北京師範大學心理学部

Developmental Population Neuroscience

发展人口神经科学（国家地区和文化）

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Beijing Normal University

State Key Lab of Cognitive Neuroscience & Learning

National Basic Science Data Center

Chinese Data-sharing Warehouse for In-vivo Imaging Brain

Cultural Neuroscience: Biology of the Mind in Cultural Contexts

Heejung S. Kim[1] and Joni Y. Sasaki[2]

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The Annual Review of Psychology is online at http://psych.annualreviews.org
This article's doi: 10.1146/annurev-psych-010213-115040

Keywords
cultural psychology, genetics, brain imaging, neuroendocrinology, physiological responses

Abstract
This article provides a review of how cultural contexts shape and are shaped by psychological and neurobiological processes. We propose a framework that aims to culturally contextualize behavioral, genetic, neural, and physiological processes. Empirical evidence is presented to offer concrete examples of how neurobiological processes underlie social behaviors, and how these components are interconnected in larger cultural contexts. These findings provide some understanding of how the meanings shared by cultural experiences trigger a neurobiological, psychological, and behavioral chain of events, and how these events may be coordinated and maintained within a person. The review concludes with a reflection on the current state of cultural neuroscience and questions for the field to address.

Contents lists available at ScienceDirect
Developmental Review
journal homepage: www.elsevier.com/locate/dr

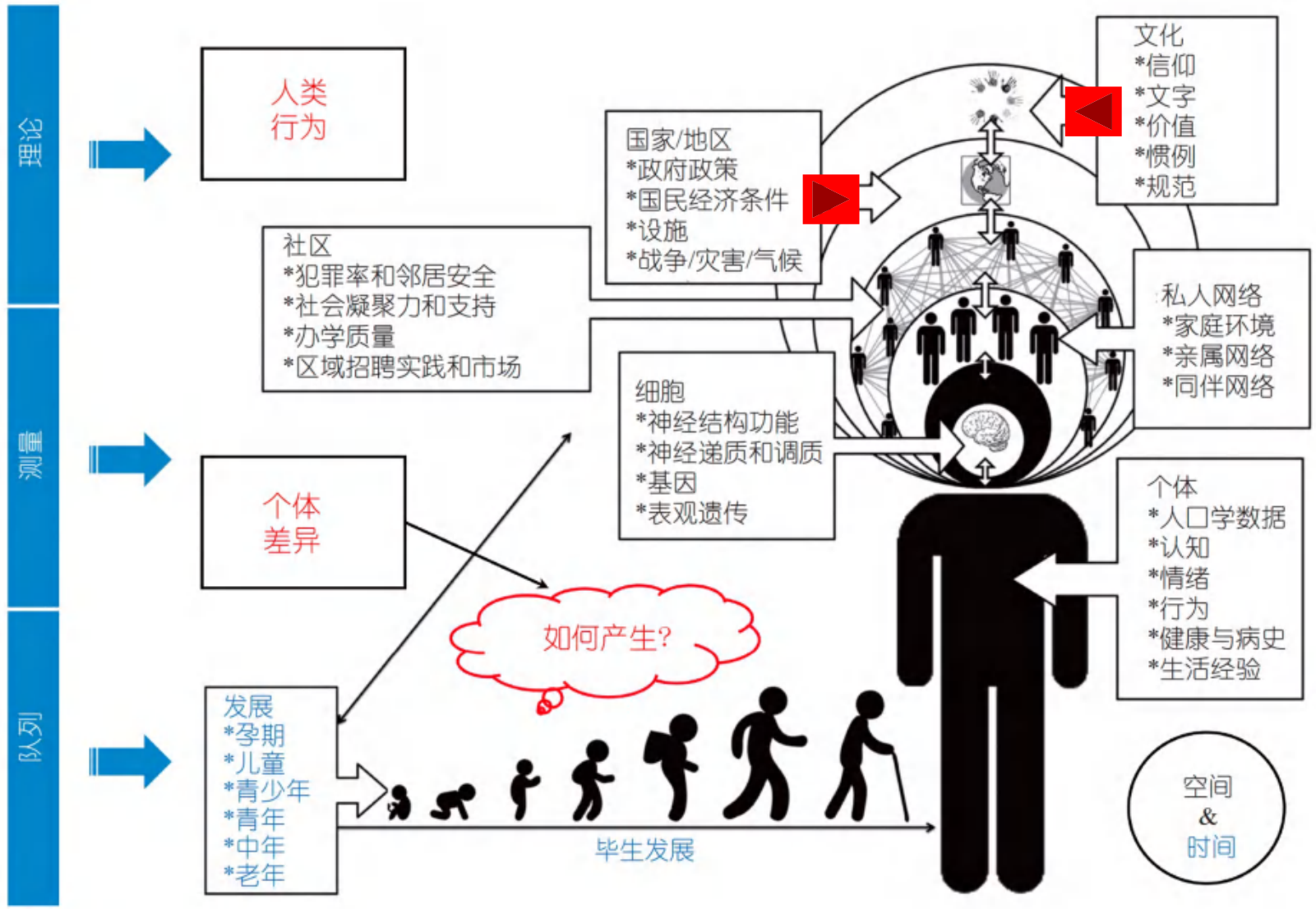
Developmental aspects in cultural neuroscience

Joan Y. Chiao*
International Cultural Neuroscience Consortium, United States

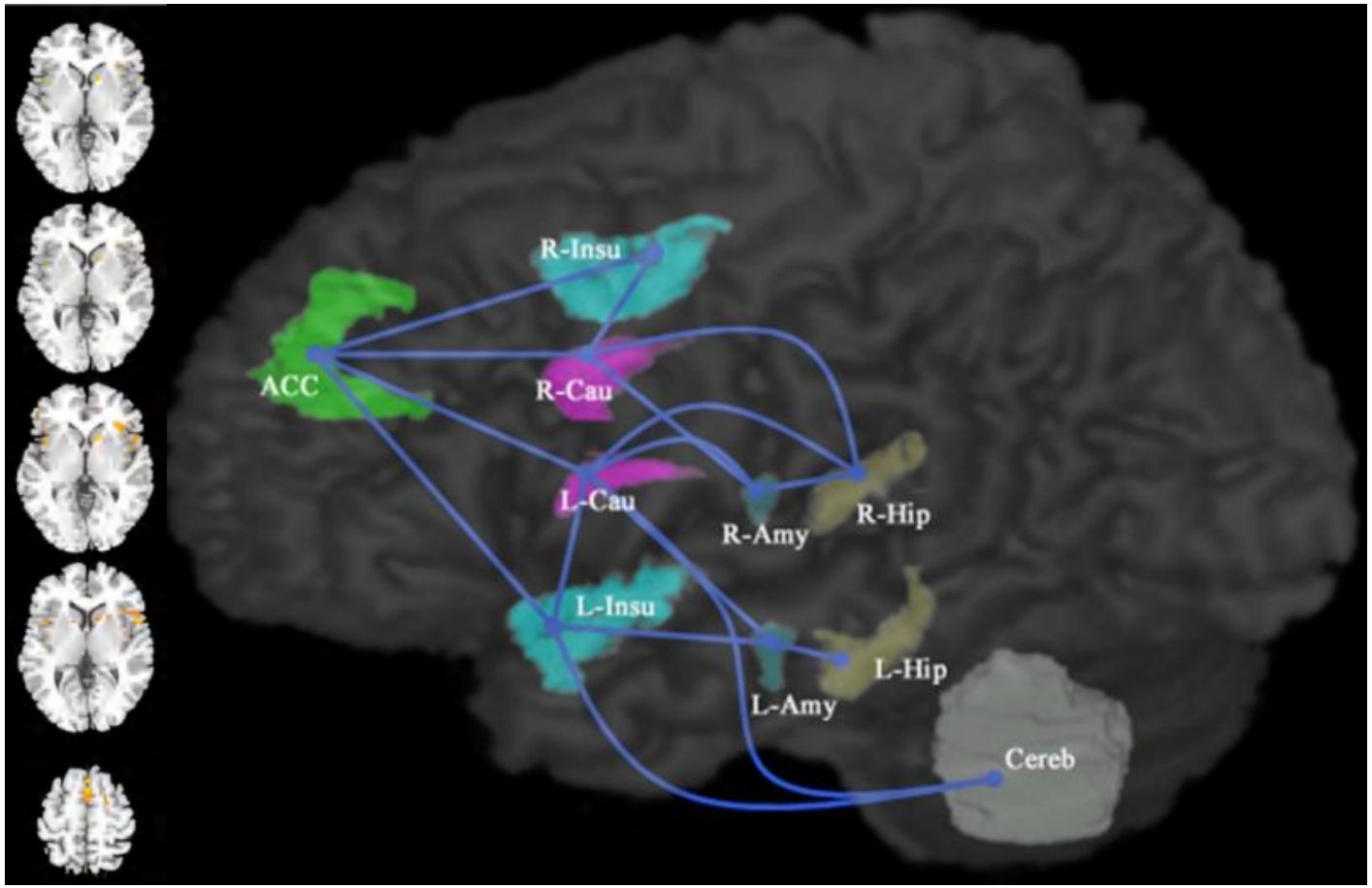
Contents lists available at ScienceDirect
Neuroscience and Biobehavioral Reviews
journal homepage: www.elsevier.com/locate/neubiorev

Cultural neuroscience and the research domain criteria: Implications for global mental health

Joan Y. Chiao[a,*], Shu-Chen Li[b,c], Robert Turner[d], Su Yeon Lee-Tauler[e]



Earthquake Changes Human Brain: China 2008 (8.0)



