Remembering past events might take place quicker than we thought, research shows

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Credit: Human Brain Project

Research published in the *Journal of Neuroscience* has shown that retrieving memories of events from our past may take place quicker than we previously thought - and it is possible to interfere with that process.

The process of retrieving episodic memory, personal experiences that

require revisiting sensory information received in the past, was believed to be a relatively slow process in the brain - taking around half a second.

Using electroencephalography (EEG), which monitors neural activity with a high time resolution, the team showed that episodic retrieval starts with a very rapid reactivation of sensory brain areas.

The findings provide the first neural evidence for this early sensory activation, and show that it actually takes between 0.1 and 0.2 seconds to begin recalling the event.

Furthermore, the initial activation of sensory brain areas was shown, for the first time, to be causally relevant for conscious remembering.

The study was conducted as a collaboration between the University of Konstanz in Germany and the University of Birmingham, which incorporated two independent experiments in human participants, also found that it is possible to interfere with memory retrieval by applying repetitive Transcranial Magnetic Stimulation (rTMS) to alter brain function.

Dr Simon Hanslmayr, from the University of Birmingham, explained, "Semantic memories, such as knowing that Paris is the capital of France, are bound by no specific time or place. You rarely remember how or where you first learned of that information."

"Episodic memories however, that we were studying here, are unique events with a unique frame of reference within both space and time. They were thought to require searching within the hippocampus, and therefore take a little time, but these findings challenge that belief and illustrate a much more fast-acting response."

Dr Gerd Waldhauser, now at the Ruhr-University Bochum in Germany,

added, "Knowing that episodic memory functionally relies on this very rapid reactivation of sensory information, and seeing that we can interfere with that process, really improves our understanding of how our memory works."

"It is early days but there are, of course, a number of ways in which this could be useful. For example, it may help in understanding psychiatric conditions that involve the automatic intrusion of unwanted memories. There are a number of instances where being able to intervene and target traumatic memories would be beneficial."

Provided by University of Birmingham