




澳門大學
UNIVERSIDADE DE MACAU
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*The 1st
International Symposium
on Addiction
and Decision Making*

Every individual makes a difference: A trinity derived from linking individual brain morphometry, functional connectivity and mentalising abilities

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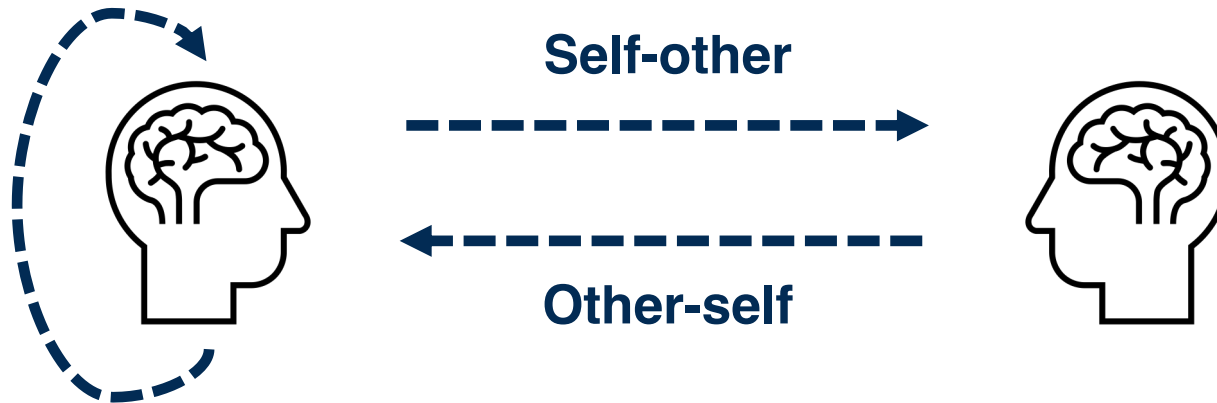
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Introduction

Mentalising abilities is a pivotal and fundamental component of human social cognition.

Metacognition

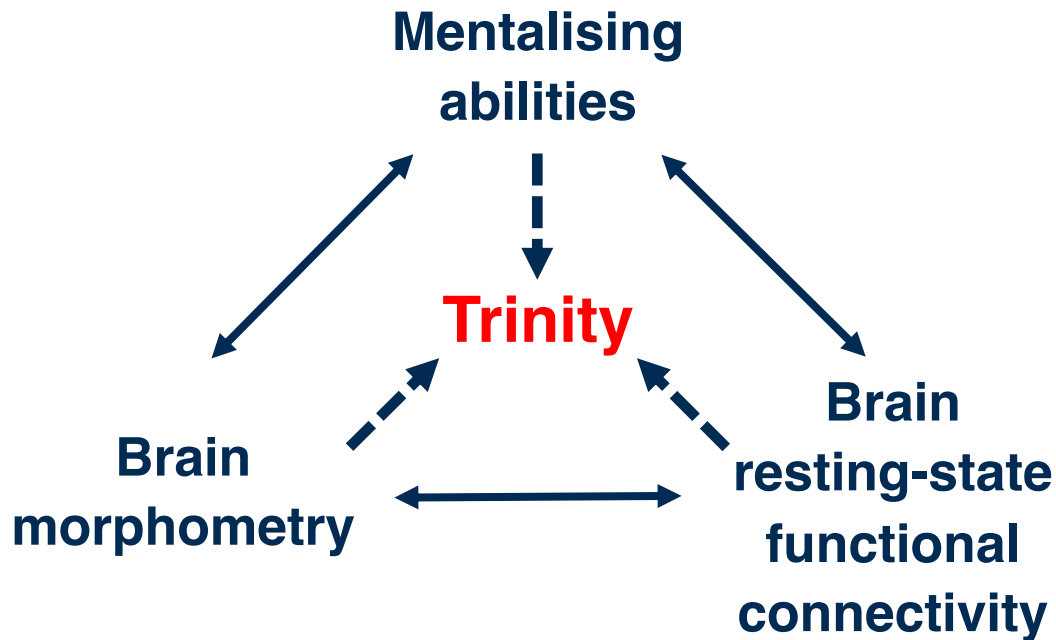


Little research: Mapping inter-individual variability in mentalising abilities to the brain.

Even less research: Examining the associations between mentalising abilities, and different neuroimaging modalities.

