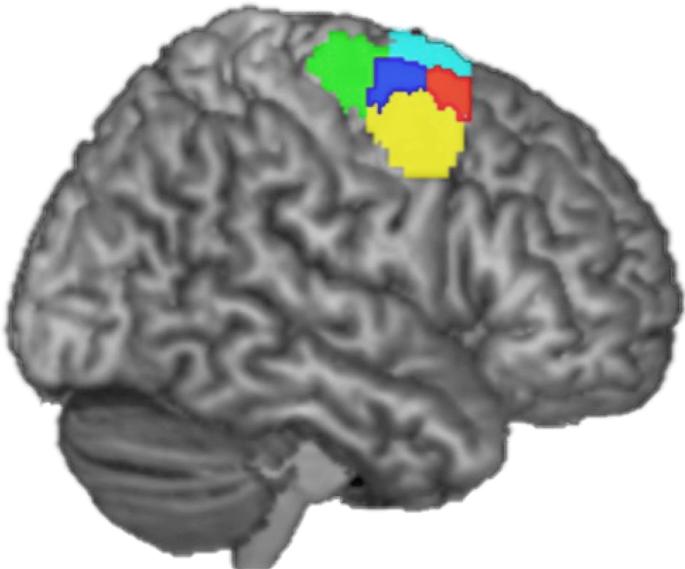


# Behavioral profiling across large-scale activation data to understand cognitive information processing

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Cognitive Neuroinformatics Group  
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# Connectivity-based parcellation (CBP)

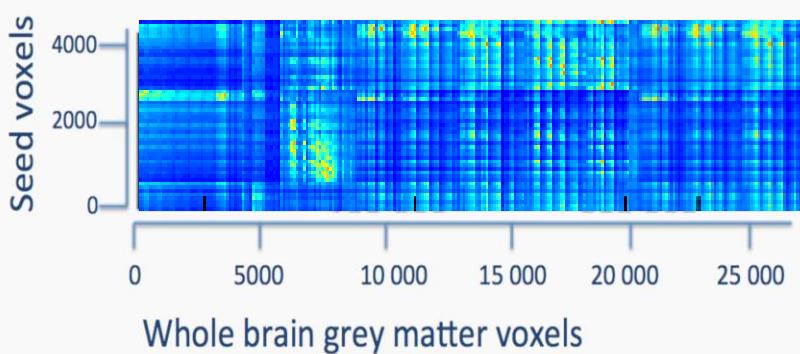


## 1) Region of Interest:

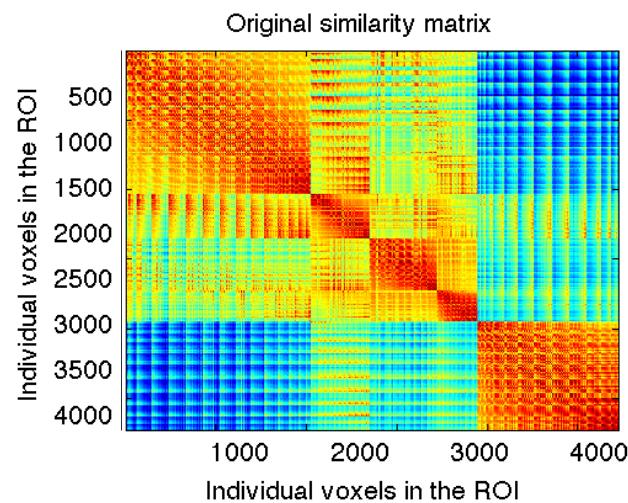
Dorsal Premotor Cortex:

*Interface between prefrontal and primary motor*

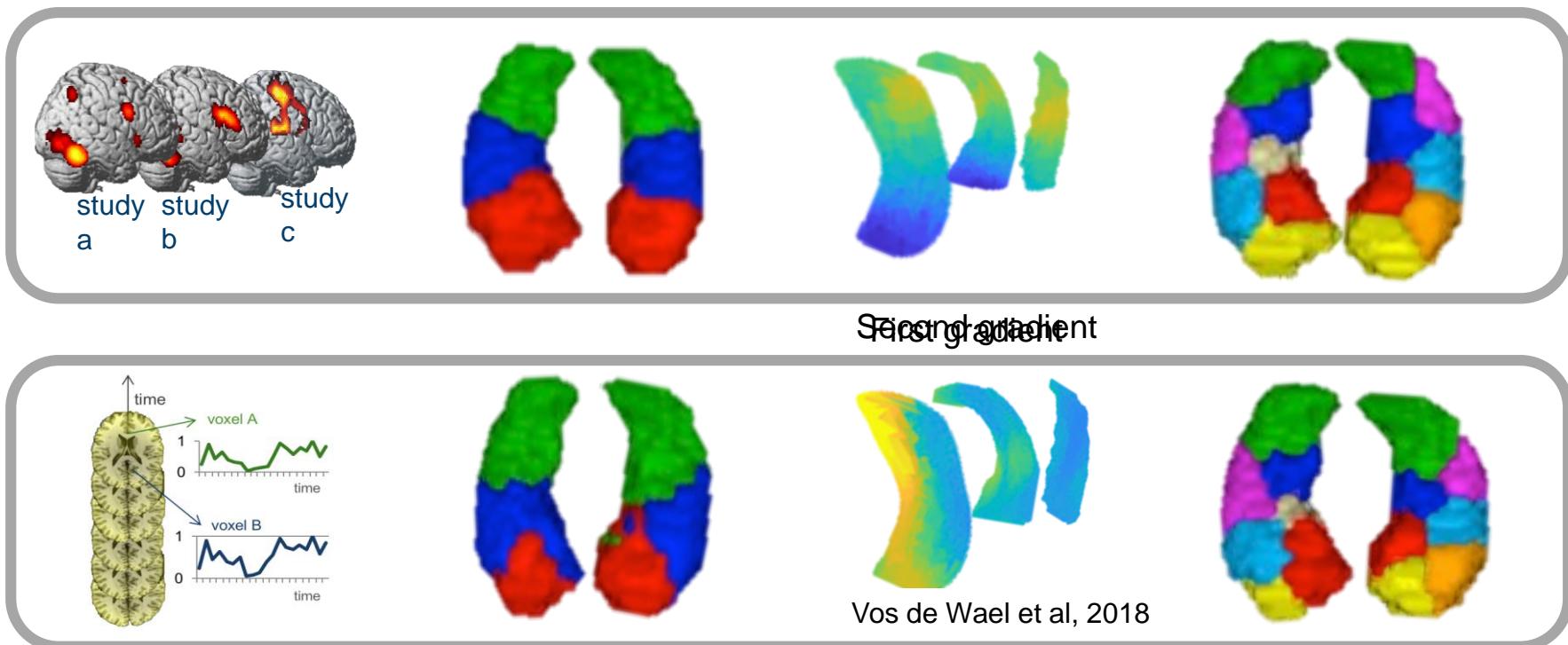
## 2) Connectivity matrix



## 3) Clustering/factorization



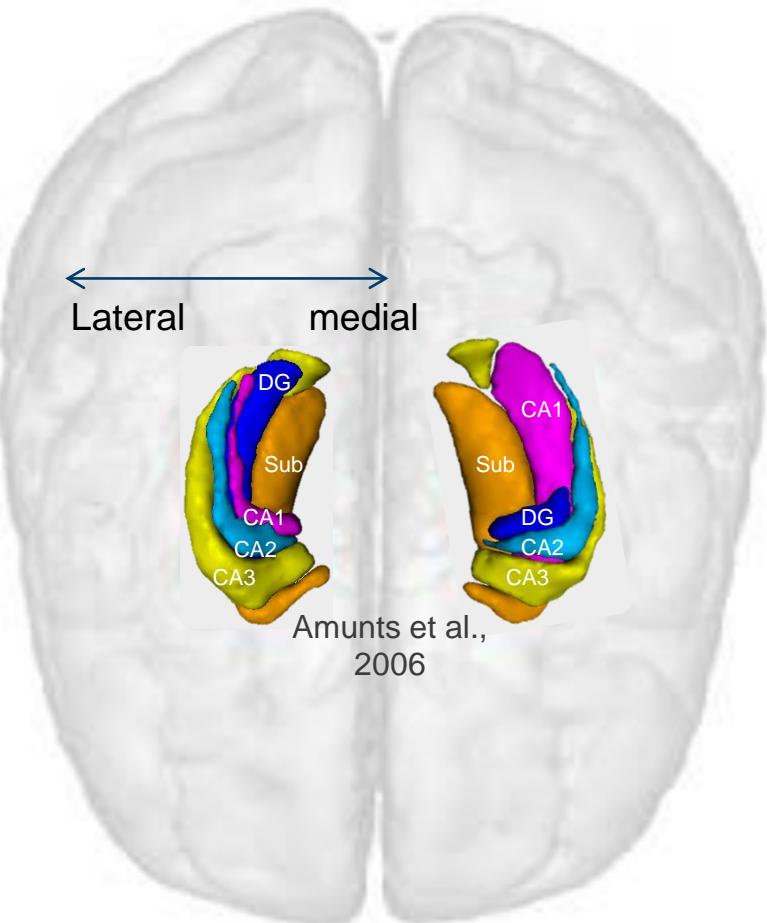
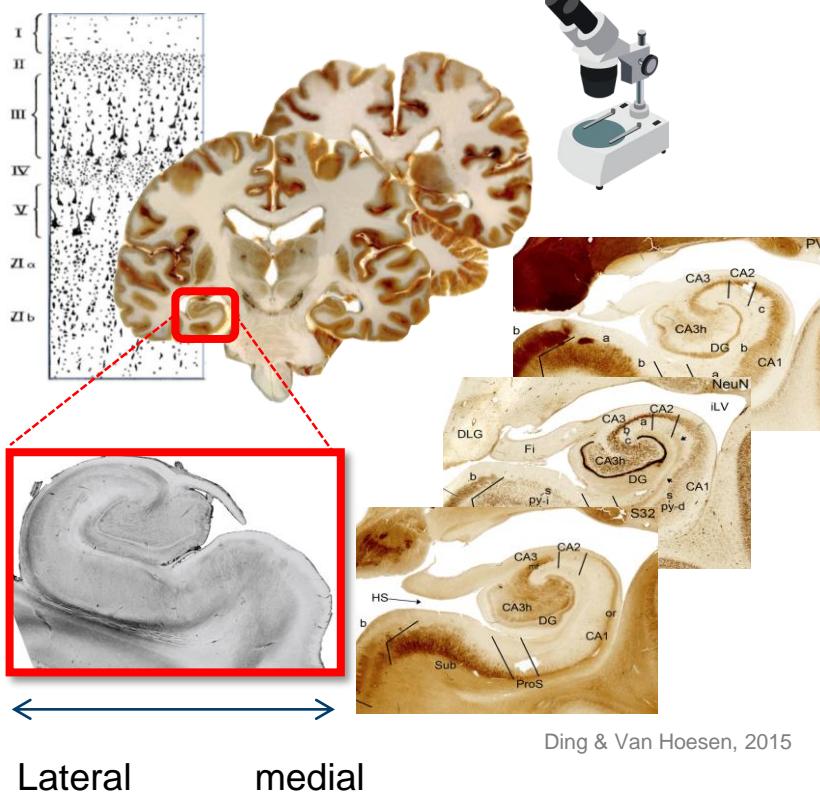
# Functional organization of the human hippocampus