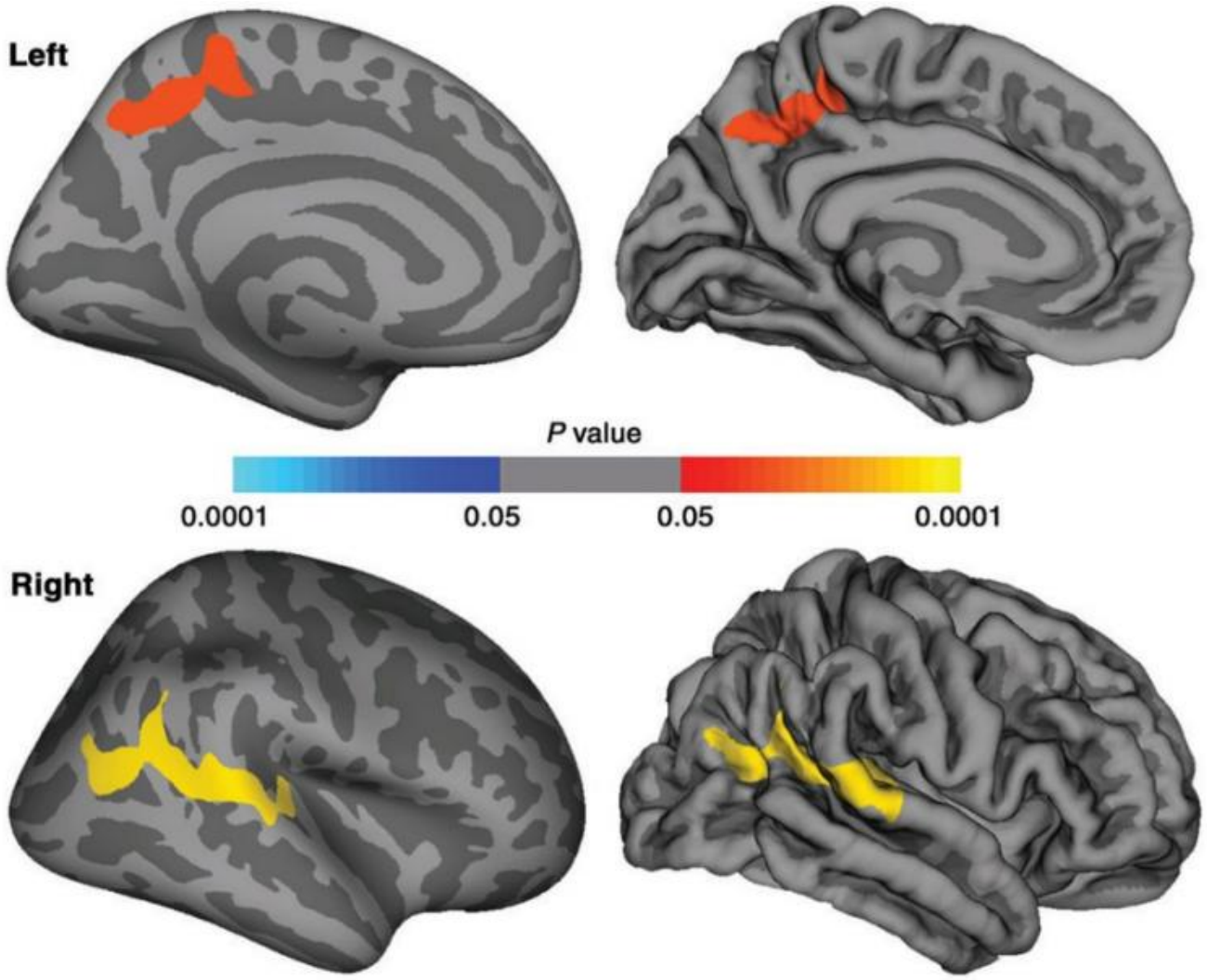
High-field MRI reveals an acute impact on brain function in survivors of the magnitude 8.0 earthquake in China

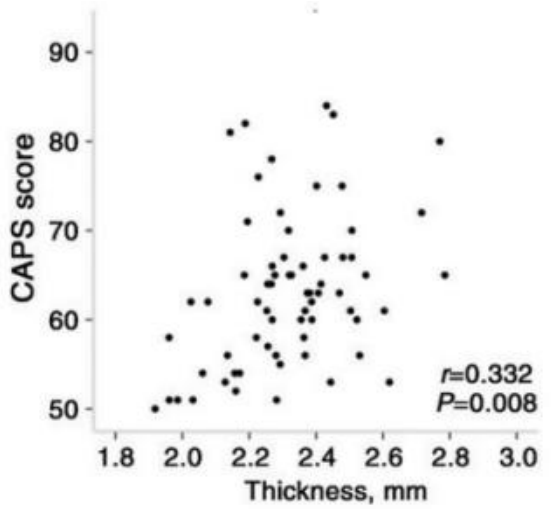
Su Lui[a], Xiaoqi Huang[a,b], Long Chen[a], Hehan Tang[a], Tijiang Zhang[a], Xiuli Li[a], Dongming Li[a], Weihong Kuang[a], Raymond C. Chan[c], Andrea Mechelli[d], John A. Sweeney[e], and Qiyong Gong[a,f,1]

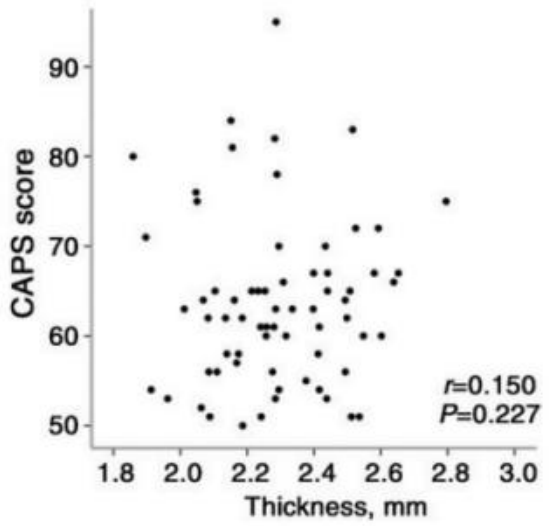
Besides the enormous medical and economic consequences, national disasters, such as the Wenchuan 8.0 earthquake, also pose a risk to the mental health of survivors. In this context, a better understanding is needed of how functional brain systems adapt to severe emotional stress. Previous animal studies have demonstrated the importance of limbic, paralimbic, striatal, and prefrontal structures in stress and fear responses. Human studies, which have focused primarily on patients with clinically established posttraumatic stress disorders, have reported abnormalities in similar brain structures. At present, little is known about potential