Introduction

Towards building a trinity by filling these gaps

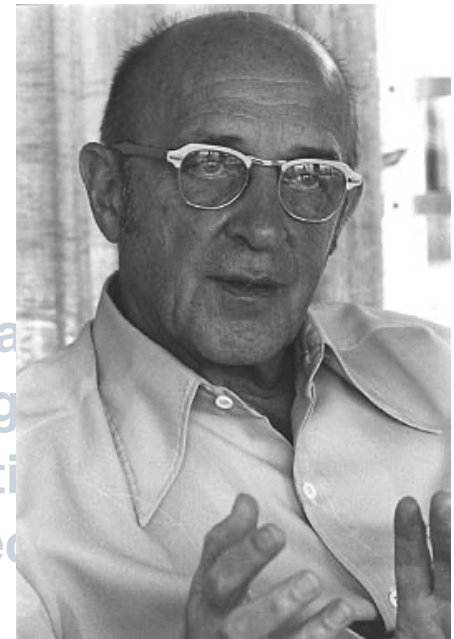
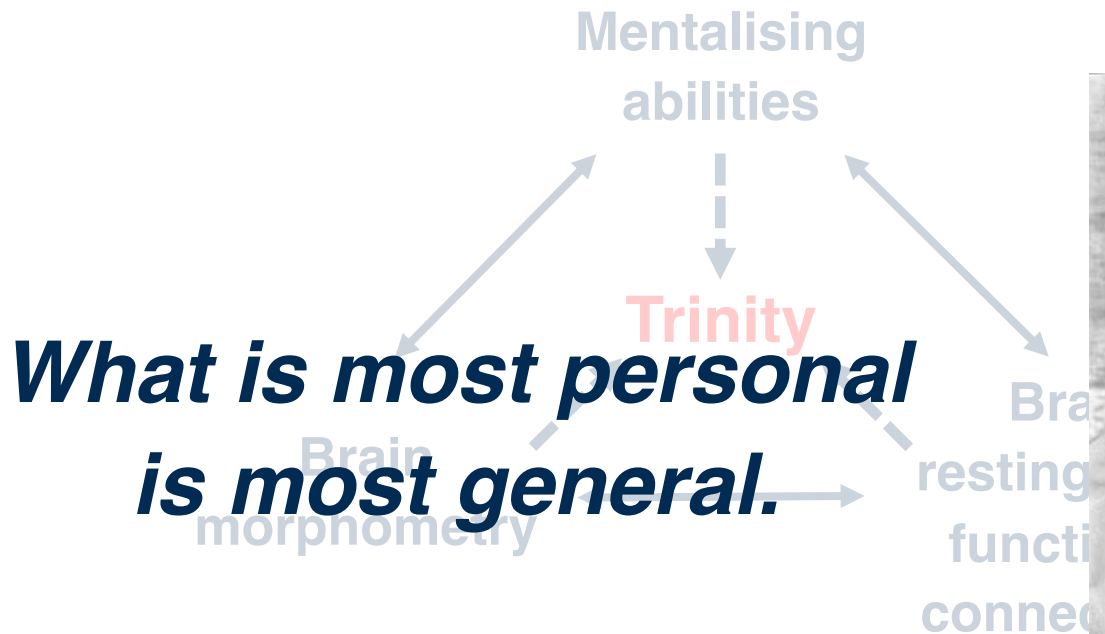


Brain: Amygdala and Hippocampus

How do we build such a trinity by pulling out variance related with all three?

