

Interaction of medial and lateral temporal lobe in memory expression: Insights from patient and fMRI data

ABSTRACT:

Background

While a dog is a good example of a mammal, a bat is less so. Concept typicality, i.e., the degree to which a concept belongs to a category, has for long been known as critical to structuring conceptual knowledge. Recently, it has also been recognized as important in episodic memory, although the way this semantic dimension shapes episodic retrieval is still unclear.

Aim of the study

We explored the interaction between semantic and episodic memory, in particular how concept typicality, a key dimension in semantic organization, modulates the neurocognitive bases of episodic retrieval.

Method

A behavioural and an fMRI study with healthy young adults explored concept typicality effects on both semantic and episodic decisions. In a semantic task, participants saw a category (e.g., mammal) followed by typical (e.g., dog) or atypical (e.g., bat) item and decided if the item belonged to the category. In a subsequent memory retrieval task, previously seen items and new ones were shown and participants indicated if the item was old or new.

Results

Participants were faster and more accurate to categorize typical than atypical items. Interestingly, the memory retrieval task revealed the opposite effect with better retrieval of atypical items. At a neural level, retrieval of atypical items (relative to new ones) involved a large network including lateral temporal cortices bilaterally, left lateral and medial prefrontal, and bilateral angular gyrus. Conversely, retrieval of typical items only showed posterior cingulate and superior parietal activation.

Conclusion

During retrieval of atypical items, the lateral temporal cortex, critical in the storage of semantic features, interplays with lateral and medial prefrontal areas, involved in semantic elaboration and monitoring. Atypical items carry distinctive features (e.g., a bat is a flying mammal) that are more related to the memory decision. These distinctive events induce greater semantic elaboration, via fronto-temporal interactions, which promote episodic retrieval.

Keywords

Concept typicality, Semantic memory, Episodic retrieval, Fronto-temporal interactions

Os textos são da exclusiva responsabilidade dos autores
All texts are of the exclusive responsibility of the authors

Published Work:

Alves, M., Marques, J. F. & Raposo, A. (in press). Is it a bird? Differential effects of concept typicality on semantic memory and episodic recollection. *Revista Portuguesa de Psicologia*.

Researcher's Contact:

Ana Raposo
Faculdade de Psicologia da Universidade de Lisboa
Alameda da Universidade
1649-013 Lisboa, Portugal
Phone: +351 217 943 867
Email: alraposo@psicologia.ulisboa.pt