objects (in the unimodal task) or of an object-picture and an environmental sound (in the crossmodal task). At test, they performed a cued-recall task and further indicated the vividness of their memory. The subjectivity account was supported during both encoding and retrieval: BOLD activation in the AnG was greatest for vividly remembered associates. In contrast, the multimodal account was only supported during encoding: greater activation for subsequent recall of crossmodal than unimodal pairs. These results resolve some of the puzzles in the literature and indicate that the AnG can play different roles during encoding and retrieval. Furthermore, they suggest that the AnG plays substantial role in memory retrieval, and that in the context of the Integrative Memory model (Bastin et al., 2019) it might link together the core representation systems and the attribution system (Tibon, in press).

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Reflections on the status of the episodic-semantic distinction

Louis Renoult
School of Psychology, University of East Anglia, Norwich, Norfolk, UK

Despite frequently being classed together under the rubric of 'declarative' memory, research in episodic and semantic memory has proceeded largely independently over the past couple of decades, and only relatively recently has there been a resurgence of interest in how the two types of memory interact. After a brief historical introduction, I will review recent research on episodic and semantic memory, highlighting similarities between the two systems. Neuroimaging evidence indicates that the episodic and semantic networks share essentially the same parahippocampal, middle temporal, ventral parietal and midline frontal and posterior regions. Exceptions to this overlap are the hippocampus, which is less commonly found to be activated in the retrieval of conceptual information, and the anterior temporal cortex, that is associated with conceptual processing in studies using sequence-optimized fMRI, but whose role in episodic retrieval has yet to be established. The neuroimaging evidence, and in particular the overlap between the semantic and episodic recollection networks, strongly suggests that successful recollection necessitates the reinstatement not only of sensory-perceptual contextual information characteristic of the original experience, but also the semantic representations and conceptual processing that occurred during that experience. Taken together, these data are compatible with the idea that the neural correlates episodic and semantic memory demonstrate considerable overlap and that the two types of memory are inextricably intertwined, yet maintain a degree of distinctiveness.

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Oral presentations

Signed reward prediction errors in the ventral striatum drive episodic memory

Cristian Buc Calderon[1], Esther De Loof[*,1], Kate Ergo, Anna Snoeck, Carsten Nico Boehler, Tom Verguts
Department of Experimental Psychology, Ghent University, Belgium

* Corresponding author.

The role of reward (anticipation) and reward prediction errors (RPE) has been firmly established in procedural learning. In recent years, these concepts were shown to be relevant for declarative learning too. For example, in our novel variable-choice paradigm (De Loof et al., 2018), large, positive RPEs evoked during declarative learning, consistently led to improved subsequent recognition performance. In the current study, using fMRI, we investigated the interplay between reward- and task-relevant processing areas to clarify the neural mechanism underlying this declarative RPE effect. Participants memorized the pairing of a celebrity face with a foreign language word; each pair was coupled with a specific RPE. Pairs associated with a large, positive RPE evoked a larger response in the ventral striatum (VS). RPE also enhanced functional connectivity between task-relevant processing areas (i.e., face-selective area) and reward-relevant areas (VS and ventral tegmental area) as well as hippocampus. Pairs that were subsequently successfully recognized, had a stronger RPE signature in VS during learning. Finally, at individual-differences level, participants with a stronger RPE signature in VS, showed a larger memory enhancement. Our results confirm key predictions on the impact of reward-based learning mechanisms for declarative memory.

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Recognition-based memory through familiarity assessment in severe Alzheimer's disease

Renaud Coppalle[*], Caroline Mauger, Marion Hommet, Shailandra Segobin, Odile Letortu, Vincent De la Sayette, Anne Quillard, Francis Eustache, Béatrice Desgranges, Hervé Platel, Mathilde Groussard
Normandie Univ, UNICAEN, PSL Research University, EPHE, INSERM, CHU de Caen, Cyceron, Caen, France

* Corresponding author.

[1] Authors contributed equally to this work.

