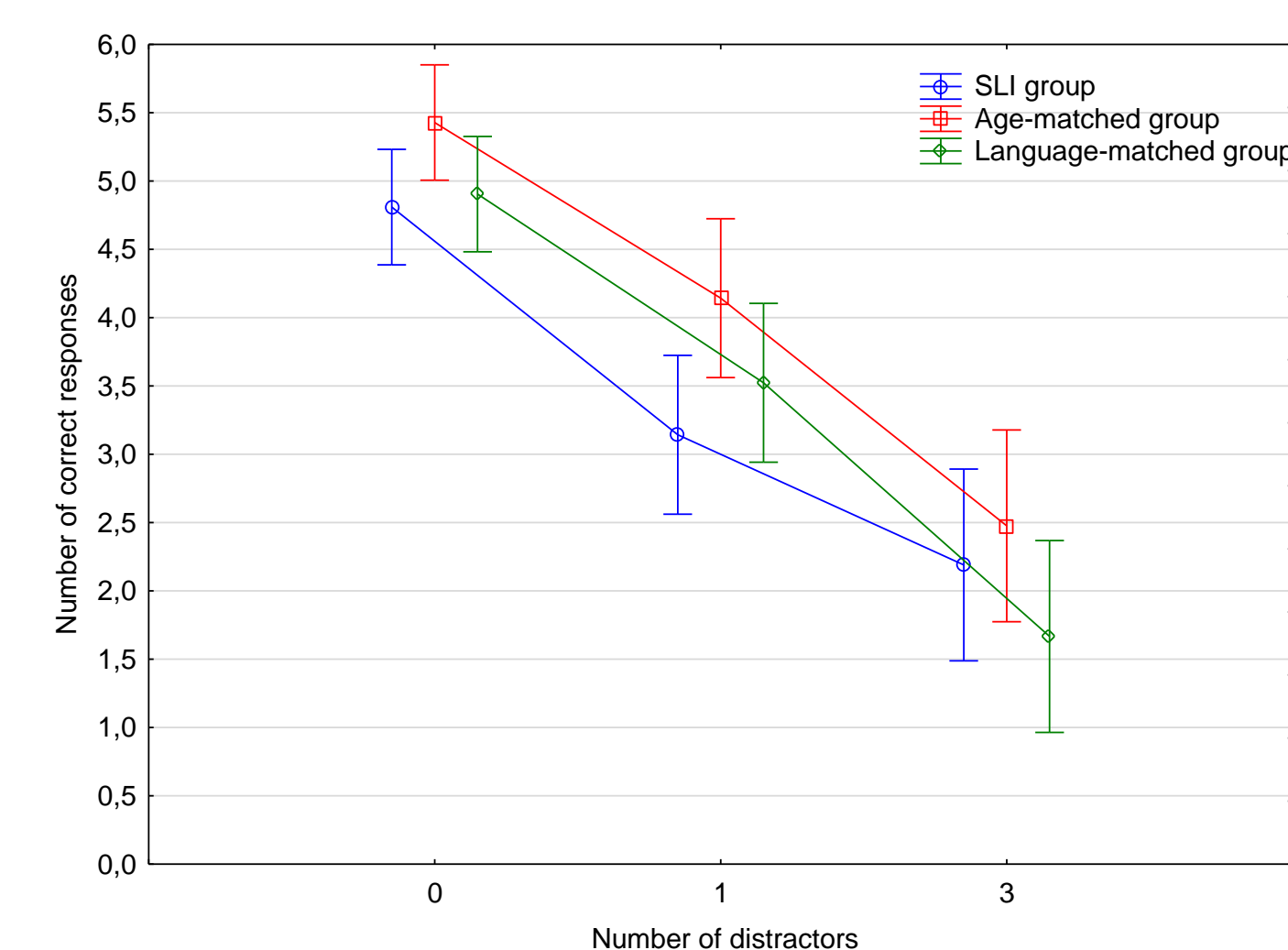
Interference

- Trend toward a group effect ($p=0.058$)
- No effect of interference condition
- Significant Group*Interference condition interaction ($p=0.012$)



Distractor

- Trend toward a group effect ($p=0.058$)
- Significant effect of the number of distractors ($p<0.001$)
- No significant interaction



Discussion

- Children's performance are **impaired by the increase of the numbers of perceptual distractors**, confirming their difficulties to inhibit perceptual similarities in order to focus on relational ones (Thibaut et al., 2010). However, children with SLI are not more influenced by the presence of distractors than their peers.
- Children with SLI have:
 - **worse performance than age-matched children** without language disorders in a non-verbal analogical task, what is congruent with other findings (Leroy et al., 2014),
 - **similar performance to language-matched children**, what reinforces the idea of a link between language and analogical reasoning (Gentner, 2010).
- Articulatory suppression:
 - influences the performance of the language-matched group; only the younger group uses verbal mediation efficiently in order to solve non-verbal analogies.
 - doesn't influence the performance of age-matched children; given their better performance, they may not rely on verbal mediation because they don't need it, the items not being too demanding for them, notably in terms of memory-sustaining (Fatzner & Roebbers, 2012 ; Otsuka & Osaka, 2015).
 - doesn't influence the performance of SLI children; they **don't rely on verbal mediation efficiently**. Their language disorders might provoke an inefficient or even a counterproductive use of verbal mediation (Sturn & Johnston, 1999). It's also likely that deficits in other functions (such as working memory or executive functions) or in general processing capacity (Im-Bolter et al., 2006) impair their analogical performance compared to age-matched peers.

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