What is the impact of the sequence structure on implicit learning in children?

Caroline Lejeune, Xavier Schmitz, Stéphanie Lempereur, Christelle Maillart, Thierry Meulemans, & Audrey Gabriel

*Department of Cognitive Science, University of Liège, Belgium*

**INTRODUCTION**

It is generally admitted that implicit learning abilities are efficient early in childhood. HOWEVER, a question persists in the literature concerning the age-invariance and the effects of sequence complexity on learning.

**OBJECTIVE**

- To explore, with two Serial Reaction Time tasks adapted to the young child, whether implicit learning abilities are present to the same extent in 4-, 7-, and 10-year-old children
- To investigate the impact of the structure of the sequence on the children’s performance
- To assess the explicit awareness developed by the children in this 2 SRT tasks

**SUBJECTS**

- A TOTAL OF 107 CHILDREN
  - 32 4-year-old children
  - 39 7-year-old children
  - 36 10-year-old children

- Monolingual French speakers
- Normal or corrected vision
- No history of learning disabilities
- No neurological or behavioral diagnoses
- Right-handed

**MATERIAL & PROCEDURE**

**Serial Reaction Time (SRT): The « Harry Potter task »**

Participants were randomly assigned to one of two adapted SRT tasks:

- **Ambiguous sequence** (8 items)
  - 7 blocks (one block consisted of 8 repetitions of the sequence)
  - 7th block = transfer block
  - The traditional SRT task was adapted in order to make the task more attractive for the children
  - Touch screen responding mode
  - A sorcerer appears in four of the six windows of a castle
  - The child has to touch the sorcerer with a magic wound (pen stylus) as fast and as accurately as possible

- **Second Order Conditional sequence** (12 items)

**RESULTS**

I. ANOVA with Block (2 levels: 6 vs. 7) x Sequence (2 levels: SOC vs. Ambiguous) x Age group (3 levels: 4, 7, 10)

Results showed significant but different learning effects for the two types of sequences:

- Group effect: p<.001
- 10-year-old children are faster than 4- and 7-year-old children
- Block effect: p<.001: block 6 is processed faster than the transfer block (B7)

**DISCUSSION**

1) 4-, 7-, and 10-year-old children demonstrate significant learning effects with both the ambiguous and the SOC sequences with touch screen responding ➔ these results confirm that implicit learning abilities are present in early childhood

2) **An age effect** appears only for the ambiguous sequence ➔ the statistical structure of the sequence enables the child to use explicit strategies

3) This latter result confirms that explicit strategies might intervene in the children’s SRT performance, which could explain the age effect observed for the ambiguous sequence

C.Lejeune@ulg.ac.be / Université de Liège. Département des sciences cognitives. Boulevard du Rectorat - B33, B-4000 Liège, Belgique