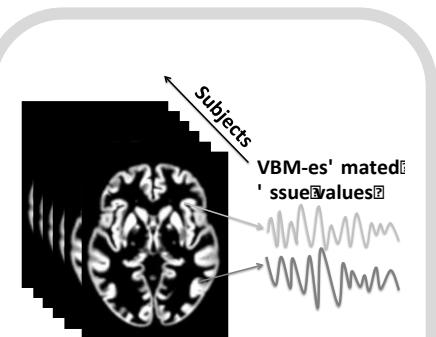
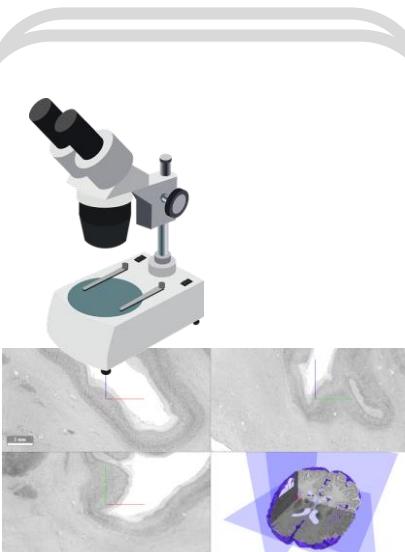
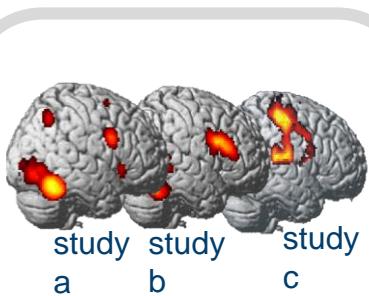
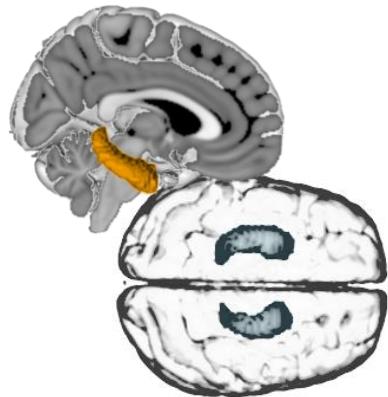
# The human hippocampus