neuroimaging | stress | anxiety | depression | posttraumatic stress disorder

Natural Disasters Change Human Brain: Wenchuan

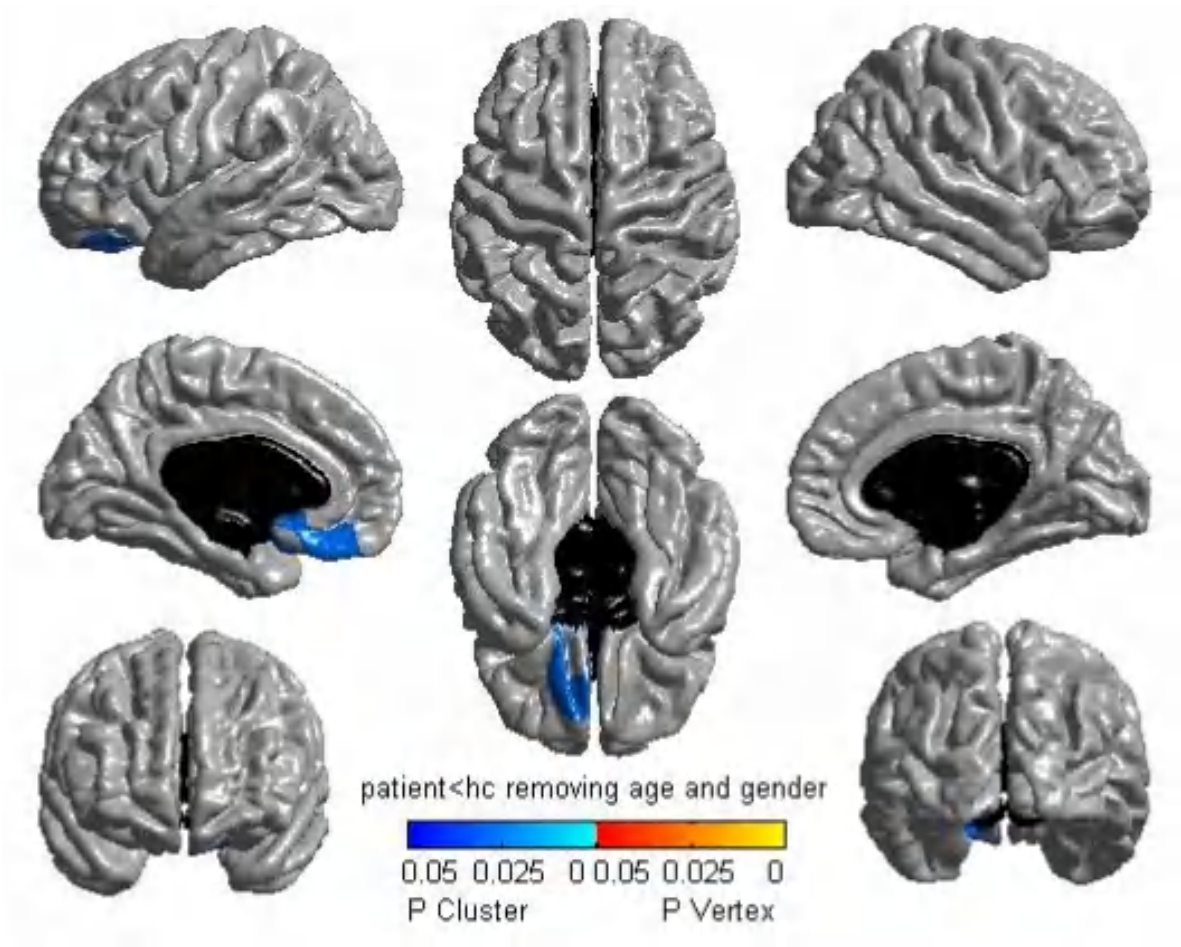


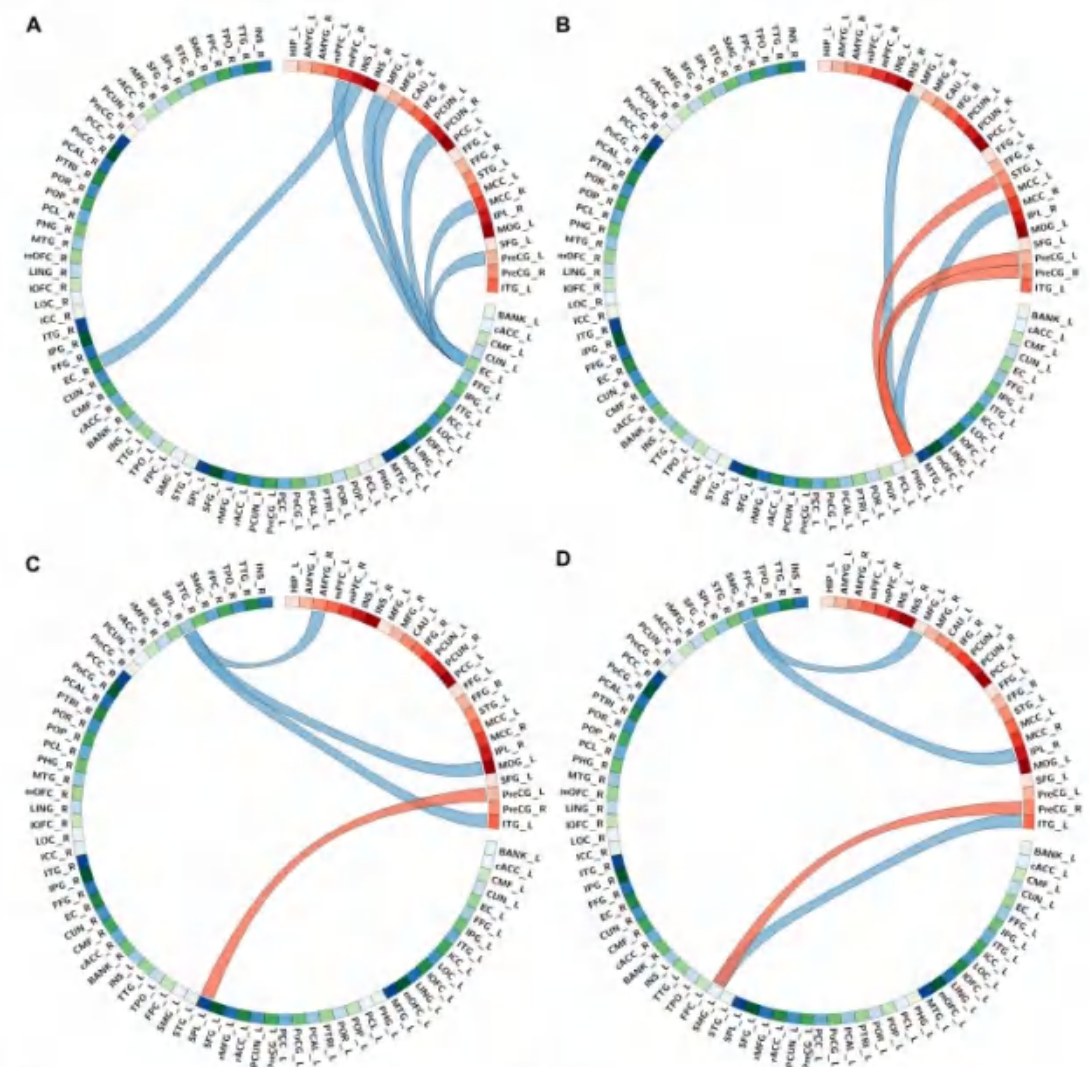




Radiology (2016) **280**:537-544.

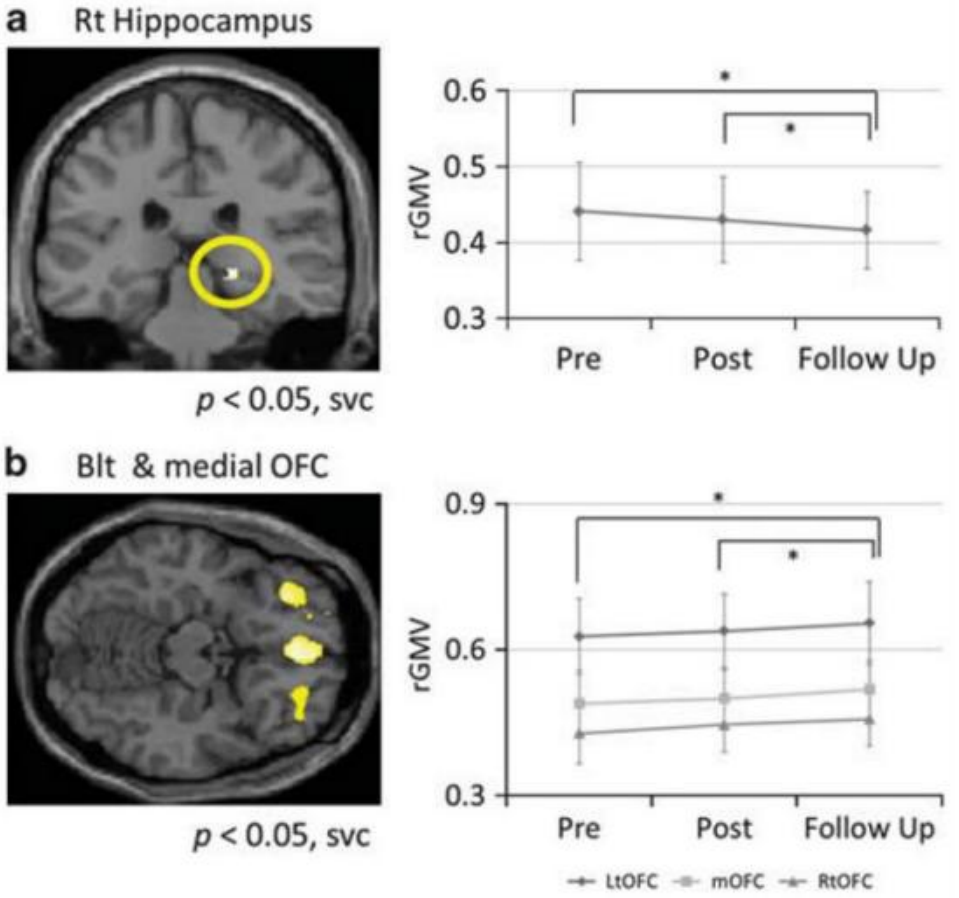
Natural Disasters Change Human Brain: Wenchuan





Frontiers in Psychiatry (2022) **13**:923572.

Earthquake Changes Human Brain: Japan 2011 (9.1)



Molecular Psychiatry (2015) **20**:552-554.

Natural Disasters Change Human Brain: Turkey 1999 (7.4)

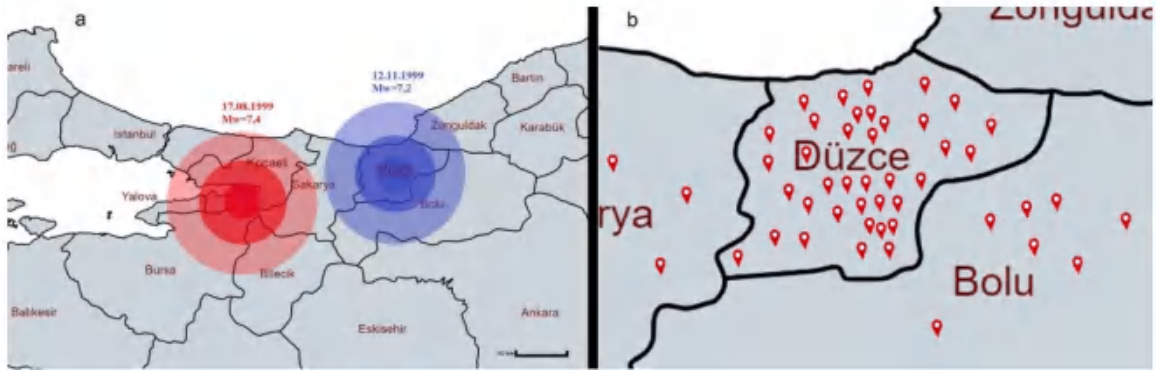
Contents lists available at ScienceDirect