Introduction

Towards building a trinity by filling these gaps



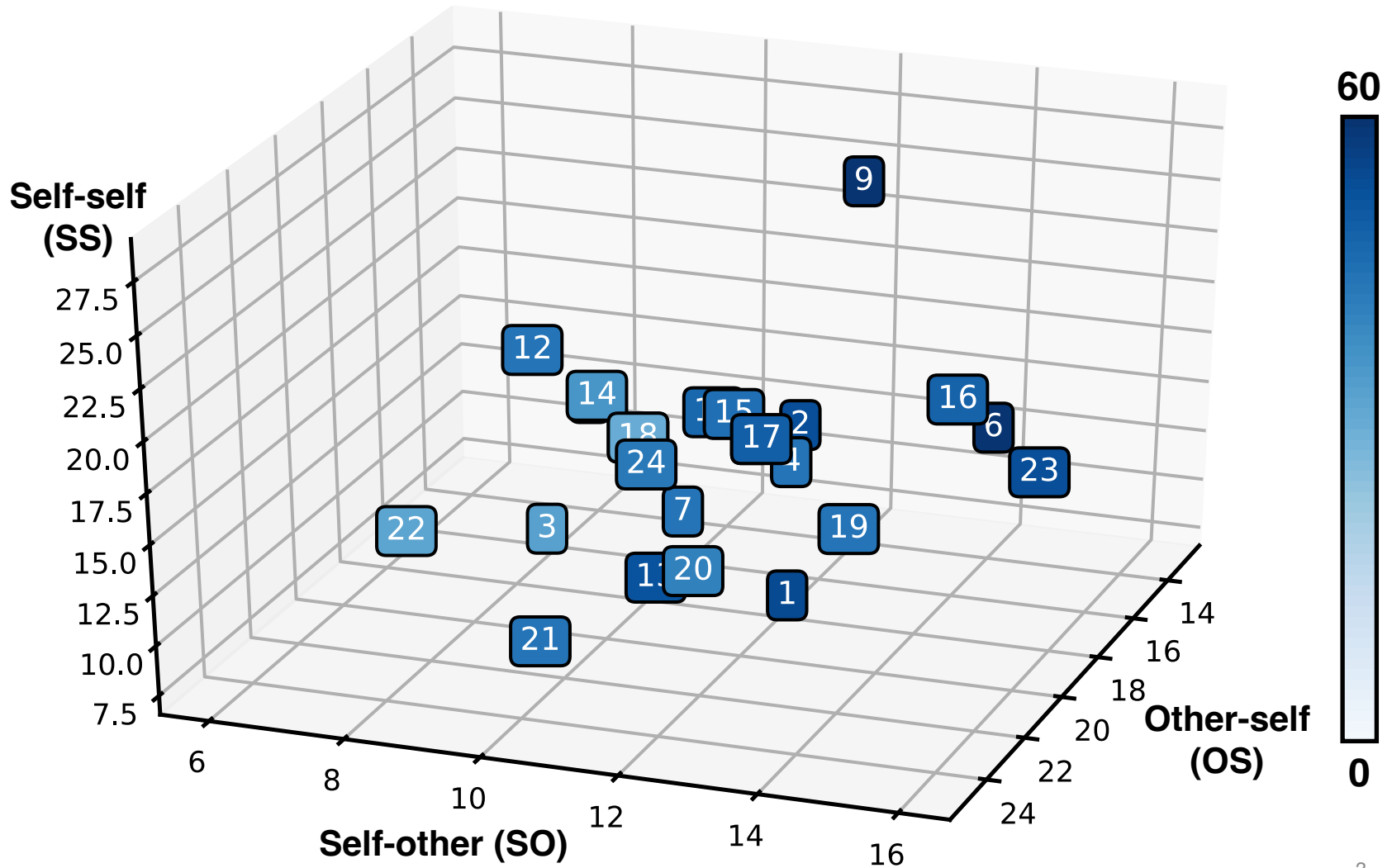
Brain: Amygdala and Hippocampus

Carl Rogers, (1956)

How do we build such a trinity by pulling out variance related with all three?

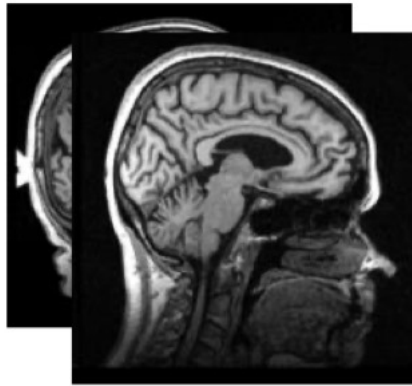
Methods

Mentalising abilities (ToM): SS, SO and OS

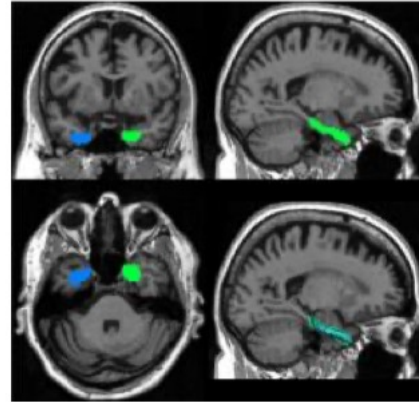


Methods

Multivariate morphometry statistics (MMS)



