

Title: Effects of working memory training on reading in children with special needs

Author(s): Karin I. E. Dahlin

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Summary:

The main purpose of this study was to examine whether working memory of children with special needs could be enhanced by a cognitive training program, and how the training outcomes would relate to their reading development. Because it was hypothesized that poor reading comprehension could be caused by working memory problems, the present study expected training in working memory would have a positive positive effect on children's reading comprehension by investigating how WM and reading skills at the word and text level are related to the group of children.

For this study, primary-school children were assigned to complete a set of assessments in non-verbal reasoning, working memory, and reading for 5 weeks. To be specific, four measures were used in a neuropsychological aspect: 1) Non Verbal reasoning ability, 2) Verbal working memory, 3) visual-spatial working memory, and 4) response inhibition. For each of the measures, Raven's Coloured Progressive Matrices, Digit Span, Span Board, and Stroop were respectively used as a test. Scores at day one (start index) and the maximum scores received during the training (max index) were analyzed. Within the same time intervals, (1) pre-test, (2) post-test, and (3) retention test, a "pre-test – intervention – post-test – retention" test design was followed in order to figure out how far WM training contributed to cognitive and literacy development. Furthermore, three kinds of reading measures were also used: 1) Reading comprehension, 2) Word decoding, and 3) Orthographic knowledge.

The effect of training was tested by comparing the outcome score at post-test in the treatment group scores at pre-test. The treatment group enhanced its results of working memory measures. The WM measures Span board forward and back were related to reading comprehension. A comparison of the experimental group with an additional control group showed that the training indeed enhanced children's working memory. Although there is a limitation that there are many more children in the treatment group than the control group,, this study practically implies that WM training may facilitate reading comprehension processes directly, and not via improvements in word-level reading processes.