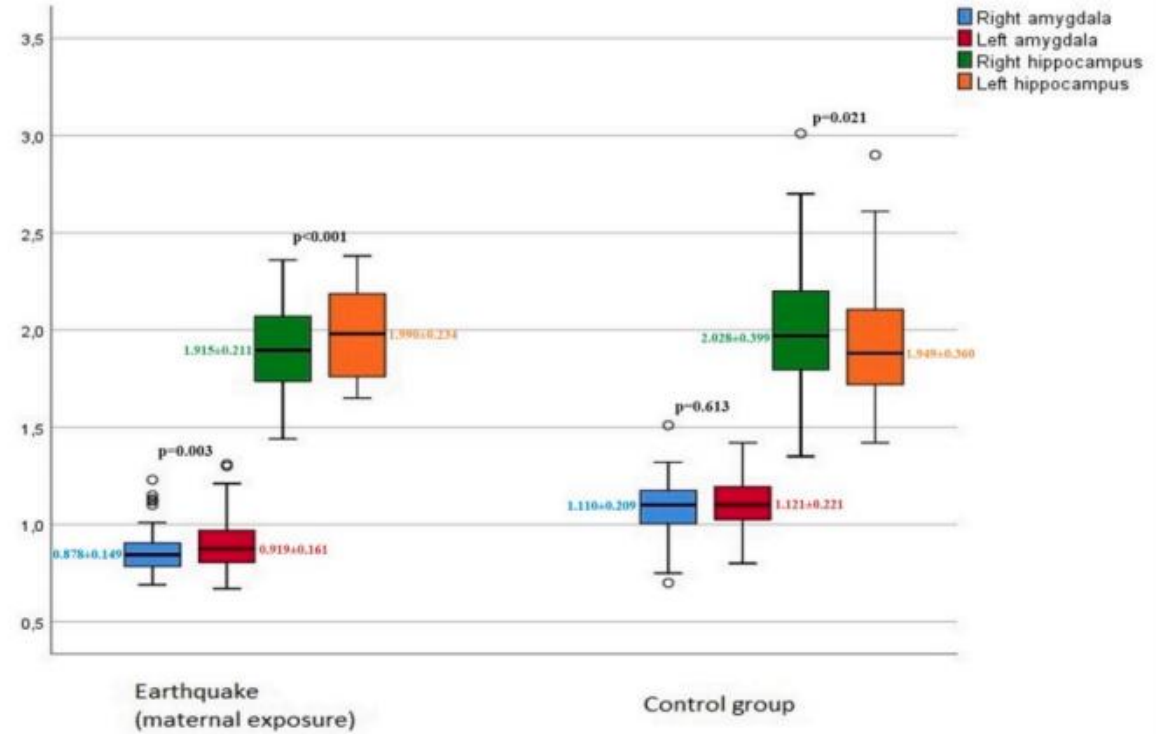
Psychiatry Research: Neuroimaging

journal homepage: www.elsevier.com/locate/psychresns

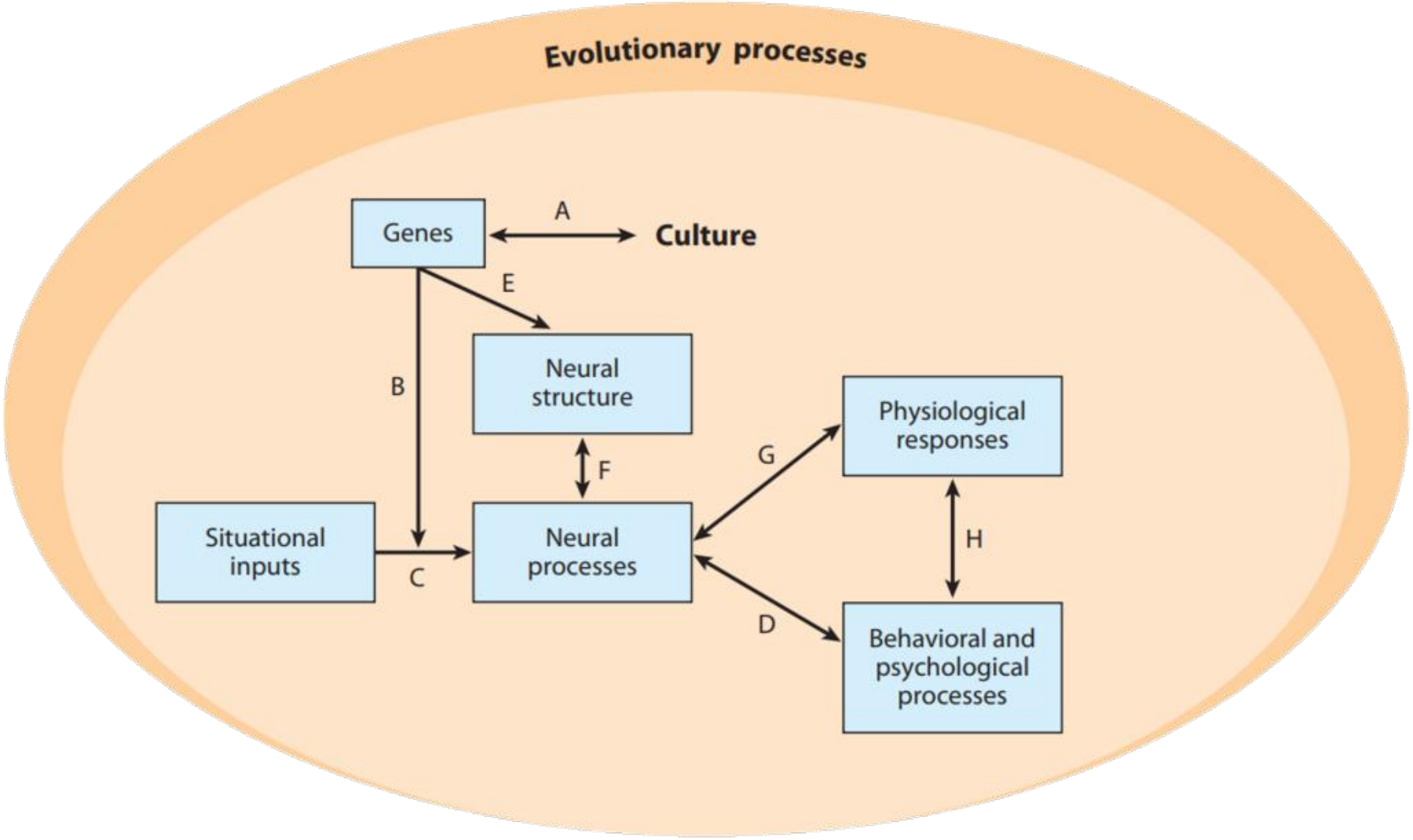
Articles

Intergenerational transmission of psychological trauma: A structural neuroimaging study