Score	Behavioral response	Example of verbal answer
1	Neither recognition nor interest	Never heard it before in my life…
2	No recognition, signs of interest	I don't know this one, but it's pretty… Did you paint it?
3	Emergence of the SoF, Uncertainty	I feel like I have heard that before, but I am not quite sure… Yes, perhaps it rings a bell!
4	SoF, "yes", no context or wrong context	Oh, yes, sure, I like this one but where did that come from? *Humming* Maybe my parents used to listen to it, or maybe I heard it with my friend Elisa at the village dance?
5	SoF with imprecise context	Yeah, sure, I've seen it not that long ago… It was with you wasn't it?
6	Precise episodic memory	Yes, we listened to it together, last week, along with some other tunes and paintings. Then you asked me the same question.

Fig. 1

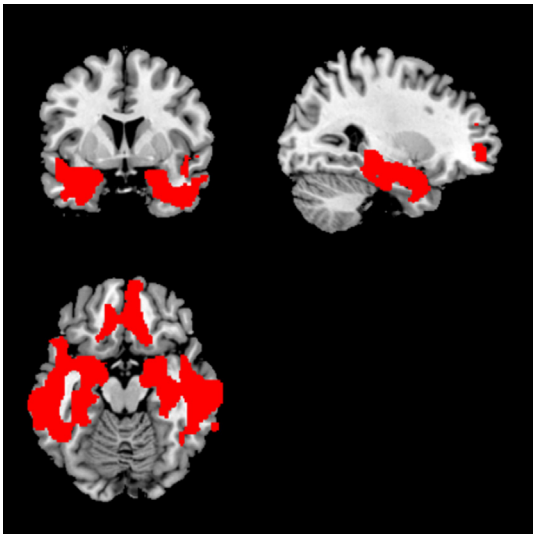

Fig. 2

Recognition-based memory is considered to be entirely impaired in people with Alzheimer's disease at an advanced stage of the disease (PWDs). However, a few case studies have reported new learning, notably with music. The INCAS project aims to better understand preserved encoding capacities in PWDs, using behavioral and neuroimaging data (anatomical and functional MRI). We presented 16 unknown targets items (eight musical items and eight painting illustrations) to 28 PWDs (mean MMSE = 14.53) and 23 matched controls (HC; mean MMSE = 28.8), until they showed familiarity for 75% of these targets in a maximum of eight training periods. These targets were then presented in a final test period, mixed with both old famous and unknown items while inside an MRI scanner. Using a scale designed for PWDs, the Sense of familiarity scale (taking into account verbal and behavioral cues, Fig. 1), helped determine the level of recognition for each item.

The following results show the behavioral part of the INCAS project. Although it took longer, encoding for both paintings and music was still possible in PWDs despite the presence of severe anterograde episodic amnesia caused by extensive lesions to the medial temporal lobe (MTL) (Fig. 2). In the final test period, both PWDs and HC showed a clear superiority of recognition for targets compared to new items both for music ($p < 0.001$) and paintings ($p < 0.001$), with no intergroup difference.

Results also showed that PWADs at a moderate to severe stage are still able to rely on recognition-based memory, which had not been previously shown in a group study. These observations are

discussed with actual models regarding the role of the MTL in memory processing.

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Masked conceptual priming of recognition memory: Conceptual fluency attribution or study-test semantic context match?

Carmen F. Ionita [a,*], Deborah Talmi [b], Jason R. Taylor [a]
[a] *Division of Neuroscience and Experimental Psychology, University of Manchester, UK*
[b] *Department of Psychology, University of Cambridge, UK*

* Corresponding author.

Familiarity and recollection judgements can be influenced through masked priming during the test phase of a recognition memory paradigm. Repetition priming increases familiarity hits and false alarms (Li, Taylor, Wang, Gao, & Guo, 2017; Rajaram, 1993; Taylor & Henson, 2012; Taylor, Buratto, & Henson, 2013), whereas conceptual priming increases correct recollection only (Li et al., 2017; Taylor & Henson, 2012; Taylor et al., 2013).

