

The Corsi Block-Tapping Task in Children

Exploring Performance and Relations to Early Math Abilities

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Is early math performance related to visuospatial memory?

In the Corsi block-tapping task, a sequence of locations in an array are indicated, and the participant must reproduce the sequence. Performance is used as a measure of visuospatial memory.

The *mental model* of arithmetic suggests that young children use mental representations of number sets to solve arithmetic problems. In accord with this model, we hypothesized that measures of visual memory (such as Corsi) would predict early numeracy. In the present research, we tested whether Corsi performance, which has usually been viewed as measure of visual memory capacity, and a more basic measure of visual memory (Flash Counting, described below), predicted children's numeracy skills.

Method

439 children completed a range of computer and paper-and-pencil tasks as part of the Count Me In project. In the present analysis, we explored the relations among measures of speeded processing, memory, and two standardized math tasks, the Numeration and Addition subtests of the KeyMath. The number of children whose data were analyzed are shown in Table 1.

To keep the children interested, the Corsi and several other measures were presented in a game-like form on laptop computers

Measures

Speeded processing

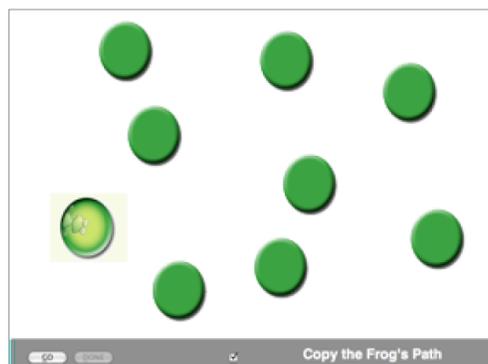
- *Flash Counting*: an array of 1-7 dots appeared for 500ms. Speed and accuracy on arrays of 4 to 6 items.
- *Processing Speed*: simple reaction time, 24 trials.

Memory

- Corsi (visual memory) & Digit Span (phonological memory); number of sequences correctly reproduced.

Math

- KeyMath™ Numeration & Addition.



'Copy the Frog': Computerized version of Corsi Block Task

Results

Do measures of visual memory predict early math performance?

As shown in Table 1, both Corsi and Flash were correlated with Numeration. By Grade 2, flash accuracy had reached ceiling levels of performance (90%), but speed of responding in the Flash task was related to math outcomes. Correlations with addition showed similar patterns.

Table 1. Correlations between KeyMath Numeration and Visual Memory Measures

	JK	SK	G1	G2	G3
Corsi	.59**	.34**	.35**	.31*	-.11
Flash (%)	.51**	.39**	.39**	.18	.17
Flash (RT)	-.34*	-.12	-.33*	-.42**	-.40**
N	50	142	64	67	64

* p < .05; ** p < .01

Are Corsi and Flash measuring the same visual memory? Multiple-regression analyses were used. Separate analyses were conducted for Numeration (JK to Grade 3) and Addition (SK to Grade 3). In both cases, Corsi and Flash predicted unique variance in test performance. Digit span was not a unique predictor. The regression controlled for age, processing speed, and gender.

Conclusions

Performance on the Corsi was significantly related to performance on standardized measures of early math performance. A measure of visual memory for quantity (Flash) also accounted for variance in early numeracy skill. These results are consistent with the mental model of early arithmetic. The strong relation between visuospatial memory and numeracy in JK children suggests that the ability to create a strong mental representation may facilitate early understanding of numbers.