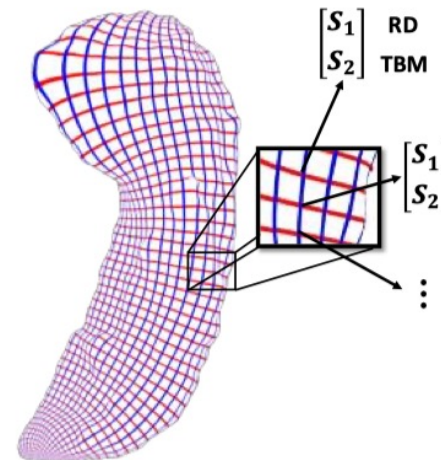
(a) MRI scans



(b) Hippocampal segmentation



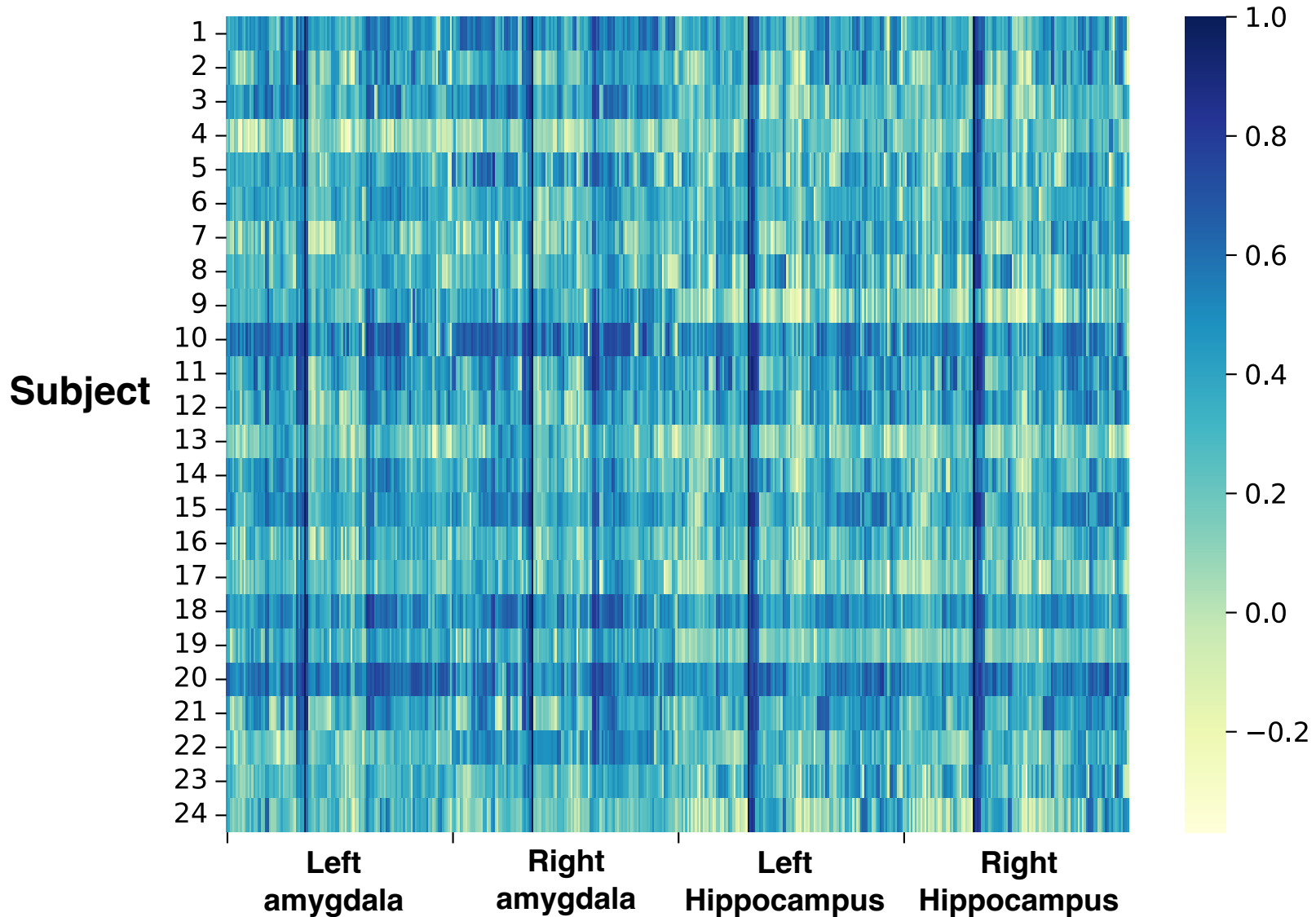
(c) Smoothed surface



(d) Radial distance and tensor-based morphometry

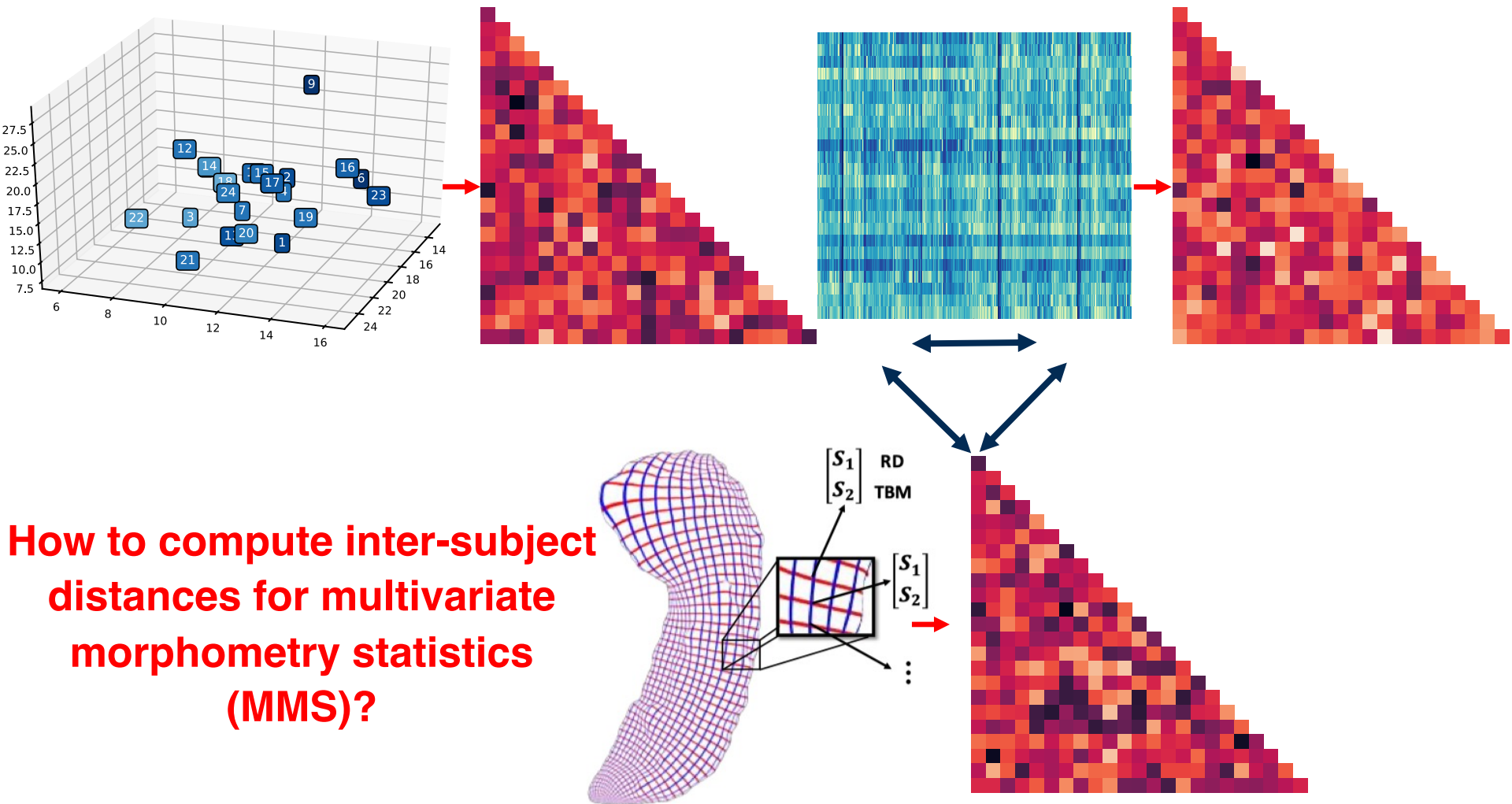
Methods

Resting-state functional connectivity (rs-FC)



Methods

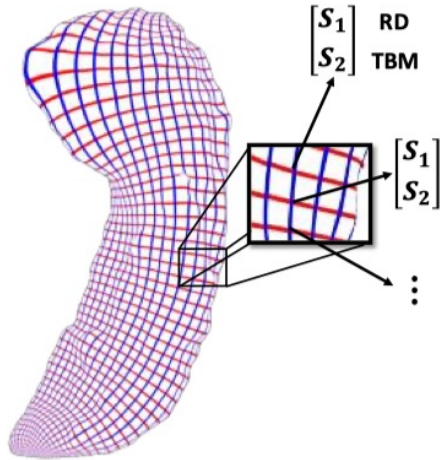
