NEUROSCIENCE

The rhythm of memory

Neuron https://doi.org/10.1016/j.neuron.2020.01.032

Credit: Dominique Braud/Dembinsky Photo Associates/Alamy / Alamy

Working memory describes the ability to maintain information at the forefront of the mind, for example when looking up the name of the street and postcode of a friend, before you program your sat nav. How we solve this task, especially when multiple pieces of information need to be maintained, is a fundamental question in cognitive science. Over the last three decades, some of our deepest insights into what brain areas that are involved in this process and the exact behaviour of neurons that allows us to perform such tasks have come from electrophysiological recordings in non-human primates.

In a new paper, Kamiński and colleagues use a combination of neural recordings in human volunteers—patients whose brain activity was recorded in preparation for surgery—and computational methods to track neuronal activity in the amygdala and hippocampus. Their findings help us to better understand precisely what characteristics of neuronal activity carry information about one or multiple items in working memory. The authors provide strong evidence for the hypothesis that the rhythmical firing of neurons in these structures plays a pivotal role in the maintenance of working memory. Of particular note is the insight that when more items had to be remembered, the rate at which neurons fired and the rhythm in which firing synchronised held information about items in working memory.

Together, these important findings not only lead us to more sophisticated models of neuronal coding, but also bring into the spotlight a brain area—the amygdala—that is not yet widely recognised as a key player in working memory.

Anne-Marike Schiffer

Published online: 17 April 2020
https://doi.org/10.1038/s41562-020-0873-2