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TEMPORAL DECODING OF SELECTIVE RECOLLECTION WITH PSYCHOPHYSIOLOGY

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Grant 169/18

Background: How and when can people control what they recall? Electroencephalography (EEG) can be used to study how selection in memory retrieval evolves over time. The parietal event-related potential (ERP) old/new effect is an established index of successful recollection which is larger when people recollect currently goal-relevant than irrelevant information. This suggests that recollection can be selective. But the parietal ERP effect may reflect integrative processes operating downstream of the initial recovery of a memory trace. To index processing closer to the point of recollection we can measure the reinstatement at retrieval of the neural representations and processes that were engaged when events were experienced. We will ask whether this episodic reinstatement can occur selectively or if it always holistically represents irrelevant and relevant features of the original events.

Aims: This project investigates how people selectively retrieve only currently relevant information from episodic memory using time-resolved psychophysiological indices of processes thought to underpin the recollective experience of 'reliving the past'. By combining established ERP measures with multivariate representational similarity analysis (RSA) of episodic reinstatement, we aim to provide converging evidence about the point at which recollection may be selective.

Method: Two EEG experiments will use a task in which people study visually-presented objects or auditorily-presented object names with background scenes. Memory is then probed with visually-presented object names, and a selective or nonselective source memory test. This will allow us to test for intentional and incidental reinstatement of encoding context by using RSA to index the similarity between distributed brain activity patterns at retrieval and the patterns that were present during the study phase. We predict that RSA will reveal incidental reinstatement of activity patterns associated with the scene contexts. If events are recollected as holistic entities, this reinstatement will also correlate with successful recall of whether objects were heard or seen. In the second phase of the project, we will extend these tests under conditions where participants are asked to adopt selective retrieval goals.

Preliminary results: With data from an initial study, we have developed a pipeline and analysis code for RSA analysis. Data acquisition for the first experiment is ongoing after a successful pilot study.

Keywords: Recollection, ERP, EEG, RSA, Selectivity

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