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Cognitive and functional correlates of accelerated long-term forgetting in temporal lobe epilepsy

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Abstract: While we know that hippocampal dysfunction is responsible for the memory deficits that patients with temporal lobe epilepsy exhibit at relatively short study-test delays, the role of this region in accelerated long-term forgetting (ALF) is not yet clear. In the present study, we probed the role of the hippocampus in ALF by directly comparing memory for associations to memory that could be supported by item recognition during a forced choice recognition task over delays ranging from 15-minutes to 72-hours. We additionally examined resting-state functional connectivity between the hippocampus and cortical regions known to be involved in processing these types of stimuli, as well as the relationship between ALF and various clinical variables including structural abnormality in the hippocampus, lateralization of epileptic focus, presence of seizures across the retention period, and standardized composite memory scores. We found evidence of accelerated forgetting for item stimuli (but not associative stimuli) by 6 hours post-learning, which became statistically reliable by 72-hours. This finding suggests that unlike controls, patients were unable to utilize novelty to reject the incorrect object-scene pair. While none of the examined clinical variables were related to long-term forgetting, reduced resting-state functional connectivity between the affected anterior hippocampus and unaffected lateral temporal cortex predicted forgetting of item stimuli over the 72-hour delay. Implications for the role of the hippocampus in accelerated long-term forgetting, and existing theories of systems consolidation in this context are discussed.

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