

Psychophysiological investigations of interference resolution during memory retrieval

Results:

The objective of this experiment was to investigate changes in neural activity over the course of a memory retrieval task. The assumption was that the demands placed on monitoring the contents of retrieval would increase as the numbers of stimuli to which memory judgments were required also increased. We tested this by measuring event-related potentials (ERPs) during the test phase of a retrieval task, because ERPs index processes related to retrieval monitoring.

Participants ($N = 16$) first studied words in one of two colours. Studied and unstudied (new) words were then presented in a neutral colour. ERPs were acquired while people made old/new and then study colour judgments to the test words. The differences between ERPs associated with correct judgments to new words (correct rejections) and correct colour judgments to old words were compared for the first and the second halves of the retrieval task. The rationale for this first/second half separation was that the demands on monitoring would increase during the task and would be revealed by differences between ERP indices of retrieval monitoring over the course of the task.

The critical ERP indices differed qualitatively from approximately 1000ms post-stimulus, indicating that not entirely the same retrieval processes were operating in support of accurate memory judgments over the retrieval task. In combination with the absence of evidence for this change in another experiment where auditory rather than visual contexts were used at study, these findings suggest the outcome is not simply an effect of time on task. It is possible that the effects specific to the second half of the retrieval task index additional processes engaged as the demands placed on distinguishing between similar memory representations increase. Irrespective of the accuracy of this account, however, the findings indicate there are circumstances where making functional inferences about patterns of neural activity in brain imaging experiments based on data averaged over the entirety of retrieval tasks might lead to inaccurate functional characterisations.

Area(s) of interest: Retrieval Monitoring; Episodic Memory; Event-related potentials

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