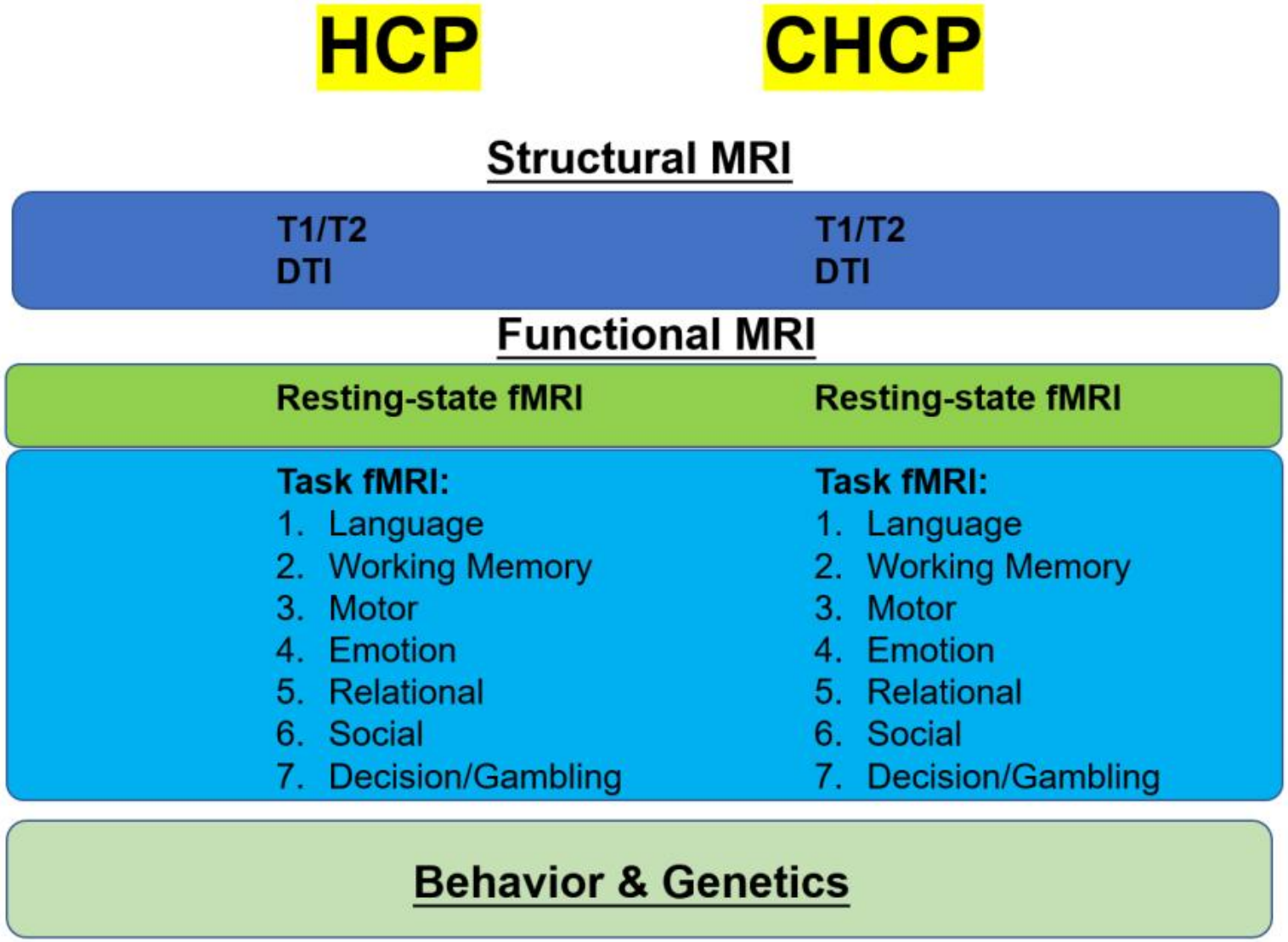




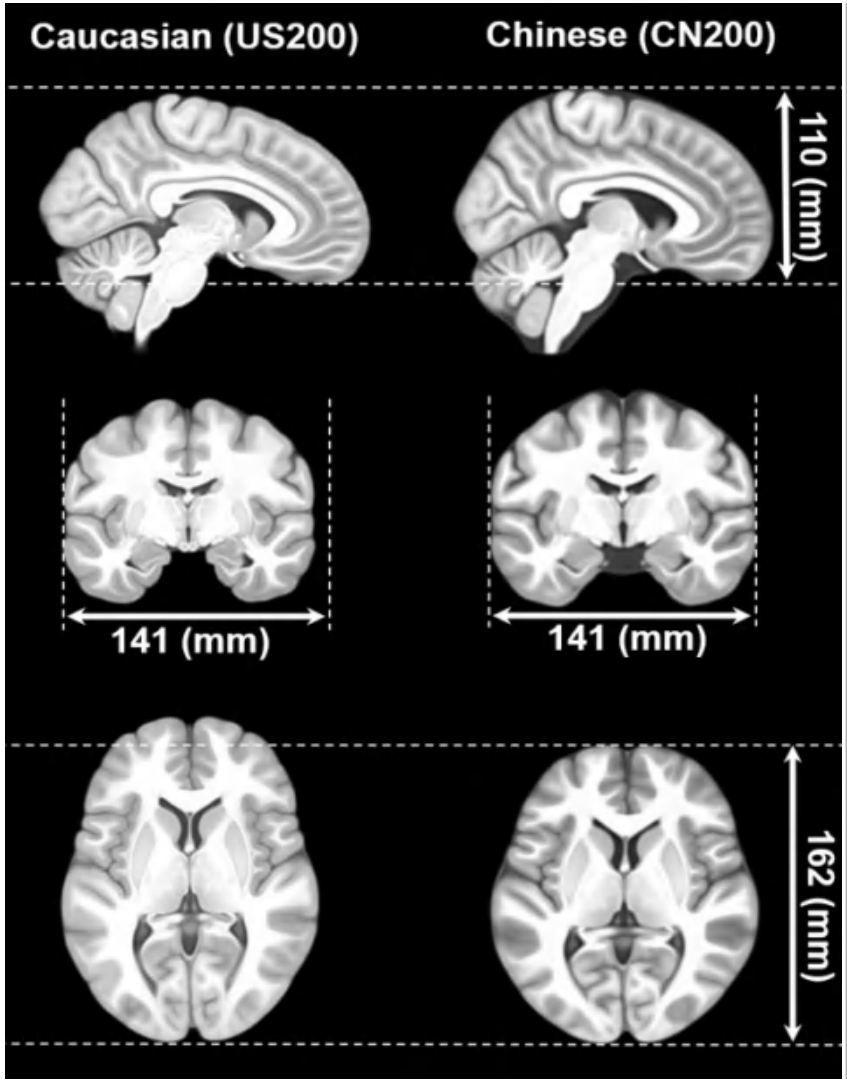
Culture Association Studies with Brain (CASB)

