



Cognitive neuroscience of memory: Recollection, familiarity, and novelty detection Third International Conference, Liège, Belgium, March 16th and 17th, 2023

Edited by Christine Bastin, Ph.D.

GIGA-CRC-In Vivo Imaging, University of Liege, Belgium

Research in cognitive neuroscience of memory highlights the complexity of the cerebral and cognitive mechanisms that allow humans to remember past events. The 3rd edition of the international conference “Cognitive neuroscience of memory: Recollection, familiarity and novelty detection” proposed a state-of-the-art overview of this topic. In line with the two previous editions, memory researchers addressed mechanisms underlying the recollection of individual events using experimental cognitive manipulations, various brain-imaging techniques (MRI, EEG), with different populations ranging from childhood and adulthood, with or without atypical development. This edition also included social aspects of memory, presenting recent advances regarding the cognitive mechanisms underlying shared and collective memory in healthy populations.

Studies of the cognitive mechanisms in individual and collective memory

Christine Bastin, Aurélien Frick, Emma Delhayé, Renaud Coppalle, Nawël Cheriet, David Baudet

GIGA-CRC-In Vivo Imaging, University of Liege, Belgium

Humans remember events that they personally experienced in the past thanks to a neurocognitive architecture in which the medial temporal lobe plays a critical role. Our research notably focuses on the role of the perirhinal cortex in memory functioning as well as in other cognitive domains (Bastin et al., 2019). For instance, we recently investigated the contribution of this brain area in fine-grained discrimination of conceptually confusable items (e.g., a panda and a koala) in episodic and semantic memory tasks. We found that the volume of the left perirhinal cortex accounts for difficulties in distinguishing between highly confusable objects. More generally, we suggest that the tasks that have been shown to target the cognitive functions supported by the transentorhinal cortex across various domains, including episodic memory, semantic memory, language, and perception, provide a potential marker of the perirhinal atrophy due to Alzheimer’s disease. In addition to exploring cognitive impairments specific to Alzheimer’s disease, our research also focuses on preserved memory capacities. Some paradigms are tested with the aim to improve recollection and familiarity by using residual capacities or by taking advantage of reduced inhibition abilities to promote unconscious rehearsal of studied information. As social animals, humans also share memories with other members of the same community (Hirst et al., 2018). Our research group investigates the cognitive processes

and individual variables that contribute to the creation of collective memories and to the sharing of memories between members of a community. Notably, we tested the hypothesis that collective memory and autobiographical memory share the same cognitive architecture. In one study, we assessed the effect of temporal and personal distance on collective and autobiographical memories of the Covid-19 pandemic. Preliminary results suggest that we recall more personal memories for the pandemic period than for a control political event. Moreover, after a 1-year delay, participants recalled less collective and personal memories of the Covid-19. Finally, family is a prominent social environment where transmission of memory takes place. As part of a larger project studying intergenerational transmission of memory within families, we explore different variables that can lead to greater transmission. One intriguing output is that transmitters of memories report sharing more than receivers report getting.

References

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The reminiscence bump and loss of autobiographical memory in Alzheimer’s disease

Dorthe Berntsen

Aarhus University, Denmark

When healthy older adults retrieve autobiographical memories in response to word cues or requests for important events, the distribution of memories over the life span shows a dominance of memories dated to the time between ages 10–30 relative to the surrounding life periods – known as the reminiscence bump. Recent findings suggest that a reminiscence bump is maintained in older adults with Alzheimer’s disease (AD) and that this reminiscence bump may account for the temporal gradient of memory loss in AD found in some previous work. I review evidence for a reminiscence bump in AD deriving from studies probing autobiographical memory through a variety of methods – including word cues, music cues, object cues, freely told life stories, structured interviews and free memory conversation. For example, in a recent semi-structured interview, we expanded the number of lifetime periods of the Autobiographical Memory Interview