Inter-subject representational similarity analysis (IS-RSA)



How to compute inter-subject distances for multivariate morphometry statistics (MMS)?

Methods

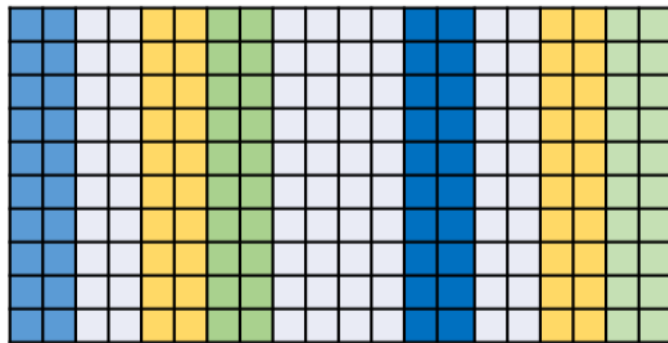
A novel way to compute inter-subject distances for MMS



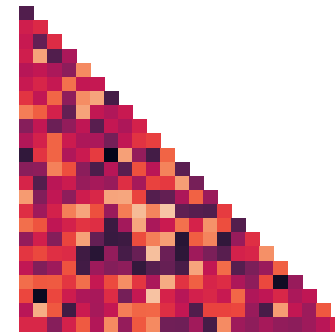
(a) Radial distance and tensor-based morphometry