## Hippocampus organization based on local microstructure

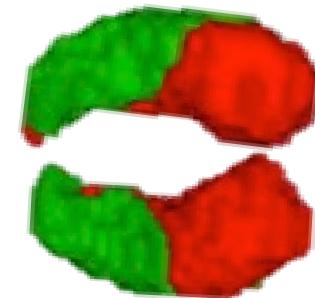
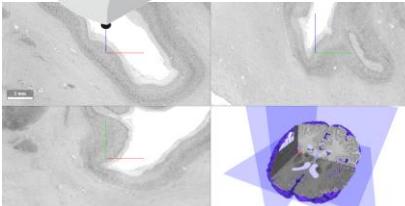
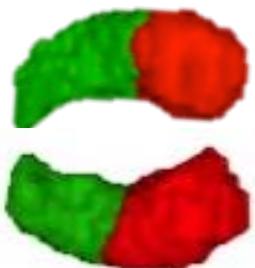
### Local microstructure



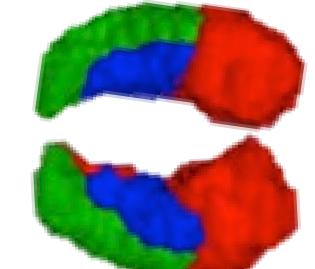
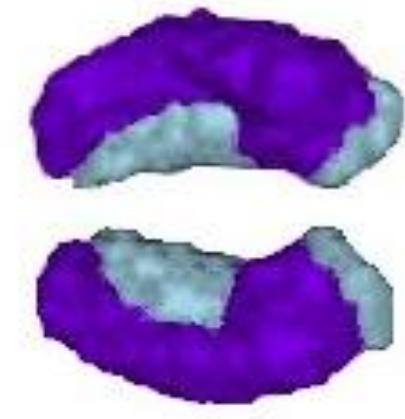
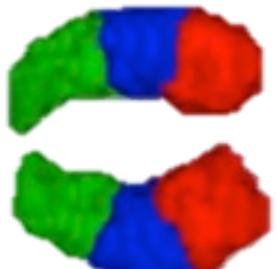
# Connectivity-based parcellation



