Online implicit learning of nonadjacent dependencies in children with and without Specific Language Impairment

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**Background**

**NADL:** Nonadjacent dependency learning  
Examples: *He walks; Yesterday we walked*

**Sensitivity to NADs** is fundamental to language acquisition[1]

**Measuring implicit NADL in children:**
- **> Offline:** accuracy on grammaticality judgment task
- **> Online:** response times (RT) to NAD-rule items versus non NAD-rule items reflect learning dynamics [2,3,4]

**NADL in SLI:**
- **> Offline:** not as effective as in people without SLI [5]
- **> Online:** no data available as yet

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<thead>
<tr>
<th><strong>Title</strong></th>
<th><strong>RT (ms) from onset third element</strong></th>
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</table>
| **SLI**   | First training: 900  
               Second training: 1000  
               Third training: 1100  
               Disruption: 1000  
               Recovery: 900 |
| **TD**    | First training: 900  
               Second training: 1000  
               Third training: 1100  
               Disruption: 1000  
               Recovery: 900 |

Visual inspection: **TD** children: disrupted by removal of rules. **SLI**: no disruption

Preliminary analysis (lmers): No evidence for a difference in RT between rule and no-rule blocks between TD and SLI group (Block*Sample: estimate = 89.57; \(z = 1.67\)). Large individual differences in both groups.

**RQ:** Do the speed and degree of learning nonadjacent dependencies differ between children with and without SLI?

## Measures

**Online:** Press green button upon hearing [target] and press red button when third word is not [target]  
**Offline:** Grammaticality judgment task

**Participants**
27 children with SLI (M = 9.1 years; F = 6)  
27 age-matchd controls (M = 9.1 years; F = 10)

SLI and TD group did not differ in Age and were matched on nonverbal IQ.

**Preliminary Results**

**Online NADL (word monitoring)**

<table>
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<th><strong>SLI</strong></th>
<th><strong>TD</strong></th>
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| Mean = 0.51 (SD = 0.08)  
Range = 0.37 - 0.69 | Mean = 0.52 (SD = 0.13)  
Range = 0.25 - 0.87 |

Visual inspection: **no evidence of learning in both groups.** Wider range of scores obtained in TD group.

**Offline NADL (grammaticality judgment)**

<table>
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<tr>
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| Mean = 0.51 (SD = 0.08)  
Range = 0.37 - 0.69 | Mean = 0.52 (SD = 0.13)  
Range = 0.25 - 0.87 |

Visual inspection: **no evidence of learning in both groups.**

**Preliminary analysis (glmers):** No evidence that children as a group scored above chance level (estimate = 51.4%; \(z = 0.80, p = 0.43\)) or that the groups differed in performance (estimate = 1.03 odds; \(z = 0.24, p = 0.81\)).

**Conclusion**

Visual inspection suggests different NADL dynamics between children with and without SLI. Preliminary analysis do not support this claim, however.

There exist **large individual differences** in children's sensitivity to nonadjacent dependencies.

More research is needed to evaluate how NADL relates to language performance and developmental language disorders.

**Contact**

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**References**

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