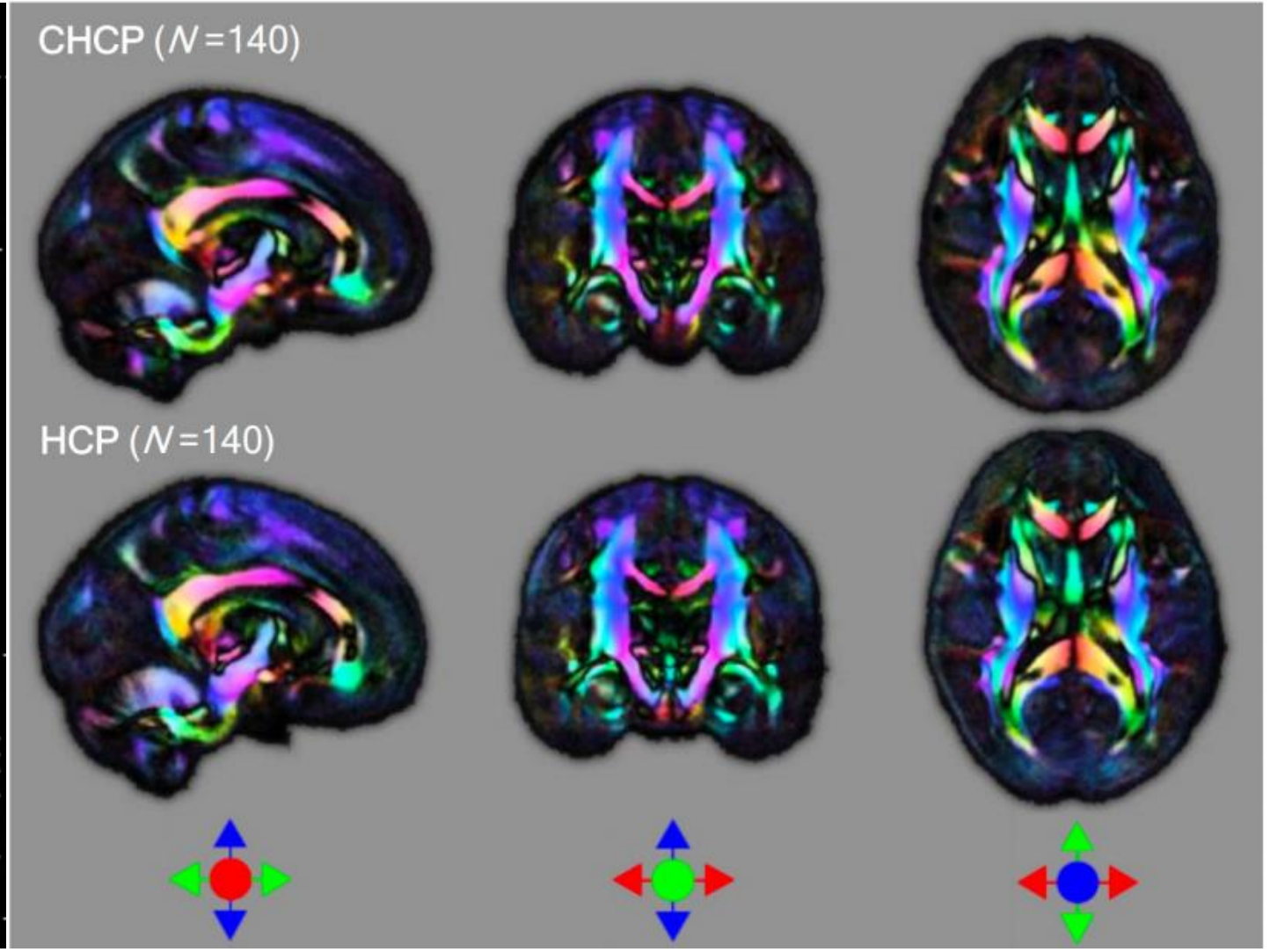


CASB: CHCP versus HCP



CASB: CHCP versus HCP





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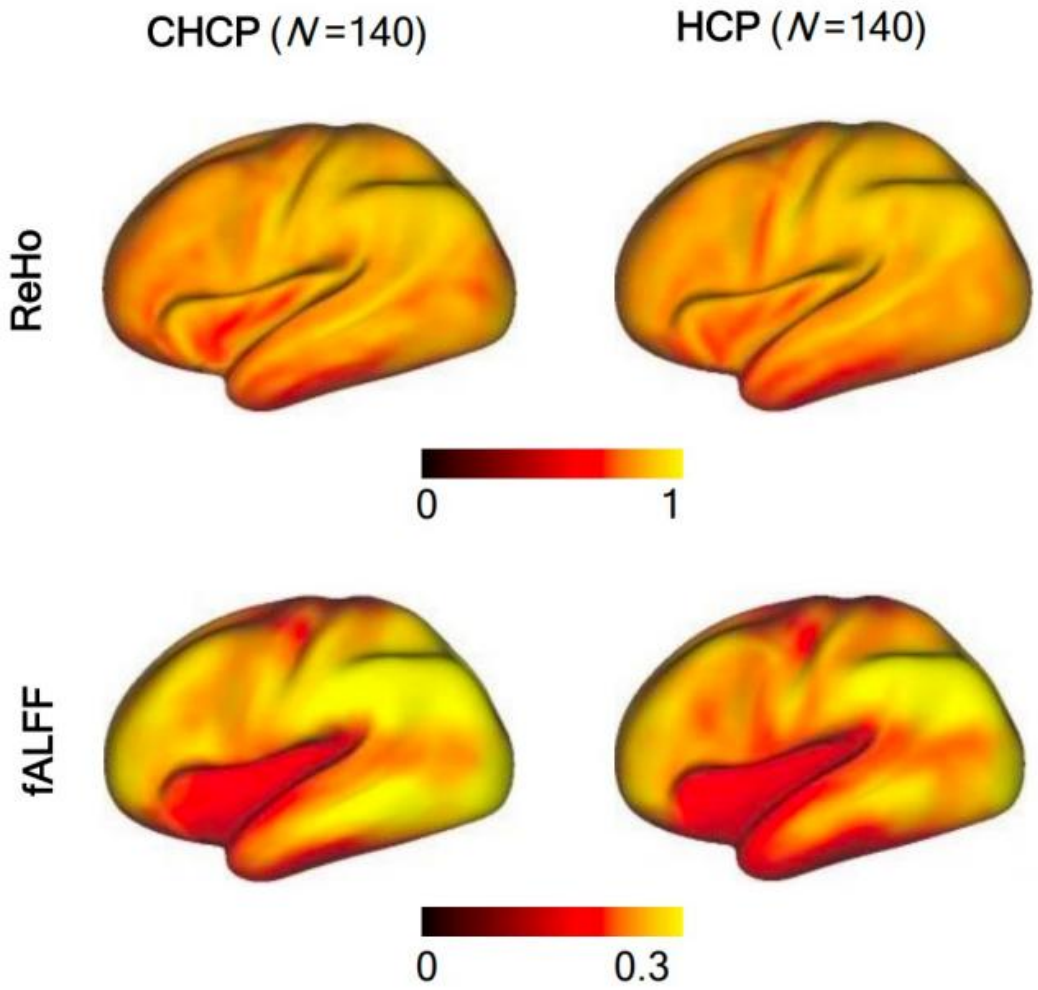
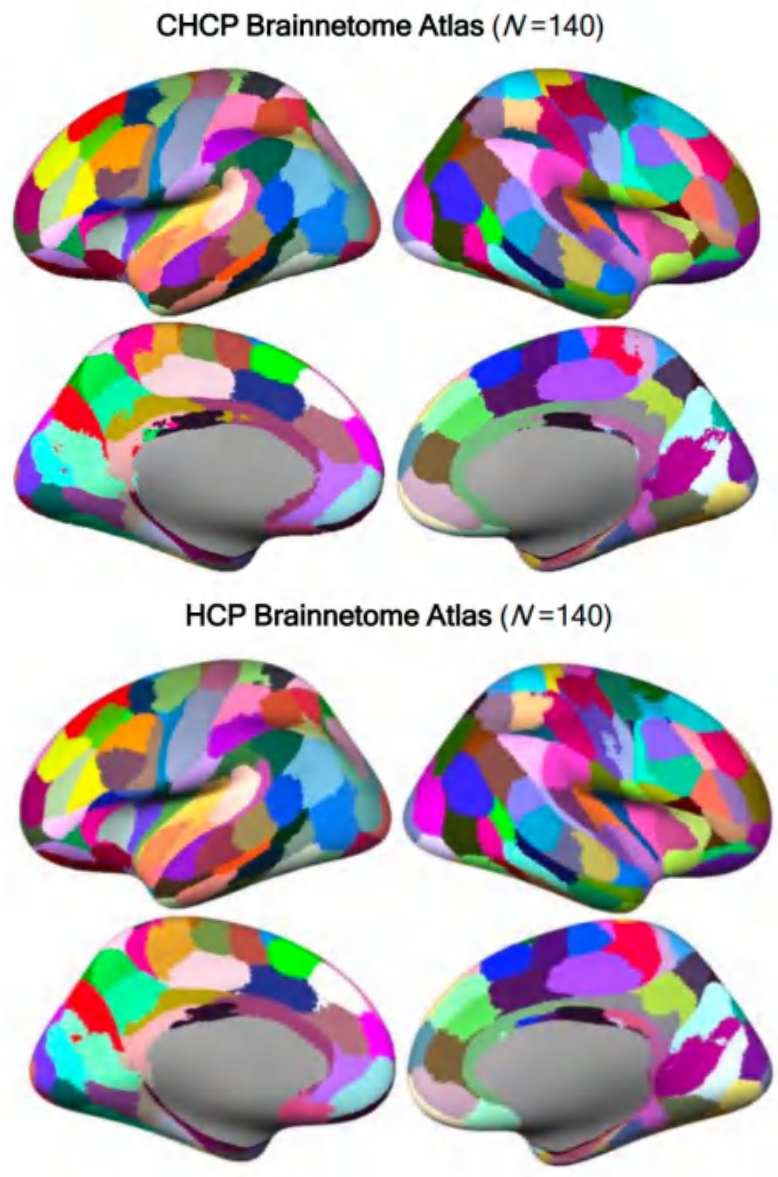
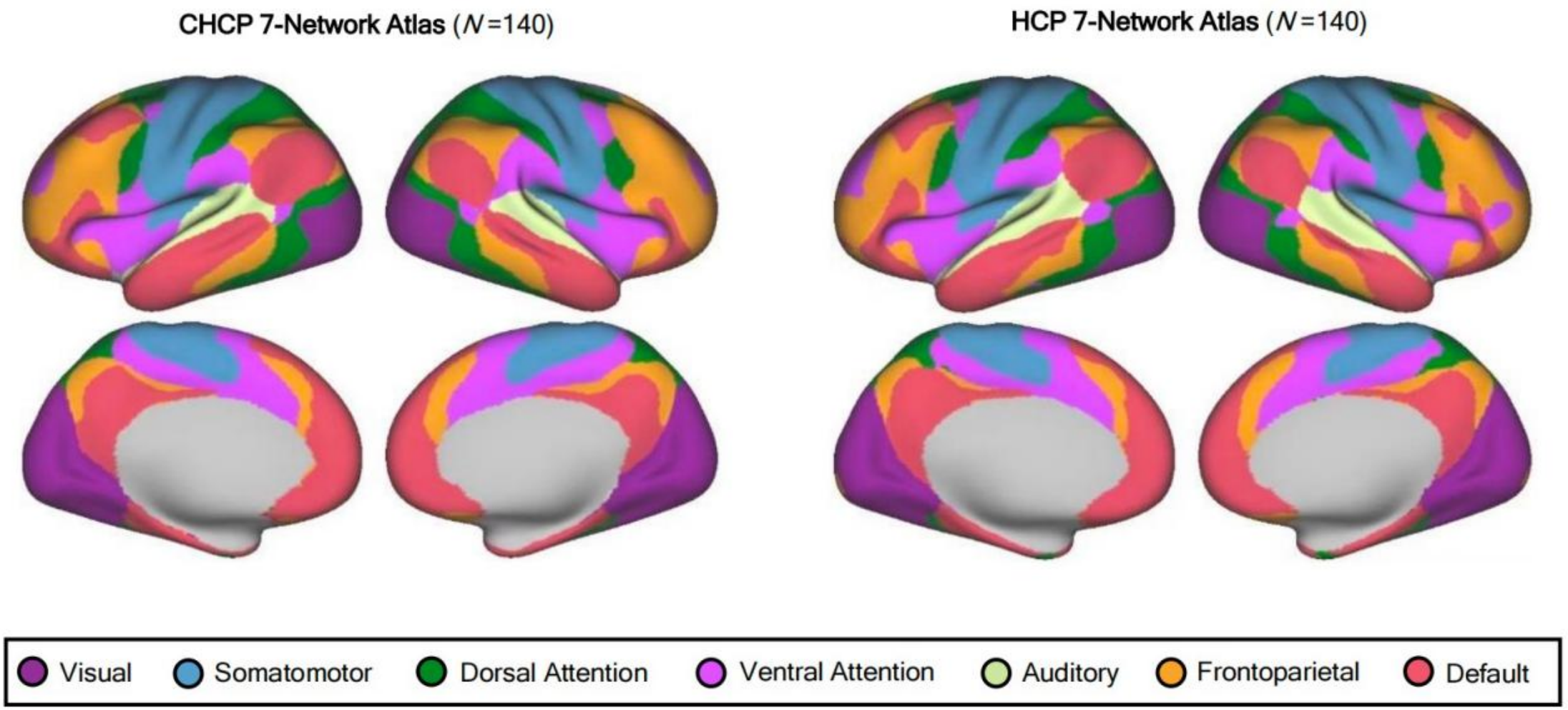
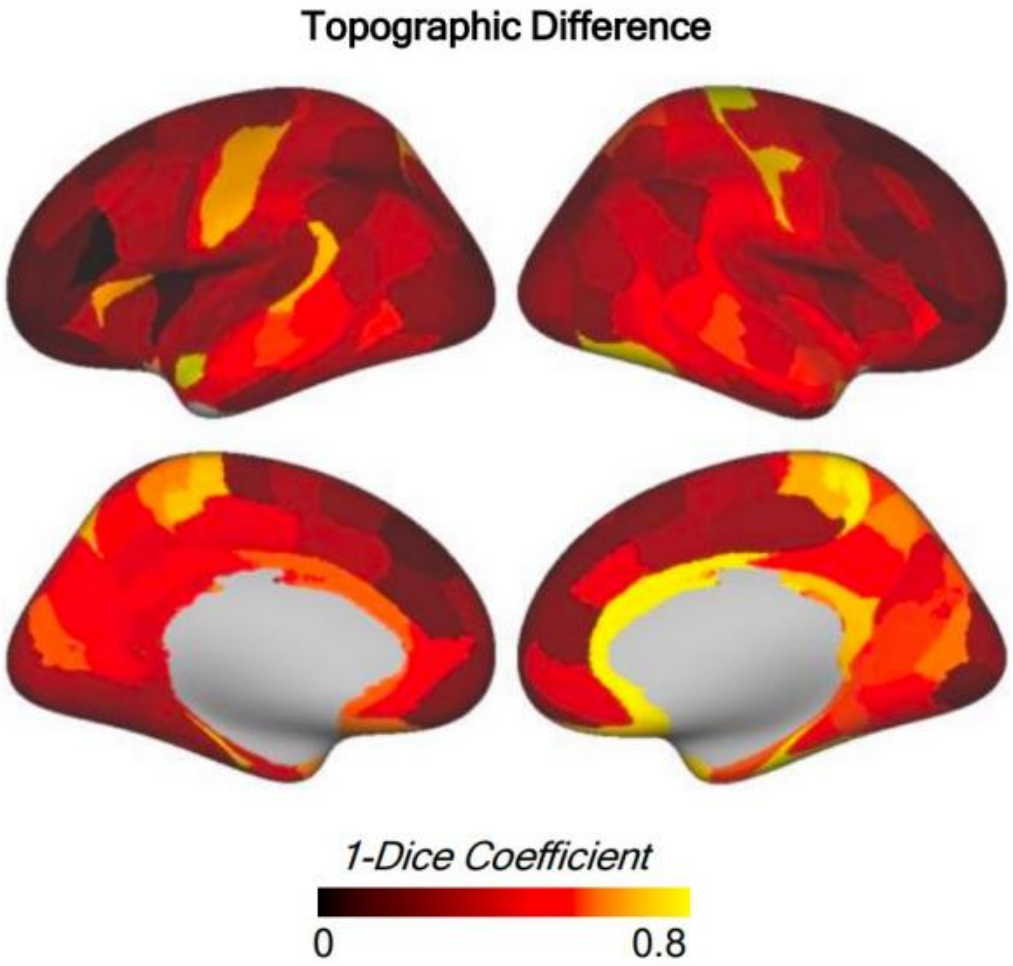