2k

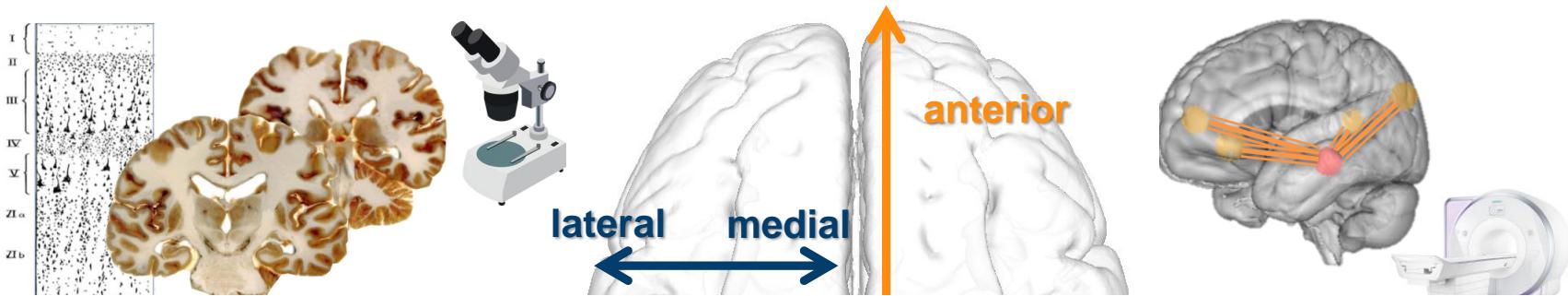


3k

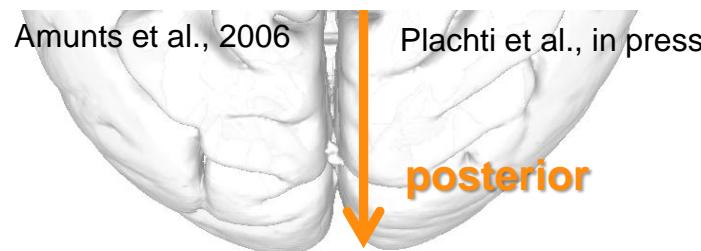


# Characterizing brain organization

- Not one map of the brain

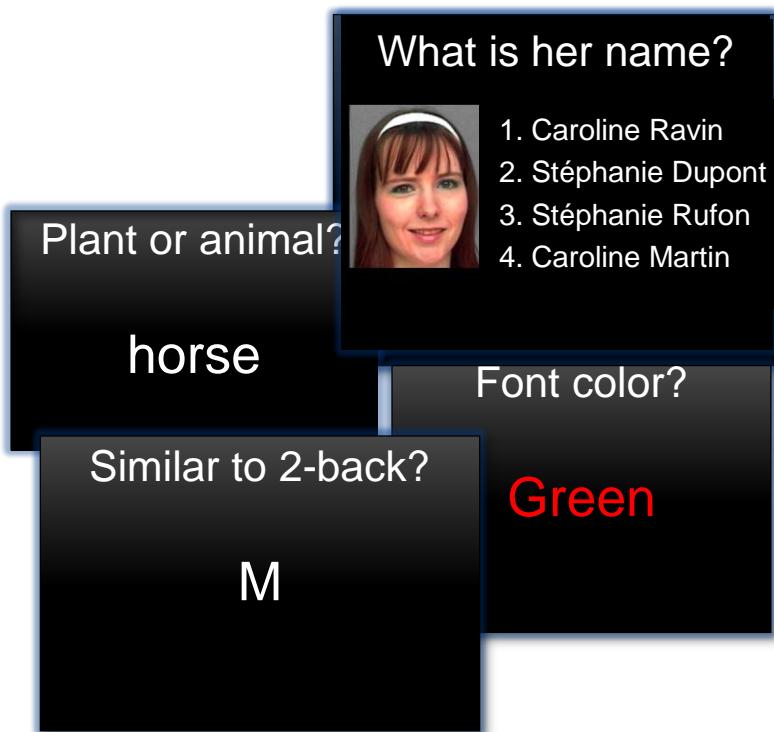


What do these organizational **dimensions** reflect in terms of cognitive information processing ?



- Beyond regions and network: gradients/organizational dimensions

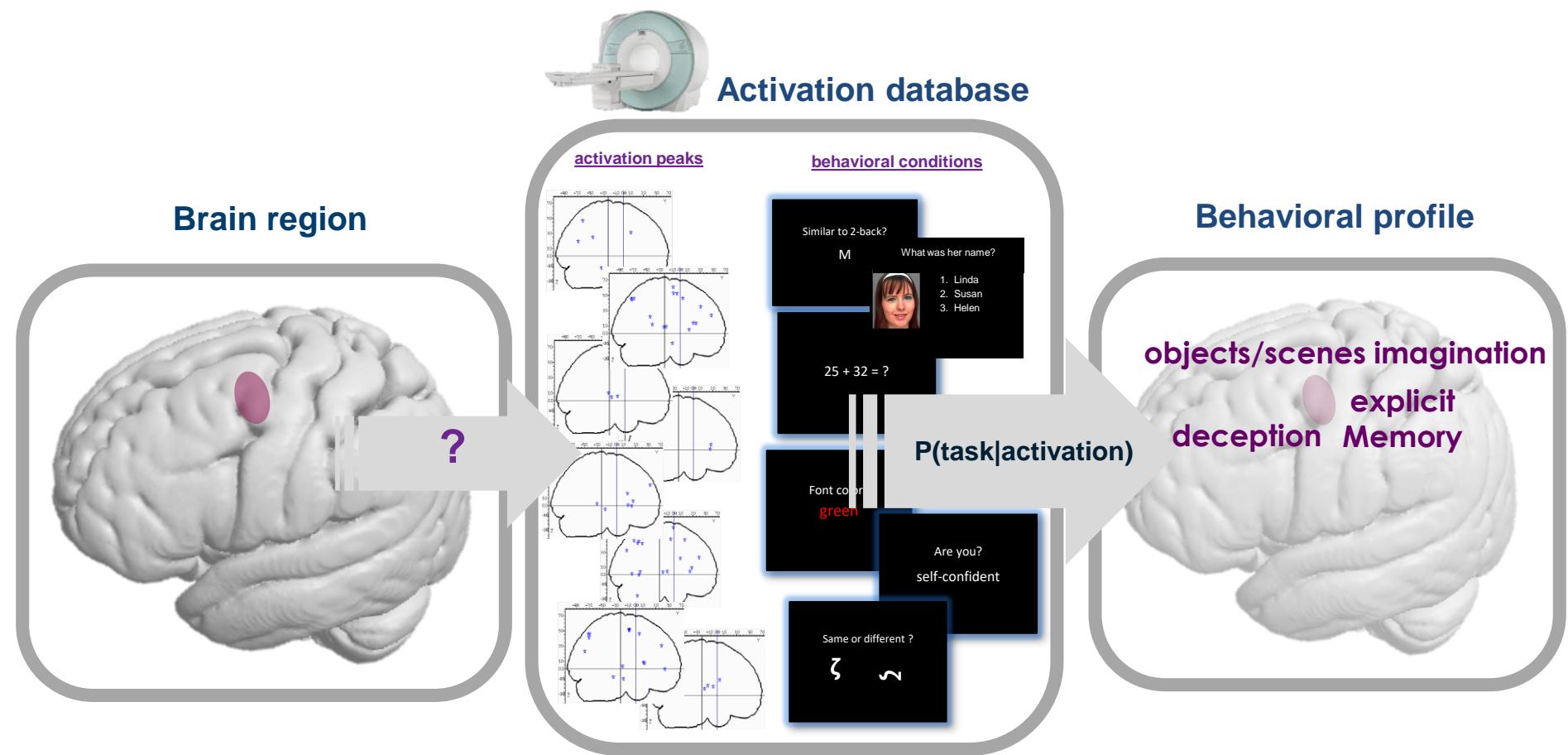
# Relating brain organization to behavioral functions with activations databases



