Tablet-based visuo-spatial training tool for preschoolers

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In the context of numerical development, visuo-spatial skills are assumed to provide an early foundation for mathematics learning [1,2,3]. Recently, the importance of these abilities in preschool years has been stressed out [e.g. 7]. Nevertheless, rarely any specific visuo-spatial training tools are available for the preschool setting. We have developed a tablet-based visuo-spatial intervention tool for preschoolers and implemented it in 5 Luxembourgish kindergarten classrooms.

**METHOD**

- **Participants & Design**
  10 kindergarten classrooms from two schools in Luxembourg were recruited. Half of the classrooms were assigned to a “teaching as usual” control condition, whereas the other five classrooms received 20 sessions (two sessions per week) of visuo-spatial training (20 minutes per session). A total of \( N = 125 \) children (61 girls) participated in the study with a mean age of \( M = 5.49 \) years (SD = .63).

  - **Intervention group (IG):** \( n = 68 \)
  - **Control group (CG):** \( n = 57 \)

- **Assessment**
  A specific assessment battery targeting visuo-spatial, symbolic and non-symbolic early numerical abilities has been compiled. All tests, besides the non-symbolic magnitude comparison task, were administered in paper-pencil version. Tests were administered during the three weeks before and after the intervention.

### RESULTS

Significant near transfer effects could be observed in the intervention group compared to the control group. Measures of verbal and non-verbal intelligence were entered as covariates into the model.

If we remove children scoring very high on tests of visuo-spatial abilities at pretest (> 4th quartile) from our sample, time x group interaction reaches statistical significance for both measures (\( N = 101; n_{IG} = 52, n_{CG} = 49 \)).

No intermediate and no far transfer effects could be observed at this stage.

Near transfer effects on trained visuo-spatial abilities could be observed, but no gains on measures of mental transformation skills and early mathematical abilities could be observed.

Possible explanation: transfer to mathematical skills might only occur when formal math instruction has begun as visuo-spatial abilities are thought to provide an early foundation for later mathematics performance.

**DISCUSSION**

**BIBLIOGRAPHY**

3. Véronique Cornu, Tahereh Pazouki, and Romain Martin (2022). Tablet workspace is conceptualized as an electronic blackboard that can be used in combination with external material such as booklets.