

The impact of retro-cue validity on working memory representation: Evidence from electroencephalograms

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Abstract

Visual working memory (VWM) performance can be improved by retrospectively cueing an item. Different hypotheses have been proposed to explain the mechanisms behind retro-cueing and VWM. There is still no clear electroencephalogram evidence to support that the retro-cue effect under different validity conditions is triggered by different mechanisms. Herein, we investigated whether retro-cue validity modulated the mechanisms underlying the retro-cue effect in VWM by using EEGs. The participants were required to perform the recognition task after retro-cue with 80%-validity (the high-validity state) or 20%-validity (the low-validity state; slightly below the chance level of 25%). Contralateral delay activity and lateralized alpha power were used to assess memory storage and spatial attention, respectively. Although the retro-cue could redirect spatial attention under both validity conditions, we found that participants maintained the non-cued items under the low-validity condition, but dropped them out of VWM under the high-validity condition. Our results can be explained by the removal hypothesis, prioritization hypothesis, and protection-during-retrieval hypothesis. This work suggests that the mechanisms underlying the retro-cue effect are not mutually exclusive, but determined by the cue validity and experimental parameters.