(b) Patch the vertices and compute structural connectivity



(c) Pooling and reshape the features to a vector



(d) Compute the inter-subject distances

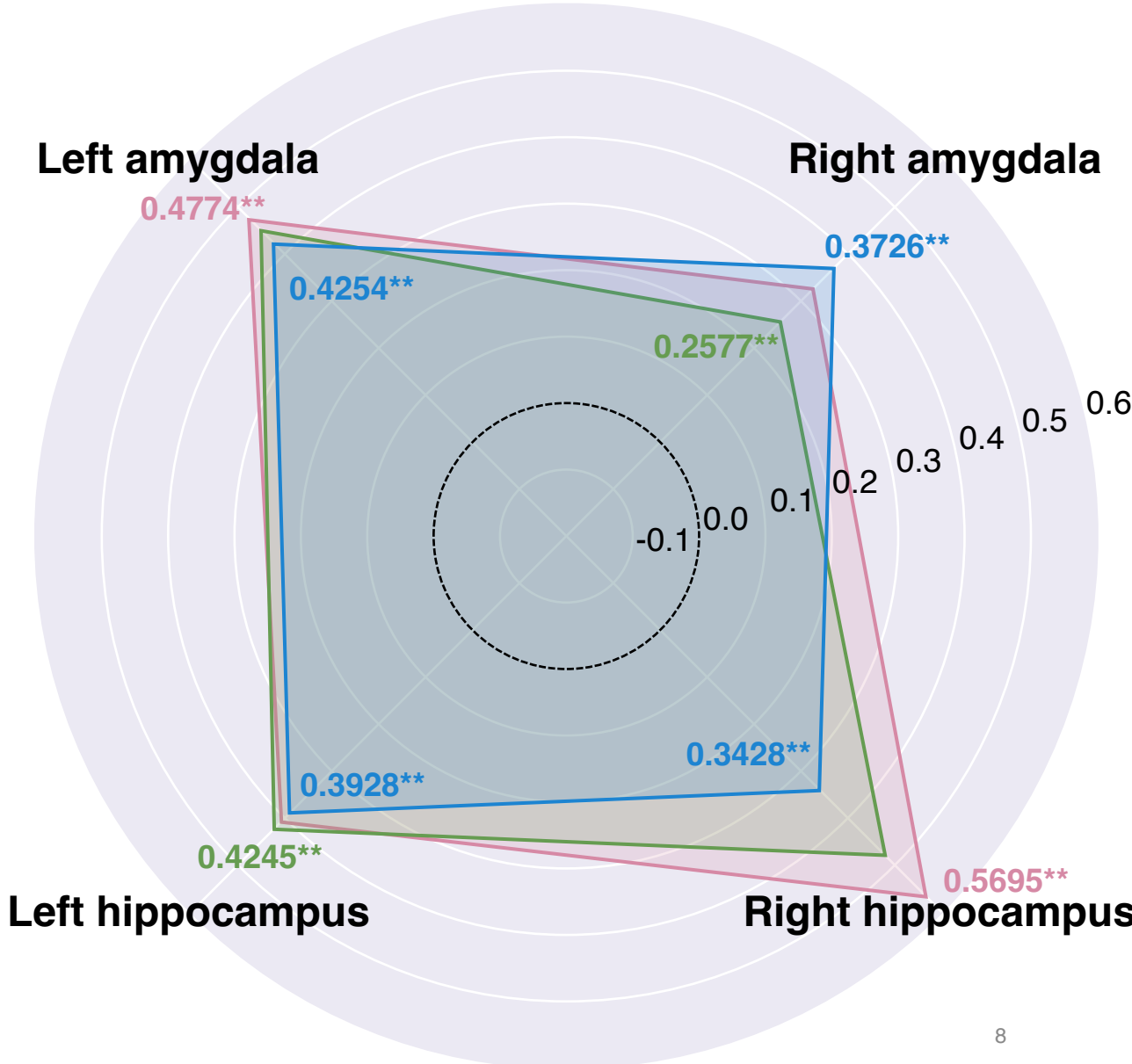
Results

MMS

ToM

- Self-self**
- Self-other**
- Other-self**

We applied Holm-Bonferroni correction to adjust for multiple comparisons (family-wise Type I error rate of 0.05).

