Modelling Working Memory

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Working memory is the blackboard of thinking. Its limited capacity is closely related to measures of reasoning ability. Current theories of working memory are primarily verbal descriptions of mechanisms and their interactions, which are often vague and ambiguous, making it difficult to figure out what exactly they predict. I will present a new model, SOB-CS, that accounts for a broad range of experimental findings from the so-called complex-span paradigm. The complex-span paradigm is the most frequently used paradigm in cognitive psychology for investigating working memory. In complex-span tests, participants try to remember a list in correct order, and in between presentation of list items, they have to carry out brief distracting tasks, such as reading aloud words or solving arithmetic problems. SOB-CS is a connectionist model that uses distributed representations of items, their list positions, and of the material of the distractor task. Items are retained in correct order by associating each item to its list position. Memory capacity is limited because of interference by superposition of distributed representations. Distractor-task material is also obligatorily encoded, thereby adding to interference. Free time can be used to gradually remove distractors from memory, thereby reducing interference. I will present applications of SOB-CS to a number of experiments from the literature, and new experiments that test some of the key assumptions of the model.