

## ABSTRACTS

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### **Reading a word imposes a higher cognitive load than listening to the same word: A new casual factor for the Modality Effect?**

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The Modality Effect is the fact that learning from an instructional material is more efficient when its presentation is audio/visual rather than only visual. According to Leahy and Sweller [Applied Cognitive Psychology 25, 943 (2011)], this effect can be explained in the following way: when reading a text, the graphic characters must initially be processed by the visual-spatial sketchpad and, then, the visual code should be translated into a verbal code, which involves also the verbal working memory. Therefore, because any written word needs to be processed both by the visual-spatial and the verbal working memory, the working memory is theorized to be more heavily loaded when the text is presented in visual modality rather than in auditory modality. However, this explanation for the modality requires an experiment to verify its underlying assumption: the casual factor for Modality Effect is the fact that recognizing a written word imposes more cognitive load than recognizing the same word presented in auditory format. Here, we report a test to verify experimentally this assumption. Specifically, we created a version of the Corsi Block Test, in which the presentation of a sequence of blocks is interleaved with the presentation of words (written or spoken), so that one word is presented right after each block is shown. By interleaving the sequence of blocks with the presentation of words, we created a dual task, being the main task the memorization of the sequence of positions of the blocks, and the secondary task (the disrupting task) the reading or listening of each word interleaved, repeating it aloud immediately after it is presented. Participants did not have to remember the words presented to them. If reading a word demands more cognitive load than listening to that word, then we expect that presenting words in a written format, interleaved with the presentation of a sequence of blocks, would have a higher disrupting effect in the retention of the information of blocks sequence in working memory than presenting these words in an auditory format. We did the Corsi Block tests for 3, 4 and 5 blocks. In our experiment, participants were seven High School sophomores. Our results showed that, the average from all participants, of correct number of tests, was higher for Corsi Block tests interleaved with words presented in visual form, than for Corsi Block tests interleaved with words presented in auditory format. These results are in accordance with the assumption that the casual factor of the Modality Effect is the fact that the recognition of words imposes a higher cognitive load when that word is presented in a visual format than when presented in an auditory format and, thus, reinforce the underlying assumption that supports Leahy and Sweller (2011) explanation for the Modality Effect.