A psychophysiological investigation of semantic contributions to episodic memory

Results:

This research project investigated how semantic information influences memories of episodic events. Focussing on the meaning of events at the time of encoding is a good way of making them more memorable. The central aim of this project was to elucidate which memory processes are particularly sensitive to certain kinds of semantic manipulations. We assessed this question by investigating how established event-related potential (ERP) indices of Familiarity (providing a sense of previous encounter, indexed by the early frontal old/new effect, occuring at 300-500ms post stimulus) and Recollection (retrieval of detailed contextual information, indexed by a later parietal old/new effect, occuring at 500-800ms post stimulus) varied according to semantic relations between stimuli and type of semantic encoding subjects employed to process stimuli. Experiment 1 revealed that stimulus-driven semantic manipulations have a particularly strong impact on episodic retrieval via familiarity-driven processes. Reliable differences in ERP indices occurred at anterior scalp locations from 300-500ms (early frontal old/new effect) for related vs. unrelated items. Experiment 2 was able to investigate the basis of this impact in more detail and demonstrated that the familiarity-driven memory effect is linked to semantic feature overlaps between stimuli, but less so to the kind of semantic processing employed. Out data revealed modulations in early frontal old/new effects that were linked to changes in semantic relatedness between stimuli. The level of strategic semantic processing employed at encoding, however, did not modulate early frontal old/new effects. Overall these findings allow us to establish a more detailed account by which semantic information is able to influence episodic retrieval. Our data suggest that stimulus driven semantic processes modulate familiarity based memory judgements. These findings have important implication for how semantic information can be used to strucutre learning environments to become more memorable.

Area(s) of interest:

Human long-term memory, EEG, cognitive neuroscience

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