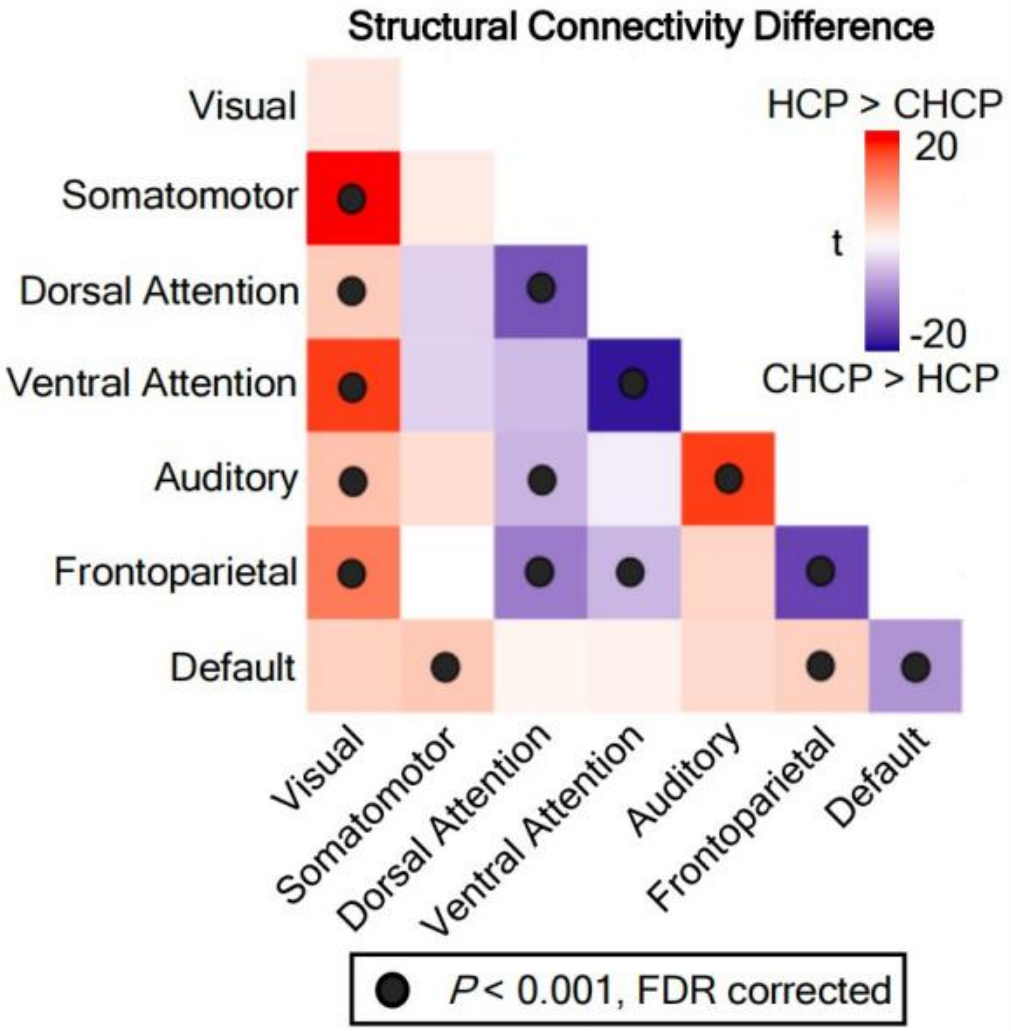


CASB: CHCP versus HCP

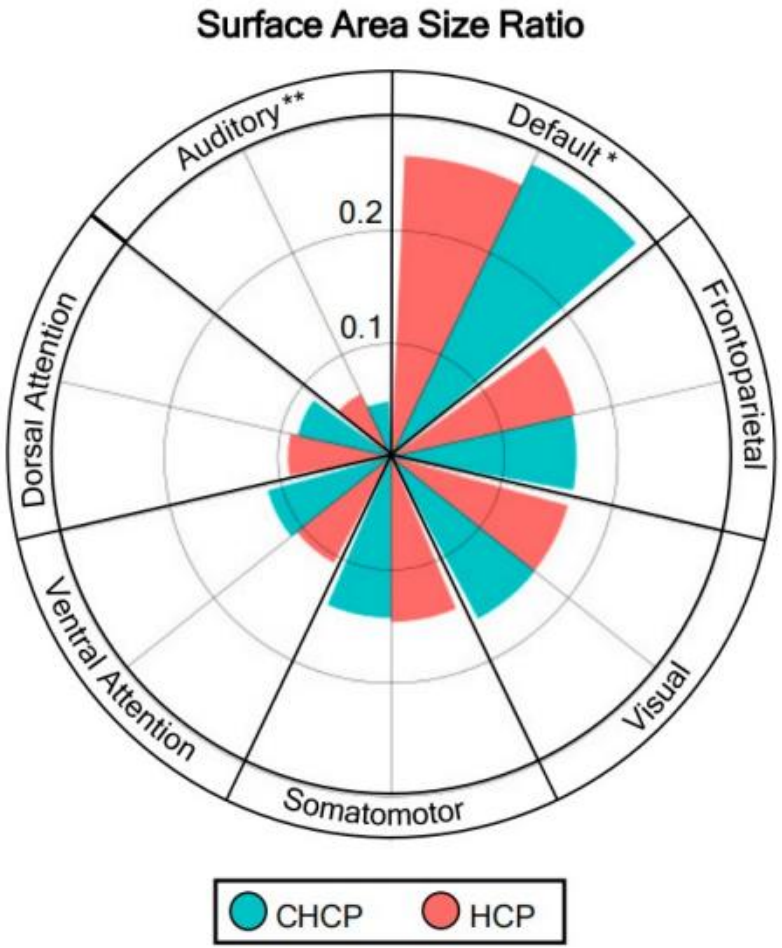


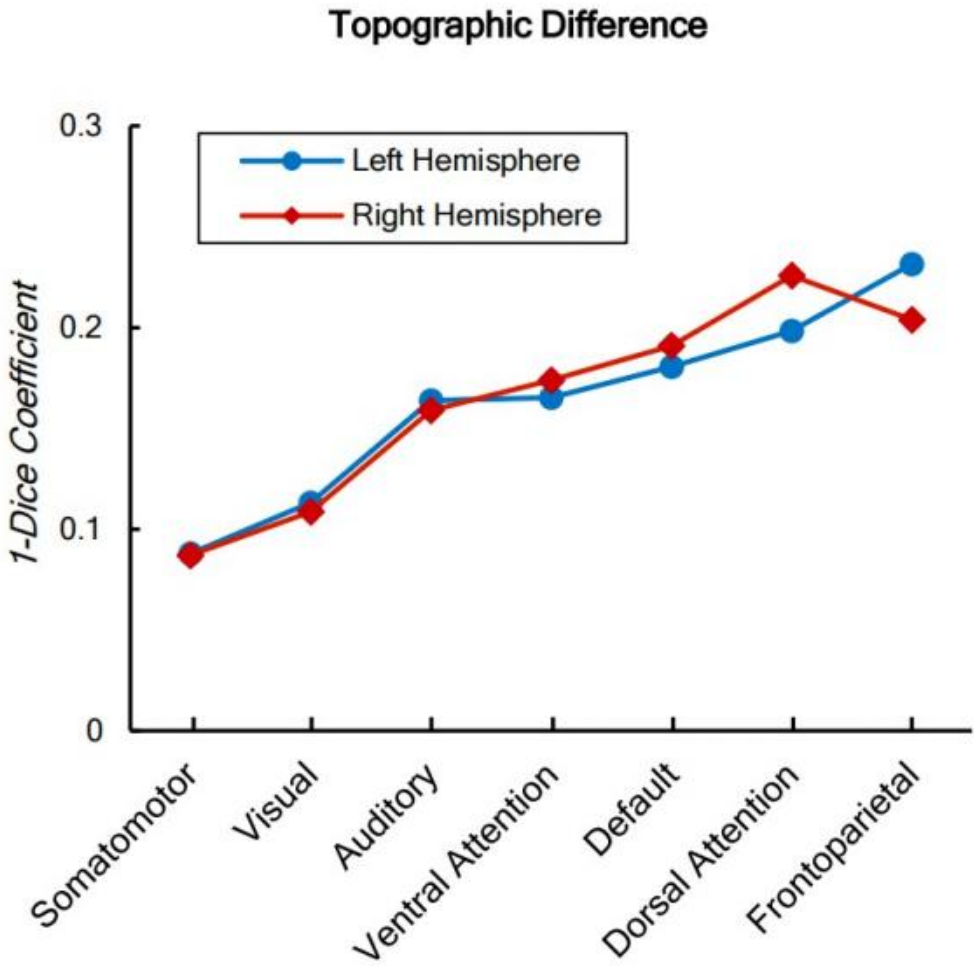
CASB: CHCP versus HCP



