

What We Remember from An Episode: Memory As Reactivation, Transformation, and Selection

Abstract

Experiences are stored in the brain via modifications of synaptic connections, changing the neural representations of specific events. Network-level signatures of these representations – “engram patterns” – can be extracted from patterns of EEG oscillations and fMRI BOLD activity.

In the first part, Professor Nikolai Axmacher will show how the reoccurrence of engram patterns supports diverse memory functions from short-term memory maintenance to long-term memory retrieval and consolidation: memory as reactivation. However, it is commonly assumed that memory is not a veridical reproduction of past experiences but involves substantial transformations.

In the second part, Professor Axmacher will describe a taxonomy of memory transformation processes and discuss some conceptual problems of a generative view on memory: memory as transformation. He will then describe a novel view which assumes that engram patterns consist of multiple representational formats which can be selectively activated during memory processes and quantitatively described via deep neural networks. Some initial evidence for this view of memory as selection is presented, together with ideas for future research.