

A new view on complex span tasks. Using eye tracking to reveal the influence of memory load on eye movements.

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Visual processing tasks, such as reading, involve the perception of visual symbols with series of fixations, their short-term storage and decoding. For fluent processing in such a task, the ability to perceive multiple symbols with single fixations is crucial. As of yet, it is an unresolved question how this ability is influenced by memory load. I expect that limited attentional resources are used to ensure a high perceptual capacity of fixations. Hence, the amount of information that can be perceived with a single fixation should decrease with increasing memory load. I employed a novel combination of the complex span paradigm and eye tracking to test this assumption. Music students ($n=75$) were asked to memorize one note and then play a simple melody at first sight on a piano. After twelve repetitions of this procedure, they were asked to recall the memorized notes in correct order. Eye movements during the performance of the melodies were tracked. While the distance of saccades was unaffected by memory load, the number of fixations used to read the melodies increased with each additional note that had to be held in memory. When more notes were stored in immediate memory, fewer attentional resources were available for visual processing and the amount of information that was perceived with a single fixation decreased. These findings show that the combination of complex span tasks and tracking of eye movements are the ideal research method to analyze the influence of memory load on eye movements during visual processing.