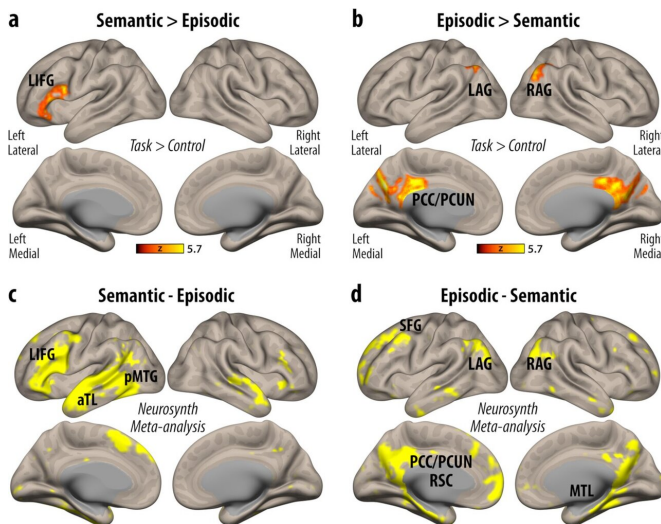


# Knowing how the brain retrieves facts may help people with memory disorders

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Differential brain activity patterns in the retrieval of long-term memory types. Credit: *Nature Communications* (2021). DOI: 10.1038/s41467-021-22443-2

A shared set of systems in the brain may play an important role in controlling the retrieval of facts and personal memories utilized in everyday life, new research shows.

Scientists from the University of York say their findings may have relevance to [memory disorders](#), including dementia, where problems remembering relevant information can impact on the daily life of patients.

Researchers say the findings may also have important implications for the development of a new generation of artificial intelligence systems, which use [long-term memory](#) in solving computational problems.

The [brain](#)'s long-term memory stores are categorized into two: factual memory and memory of personal experiences.

Together, these two long-term memory stores help us understand and respond to the world around us.

Decades of clinical and [experimental research](#) has shown that these two memory stores are represented across two separate brain regions.

But the new study suggests that a shared set of brain regions play an important role in controlling the successful retrieval of weak memories.

Using [functional magnetic resonance](#) imaging technology, researchers studied how these regions were shown to increase their activity when participants were asked to retrieve fact memories and [personal memories](#).

Lead researcher Dr. Deniz Vatansever, formerly of the University of York and now working for the Institute of Science and Technology for Brain-inspired Intelligence, Fudan University said: "The new research suggests that despite their functional differences, successfully retrieving weak information from these two memory systems might be dependent upon a shared brain mechanism.

"Our memories allow us to make sense and flexibly interact with the world around us. Although in most cases, our strongly encoded memories might be sufficient for the task at hand, remembering to pack a beach towel for an upcoming seaside holiday, this strong memory may be irrelevant in other instances, such as when packing for a business trip. As such, we need to tightly control the retrieval of relevant memories to solve different tasks under different circumstances. Our results indicate that this control process might be shared across both factual and personal memory types."

Senior author Prof. Elizabeth Jefferies from the Department of Psychology, University of York, said: "In order to generate appropriate thoughts and behaviors, we have to draw on our memory stores in a highly flexible way. This new study highlights

control processes within the brain that allow us to focus on unusual aspects of the meanings of words and to retrieve weakly encoded personal experiences. This control over memory allows us to be creative and to adapt as our goals or circumstances change."

The research was supported by the European Research Council and the National Natural Science Foundation of China.

The paper, "Varying demands for cognitive control reveals shared neural processes supporting semantic and episodic [memory](#) retrieval" is published in *Nature Communications*.

**More information:** Deniz Vatansever et al. Varying demands for cognitive control reveals shared neural processes supporting semantic and episodic memory retrieval, *Nature Communications* (2021). [DOI: 10.1038/s41467-021-22443-2](https://doi.org/10.1038/s41467-021-22443-2)

Provided by University of York

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