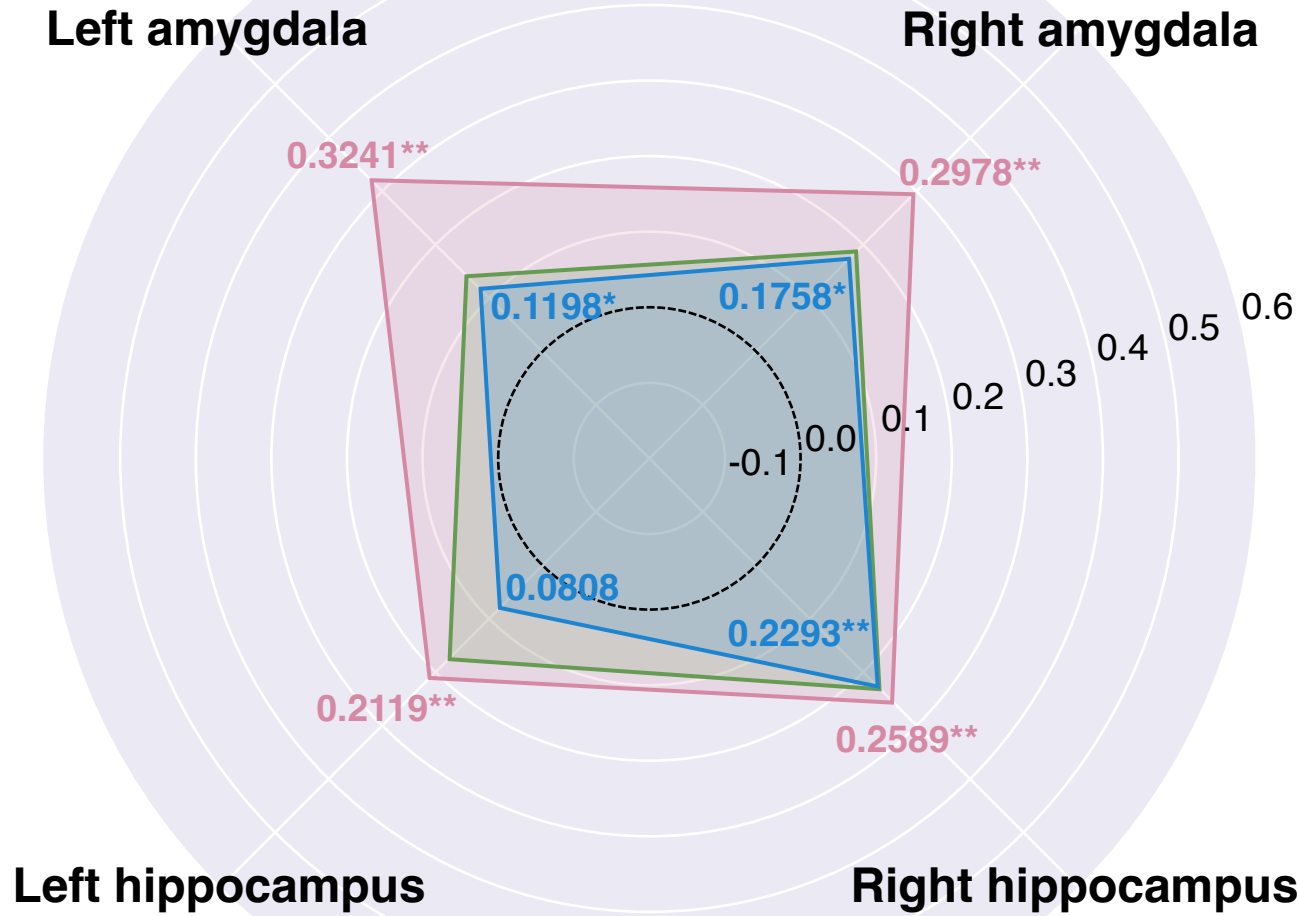


Results

rs-FC

ToM

- Self-self**
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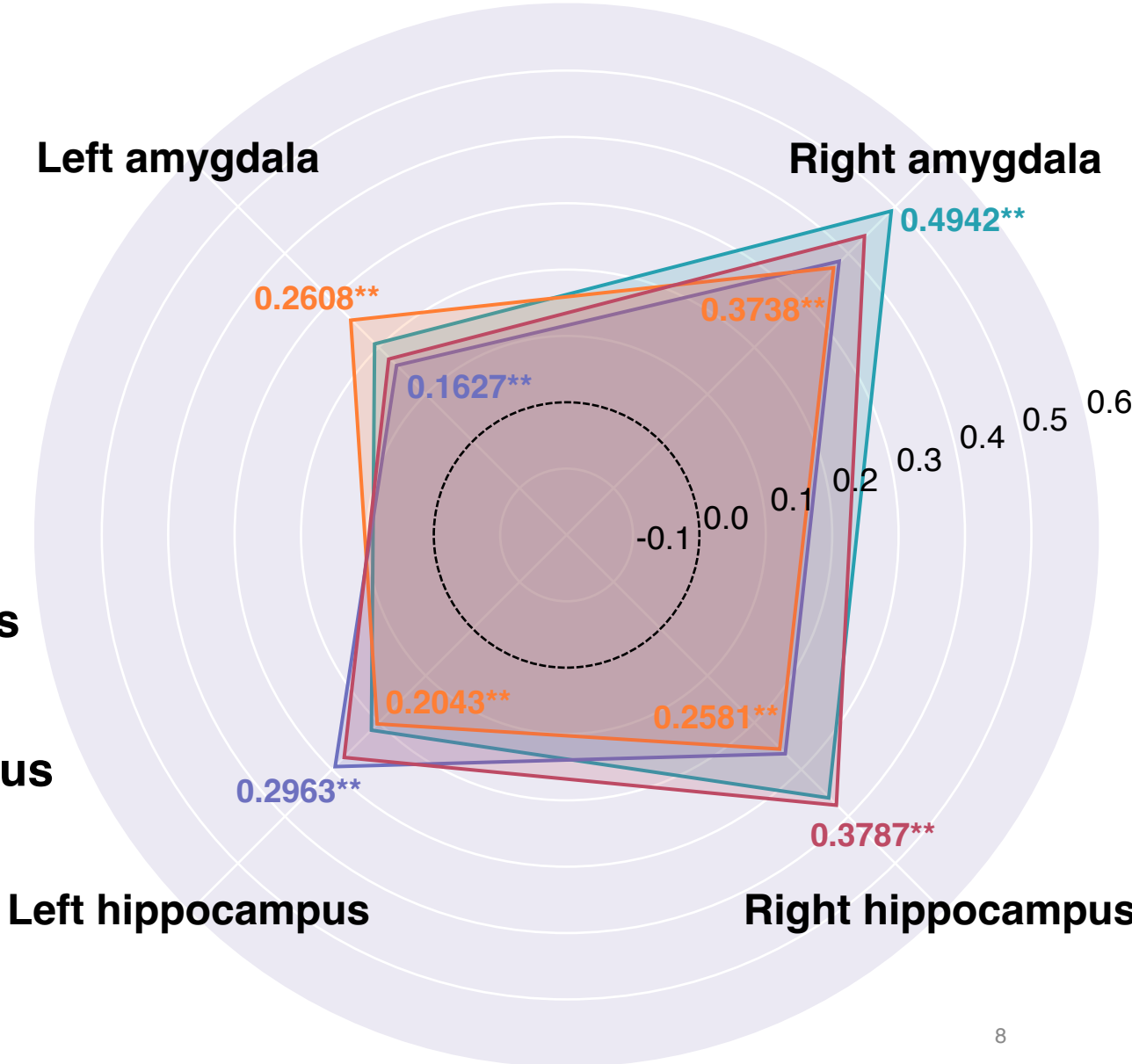
Results

