Introduction

**Question:** Does long-term memory contribute to the development of visuo-spatial working memory?

**Assumptions:** (1) Older children have acquired more knowledge about structural features in their environment than younger children.
(2) Visuo-spatial knowledge contributes to the performance on visuo-spatial working memory tasks: chunking.

**Prediction:** Knowledge about structural features will be used especially by older children in order to remember visuo-spatial stimuli.

**Expectation:** The discrepancy in visuo-spatial working memory performance between structured and unstructured stimuli should grow larger with age. → We expect an age × structure interaction.

Method

**Participants:** Children, adolescents, and adults of 9, 11, 13, 15, 17, and 19 years old (twelve in each age group).

**Material:** Corsi Blocks Task with structured and unstructured paths (based on Gestalt principles: continuation, repetition, and symmetry; Kemps, 2001).

Results

**Analysis on the absolute performance: Trial-length**

Age (6) x Structure (2) x Trial-length (6) ANOVA
- Main effects of Age, Structure, and Trial-length.
- Interaction Age x Structure: the effect of structure augments as a function of age (graph 1).
- Interaction Structure x Trial-length: the benefit of structure grows with trial-length.
- Interaction Age x Structure x Trial-length: is the age x structure interaction biased by trial-length? → Analyses on the relative performance.

**Analysis on the relative performance: Span-level**

For each participant, the age-related, individual memory span was calculated, and also the span-1 and span+1.

Age (6) x Structure (2) x Span-level (3) ANOVA
- Main effects of Structure and Span-level.
- No main effect of Age: possible confound is excluded.
- Interaction Age x Structure: the effect of structure augments as a function of age (graph 2).
- Interaction Structure x Span-level: the benefit of structure grows with span-level (graph 3).

Conclusions

Long-term knowledge about visuo-spatial features plays an important role in the development of visuo-spatial working memory. Older children perform better than younger ones, and this difference is most apparent on structured stimuli. Even when the working memory task is within the range of their individual processing capacity, younger children make less use of the presented structure than older children.

Implications

**Interaction long-term memory - working memory**
Working memory promotes the development of long-term memory (Gathercole & Pickering, 2000a, 2000b); and stored knowledge promotes the development of a well-functioning working memory (this study).

**Sensitivity to cognitive stimulation**
Cognitive stimulation turns out to be very useful in learning situations, and especially when the processing capacity of the child is challenged.

References