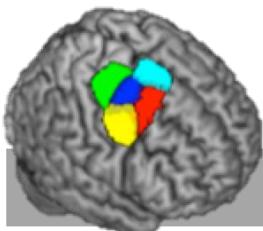
**BrainMap:**  
>> 3200 papers (> 16380 experiments)

**Neurosynth:**  
>> 11400 papers

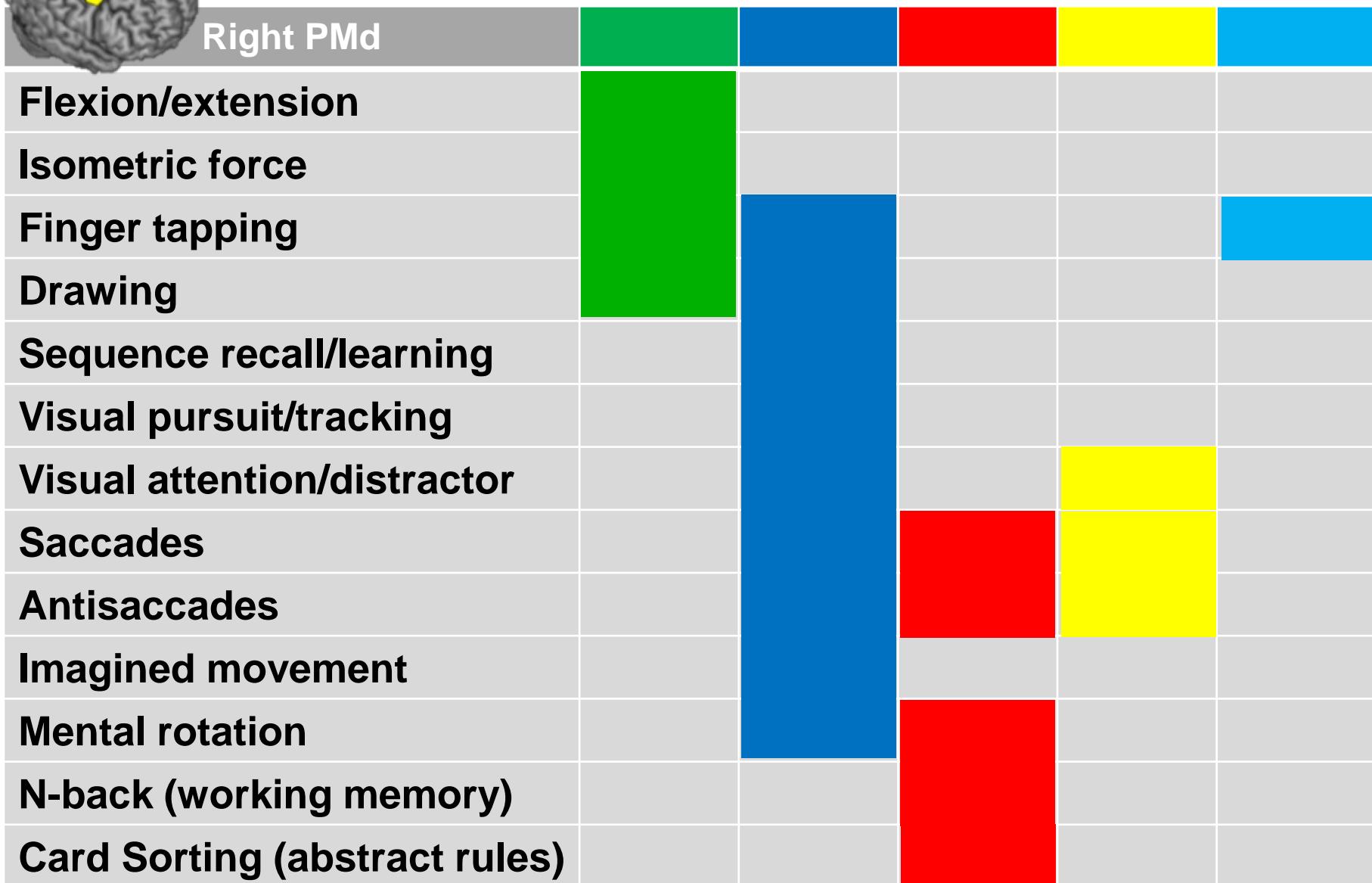
# Behavioral profiling



**Reverse Inference:  $P(\text{task}|\text{activation})$**

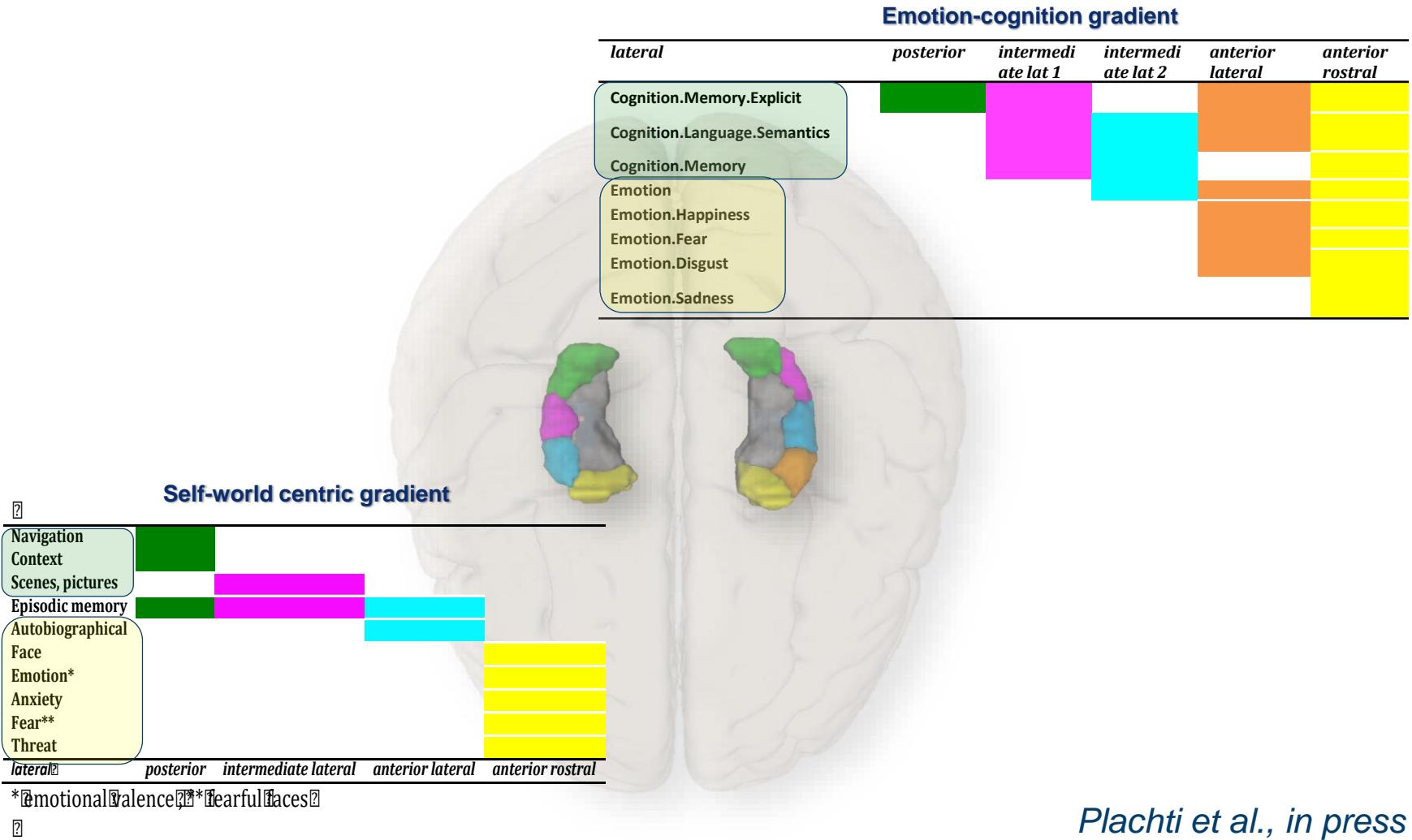


## Task activation data



# Characterizing the anterior-posterior gradient of the human hippocampus

Associated behavioral functions in activations databases



# Behavioral profiling based on activation results aggregation

## SCIENTIFIC DATA

A graphic consisting of a grid of blue binary digits (0s and 1s) arranged in a roughly triangular shape, representing digital data.