MMS

rs-FC

- Left amygdala
- Right amygdala
- Left hippocampus
- Right hippocampus

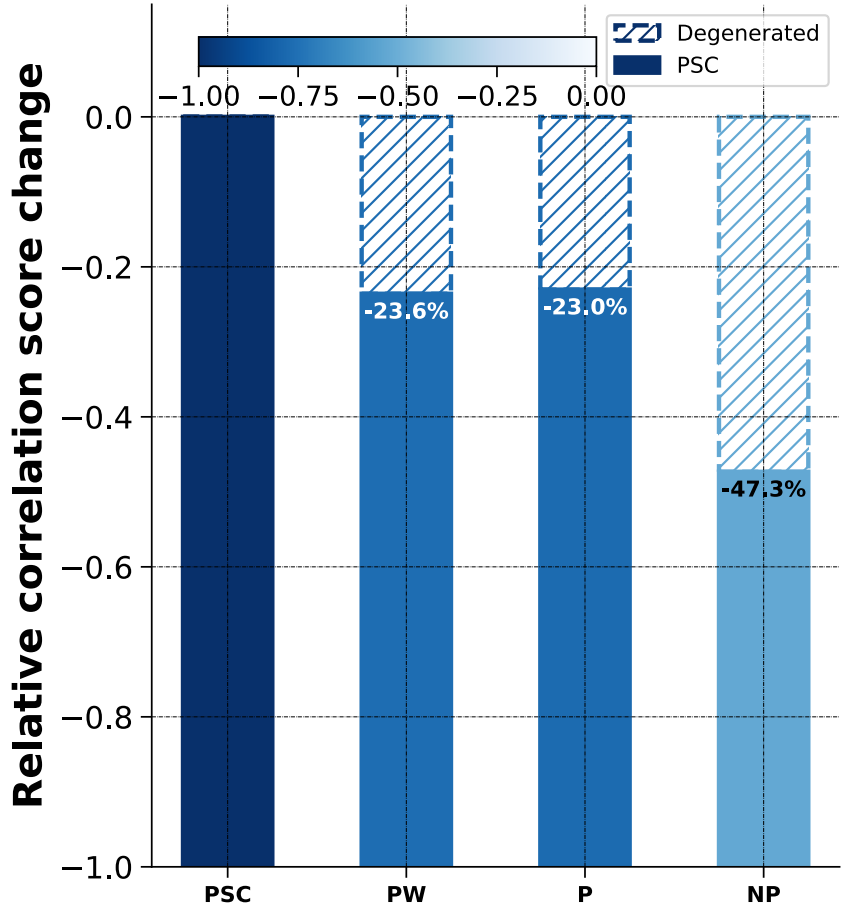
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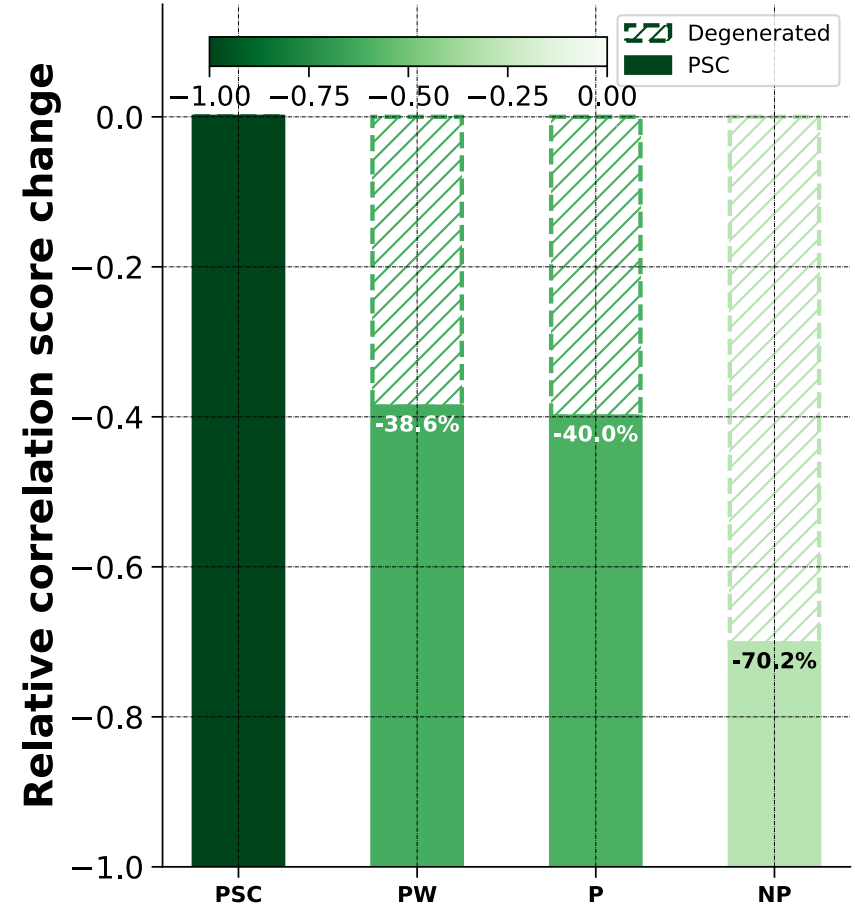
Results

Patching + structural connectivity (PSC) outperforms all other models

ToM vs MMS



rs-FC vs MMS



Summary

A trinity existed in idiosyncratic patterns of brain morphometry, resting-state functional connectivity and mentalising scores.

Demonstrated the feasibility of using IS-RSA to study individual differences, deepening the understanding of how individual brains give rise to their mentalising abilities.

Offered a promising way to compute inter-subject distances of multivariate morphometry statistics.

Summary

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Every individual matters.

Every individual has a role to play.

Every individual makes a difference.

Acknowledgement



Qunxi Dong



Bin Hu



Haiyan Wu

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Thanks for your attendance!