The Influence of Working Memory on Strategy Use

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Introduction

Working memory (WM) is part of the short-term store that is responsible for maintaining and manipulating information. To successfully execute a memory strategy one must have enough WM capacity to maintain the to-be-remembered information and devise an effective strategy.

Baddeley (1990) conceptualizes WM as being a limited capacity system with two subsidiary slave systems, the articulatory loop for verbal information and the visuo-spatial sketchpad for visual/spatial information. Thus, information presented auditorially should be more likely to be encoded in a verbal code by the articulatory loop and, if a strategy is employed, it is likely to be verbally-based. In contrast, visually presented information should be encoded into a visuo-spatial code of the visuo-spatial sketchpad and strategy use is likely to be visually/spatially-based.

Method

Subjects were 128 7- and 11-year-olds. For the memory task subjects were asked to remember where objects were located in imaginary haunted rooms. Subjects were assigned to either auditory presentation (heard sentences like "The book is above the ghost") or to visual presentation (saw pictures with the book placed above the ghost). Half of the subjects in each presentation modality either had objects available during presentation of to-be-remembered information or objects were made available only at recall. For the 18 trials, memory load was classified as: (a) low (1 and 2 objects), (b) medium (3 objects), and (c) high (5 and 7 objects). This memory task allowed for the use of multiple strategies (e.g, verbal, external, and imagery).

Each participant's WM span was also assessed using four WM measures. The two verbally-based measures, backwards digit span and sentence span, involved subjects listening to tape-recorded information and repeating this information as specified. In Mr. Cucumber, a visually/spatially-based task, subjects were shown a picture with dots on various body parts and asked to place dots on the same body parts on a blank picture. In the crooked worm task, also visually/spatially-based, subjects saw a figure on a computer screen which appeared in different locations and at recall were asked to draw the figure created.

Results

There was a positive correlation between age and WM span, $r = .55$. There were also age-related increases in sophisticated external/spatial strategies and decreases in unsophisticated external and verbal strategies. However, it was of greater interest to know if a child's WM span correlated with strategies used. Early results indicated that there was no strong association between verbal WM and verbal strategy use or between visual/spatial WM and external/spatial strategy use. Thus, correlations were conducted on object-available versus objects-not-available conditions as the between-subjects condition. For the 11-year-olds, no significant correlations were found.

Examination of the 7-year-olds revealed relatively weak support for relations among visual/spatial measures and external or imagery strategies. In the objects-available conditions, knowing a child's WM span on the crooked worm task correlated positively with external strategy use at all memory loads. However, Mr. Cucumber, the other visual/spatial measure, did not correlate with strategy use at any memory load.

In the objects-not-available condition, crooked worm positively correlated with both verbal and external strategy use at all memory loads.

Conclusions

Overall, some additional information about strategy use was gained by knowing a child's WM span; however, most information was gleaned from knowing a child's age.

The correlation between strategy use and WM provided little support for the idea that different types of strategies would be used when information was verbally presented as opposed to visually presented, as was hypothesized from Baddeley's WM model.

References

Baddeley, A. (1990). *Human memory*. Boston: Allyn & Bacon.