OPEN

### Data Descriptor: Individual Brain Charting, a high-resolution fMRI dataset for cognitive mapping

Ana Luísa Pinho<sup>1,2,3</sup>, Alexis Amadon<sup>2</sup>, Torsten Ruest<sup>1,2,3</sup>, Murielle Fabre<sup>2,3,4,5,6</sup>, Elvis Dohmatob<sup>1,2,3</sup>, Isabelle Denghien<sup>2,3,4,5,6</sup>, Chantal Ginisty<sup>2,7</sup>, Séverine Becuwe-Desmidt<sup>2,7</sup>, Séverine Roger<sup>2,7</sup>, Laurence Laurier<sup>2,7</sup>, Véronique Joly-Testault<sup>2,7</sup>, Gaëlle Médiouni-Cloarec<sup>2,7</sup>, Christine Doublé<sup>2,7</sup>, Bernadette Martins<sup>2,7</sup>, Philippe Pinel<sup>2</sup>, Evelyn Eger<sup>2,3,4,5,6</sup>, Gaël Varoquaux<sup>1,2,3</sup>, Christophe Pallier<sup>2,3,4,5,6</sup>, Stanislas Dehaene<sup>2,3,4,5,6,8</sup>, Lucie Hertz-Pannier<sup>2,5,7,9</sup>, & Bertrand Thirion<sup>1,2,3</sup>

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# Conclusions and perspectives:

## Behavioral profiling of parcellation maps

- As a proof of concept, behavioural profiling across activation data of the PMd rostro-caudal organization highlights a cognitive-motor gradient.
- Behavioural profiling along the hippocampus longitudinal axis supports a cognitive-motor gradient and further suggests a self-word centric gradient

## Perspectives: resources

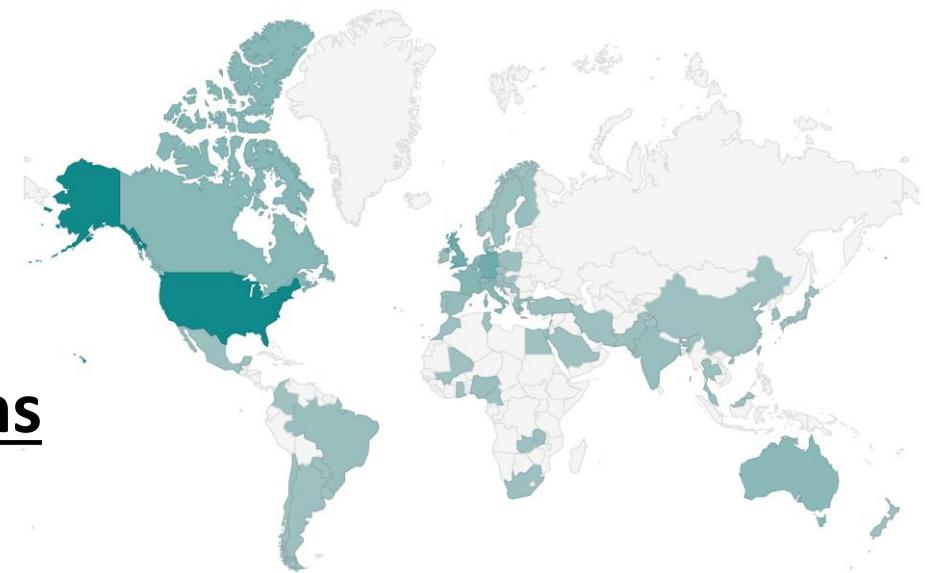
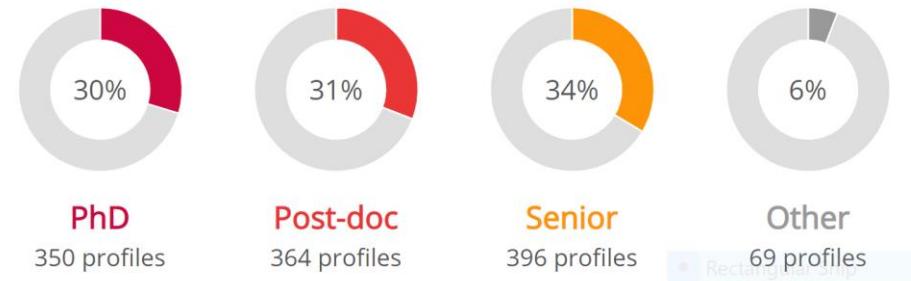
- Individual Brain Charting data

# Repository for Women in Neuroscience

- [www.winrepo.org](http://www.winrepo.org)
- over 1,100 profiles
- easy search
- recommendations

## Support the project:

- sign up
- spread the word
- **submit recommendations**



# THANK YOU



## Cognitive Neuroinformatics Lab



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