We investigated the mechanism of conceptual priming effects on recognition memory in two experiments. We used homonyms (i.e., words with two different meanings) as critical stimuli and we biased the meaning participants encoded by pairing the target cues with another word in the study phase (e.g., *tree* – BARK). In the test phase (R/K paradigm), the target words were preceded by three types of primes: related to the encoded meaning (*trunk* – BARK), related to the alternative meaning (*howl* – BARK), or unrelated (*slender* – BARK). If priming increases *(conceptual) item fluency* then we would expect both related primes to increase familiarity/recollection compared to unrelated primes. If priming causes a (partial) retrieval of the encoded semantic context, then we would expect that only primes related to the encoded meaning would increase recollection responses, compared to unrelated primes. In the first experiment, related-encoded-meaning primes, but not related-alternative-meaning primes, increased correct recollection responses compared to unrelated primes. In the second experiment, where the encoding task has been optimized and the stimuli validated, related-encoded-meaning primes increased correct recollection compared to related-alternative-meaning primes, whereas the reverse was observed for familiarity hits. This pattern of results suggests that conceptual priming influences familiarity and recollection through distinct mechanisms: Generic conceptual fluency increases familiarity, whereas matching the encoded semantic context facilitates recollection.

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Learning what you know: How prior knowledge impairs new associative learning in early AD

Pierre-Yves Jonin [a,b,c,*], Quentin Duché [b], Elise Bannier [b,d], Isabelle Corouge [b], Jean-Christophe Ferré [b,d], Serge Belliard [c], Christian Barillot [b], Emmanuel J. Barbeau [a]
[a] *Brain and Cognition Research Center, CNRS UMR 5549, Université de Toulouse Paul Sabatier, Toulouse, France*
[b] *Univ. Rennes, CNRS, Inria, Inserm, IRISA UMR 6074, Empenn ERL U-1228, F-35000 Rennes, France,*
[c] *CHU Rennes, Department of Neurology, F-35033 Rennes, France,*
[d] *CHU Rennes, Department of Radiology, F-35033 Rennes, France*

* Corresponding author.

While associative memory impairment is a core feature of prodromal Alzheimer's Disease (AD), whether prior knowledge affects associative learning has been largely overlooked. Stimuli repetition yields suppression or enhancement of the BOLD signal, allowing the functional mapping of brain networks. We addressed the role of prior knowledge in associative encoding by manipulating repetition and familiarity of the memoranda in a subsequent memory fMRI study design.

Seventeen patients with prodromal AD (AD-MCI) and 19 Controls learned face-scene associations presented twice in the scanner. Pre-experimental knowledge trials (PEK) involved famous faces while in Experimental Knowledge trials (EK), unknown faces familiarized before scanning were used. Study events were sorted as associative hits, associative misses or misses after a recognition test outside the scanner. We computed the Repetition X Prior knowledge interaction contrast to test whether the encoding networks differed along with prior knowledge, then looked for subsequent associative memory effects in the resulting clusters.

PEK and EK yielded similar associative memory performance in AD-MCI, while PEK increased associative memory by 28% in Controls. Repetition effects were modulated by Prior knowledge in Controls, but AD-MCI showed aberrant repetition effects. Subsequent memory effects were observed only in Controls for PEK in the right subhippocampal structures. By contrast, in both groups, EK triggered a subsequent memory effect in the right hippocampus.

Provided that tau pathology starts within anterior subhippocampal regions in early AD, our findings that subhippocampal, not hippocampal, involvement underlies the inability of the patients to benefit from PEK open innovative clinical and research perspectives.

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A meta-analysis of semantic memory in Mild cognitive impairment

Ludovic Gardy [a,b,*], Sven Joubert [c,d], Mira Didic [e,f], Isabelle Rouleau [g,h], Emmanuel J. Barbeau [a,b]
[a] *Université de Toulouse, UPS, Centre de Recherche Cerveau et Cognition, Toulouse, France*
[b] *CNRS, CerCo, Toulouse, France,*
[c] *Centre de Recherche de l'Institut Universitaire de Gériatrie de Montréal (CRIUGM), Montreal, Quebec, Canada*
[d] *Département de Psychologie, Université de Montréal, Montreal, Quebec, Canada*
[e] *Service de Neurologie et de Neuropsychologie, Pôle de Neurosciences Cliniques, Centre Hospitalo-Universitaire de la Timone, AP-HM, Marseille, France*