

EWIC 2010 Keynote lecture

Individual differences in attentional control over primary and secondary memory.

Professor Edward K. Vogel,

Department of Psychology, University of Oregon.

The storage capacity of visual short-term memory (VSTM) for simple objects is known to be severely restricted and to vary considerably across individuals. Individual differences in memory capacity appear to be a stable trait of the observer and are positively correlated with many high-level aptitude measures such as fluid intelligence and reasoning. These individual differences in capacity have often been proposed to be due to variability in online memory storage space. However, it is also possible that much of the variability stems from the efficiency of attentional control mechanisms that restrict access to VSTM. In previous experiments, we have found the low capacity subjects are poorer at keeping irrelevant items from being stored in VSTM than high capacity subjects. In the present study, we extend these findings by examining how these individual differences in controlling access to VSTM also determine what information from a display will ultimately be stored offline in long-term memory (LTM). To do this, we tested LTM recognition performance for novel and repeated arrays of simple objects that were originally presented as part of a VSTM change detection task. Across several experiments, we found that an individual's STM capacity strongly predicted his or her success on both incidental and intentional LTM recognition tasks. Furthermore, ERP components known to be sensitive to successful retrieval from LTM (e.g. frontal N400) also indicated that high STM capacity individuals were better able to control the flow of information into LTM at a given time. These results support the proposal that the individual differences in VSTM capacity reflect the effectiveness of attentional control mechanisms governing encoding into both primary and secondary memory systems.