Updating for free? Span and Updating tasks modulate Visual Search in a similar manner

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Many theories in cognitive psychology have proposed that working memory (WM) plays a central role in visual search (VS). Tasks evaluating the role of WM in VS have generally used dual-task paradigms where VS tasks are performed with or without a WM load that is passively maintained. Under these circumstances, previous research has found that the VS task is slowed. Furthermore, search efficiency also decreased under some circumstances. While passive WM tasks appear to require resources to maintain information in WM, it is unclear how VS would be influenced by an updating task that required more continuous processes of encoding or maintenance. We contrasted VS performance with a span task load or an updating load. In both tasks, we asked observers to perform a typical T among Ls search task. A single object was displayed in the center of each VS display. In the span task, observers were asked to hold 1-4 objects in memory. During every VS trial observers had to determine whether the object in the VS display was one of the objects maintained in memory. After twelve trials, they had to report how many times an object from their memory set appeared during the preceding VS trials. In the updating task, observers had to determine how many times the central object was repeated in an Nback task. After every twelve trials participants were asked to answer how many times a repetition occurred. We observed an additive cost of the load for both span and updating tasks but no evidence for a decrease in search efficiency in any task. Both span and updating task appear to modulate VS processes in a similar manner.