**The influence of active removal from working memory on serial dependence**

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**Abstract**

Flexible control of the contents of working memory (WM), necessary for many aspects of behavior, includes the ability to remove no-longer-relevant information. Although simply withdrawing attention is one likely mechanism, many empirical results suggest that it is possible to actively remove information from working memory. We tested evidence for a specific mechanism for active removal: modulating the gain of the sensory channels that encode the stimulus-specific features (Lorenc et al., 2020; an efficient coding mechanism (c.f., Fritsche et al., 2020)). Subjects performed paired doublets of trials, the first being multi-item WM with retrocuing and updating, the second being 1-item delayed recall, with measures of serial dependence of the latter on various items from the former as the primary dependent variable of interest. The first trial of each doublet presented two sample Gabor patches, followed by a retrocue that implicitly designated the uncued item as an irrelevant memory item (IMI). Next a third item was presented, and finally memory for either the cued or the third item was tested. The critical manipulation was whether or not the third item was presented at the same location at which the IMI has appeared, with overlap between the two expected to prompt the active removal of the IMI from WM, whereas nonoverlap might require nothing more than the withdrawal of attention. Results indicated that whereas the IMI exerted the attractive bias on 1-item delayed recall in the no-overlap condition (consistent with a withdrawal of attention), but a repulsive bias in the overlap condition. Because repulsive serial dependence effects have been attributed to an efficient encoding mechanism (Fritsche et al., 2020), this result suggested the active removal of information from WM could be implemented by modulating the gain of the sensory channels that encode the features of IMI.