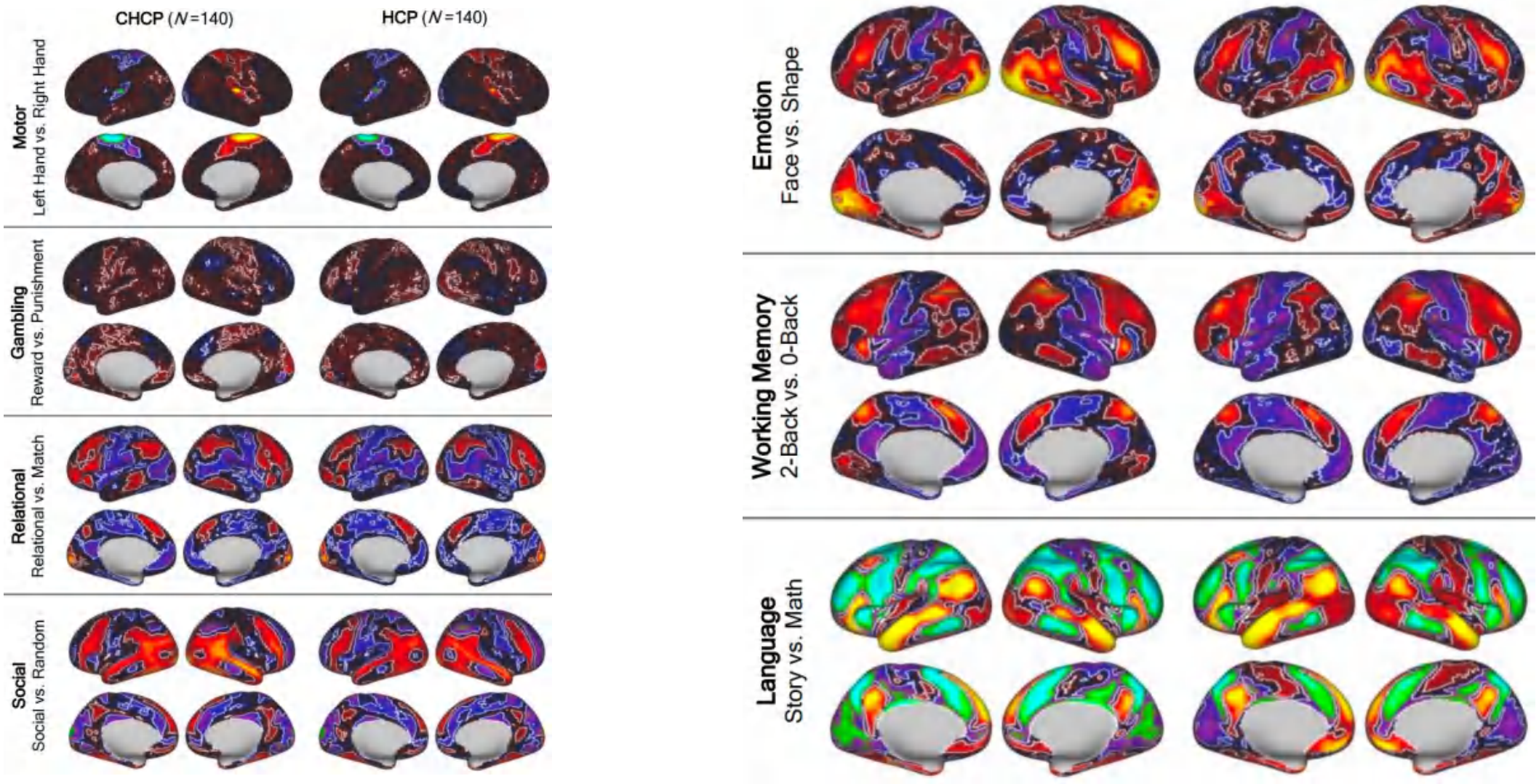


CASB: CHCP versus HCP

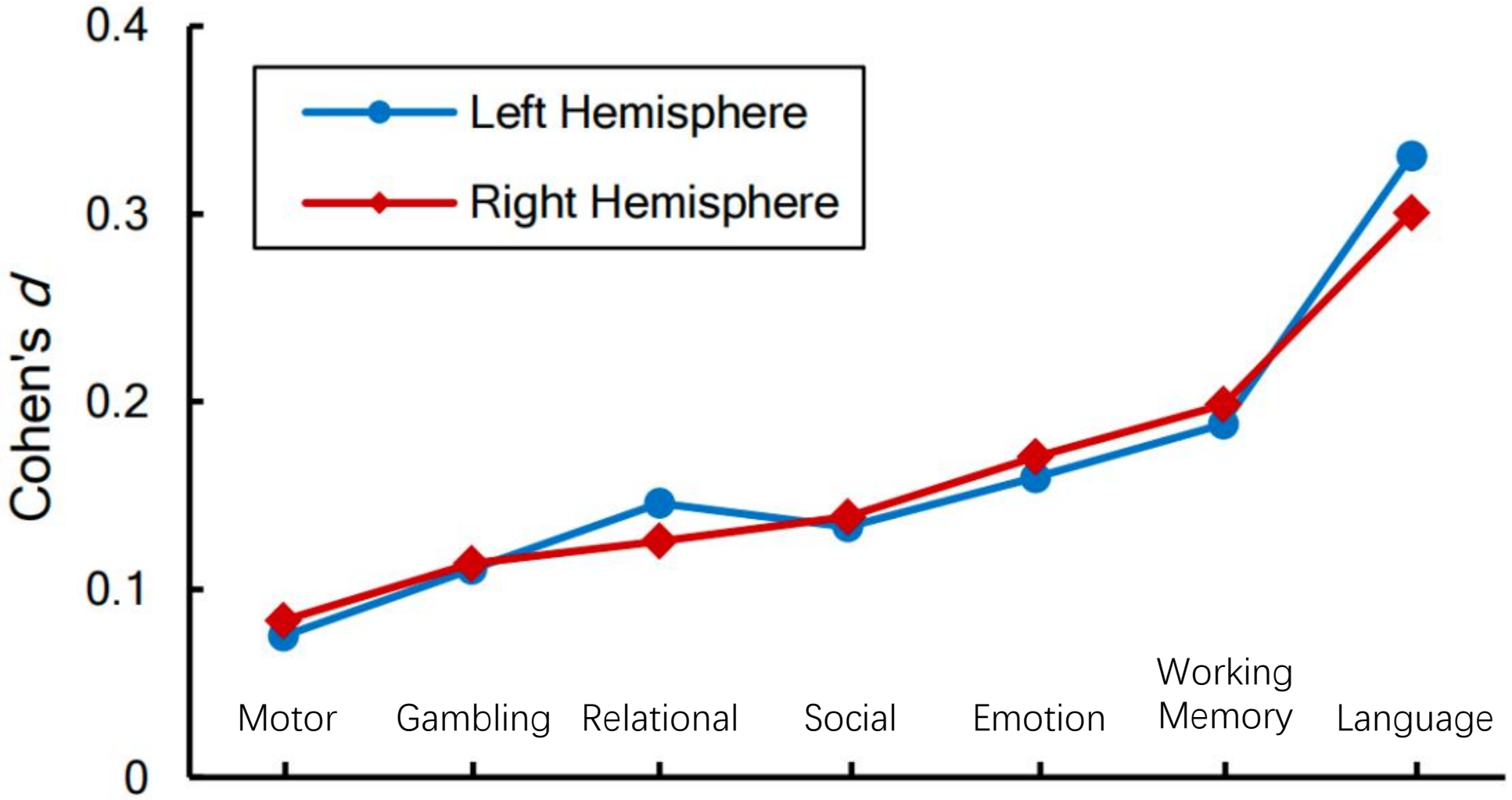




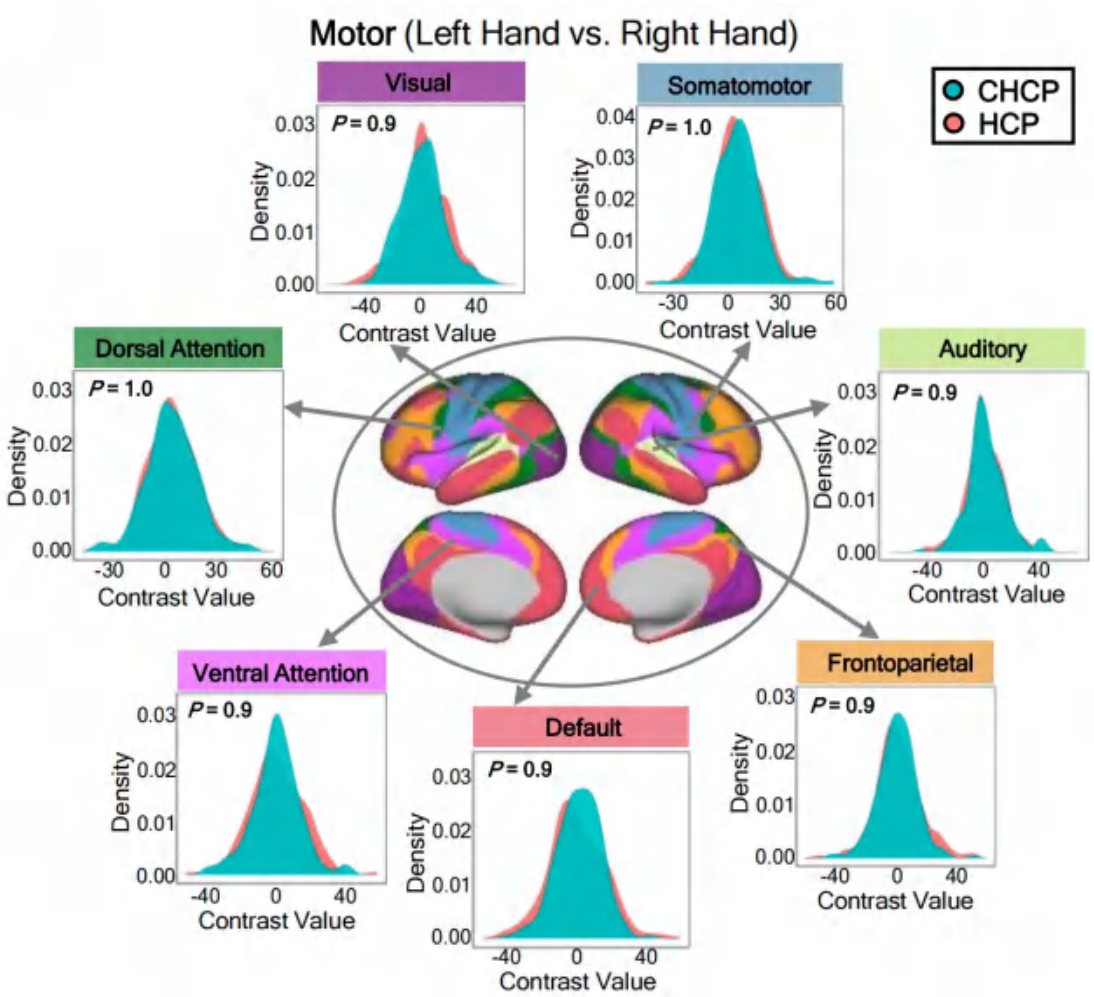
CASB: CHCP versus HCP

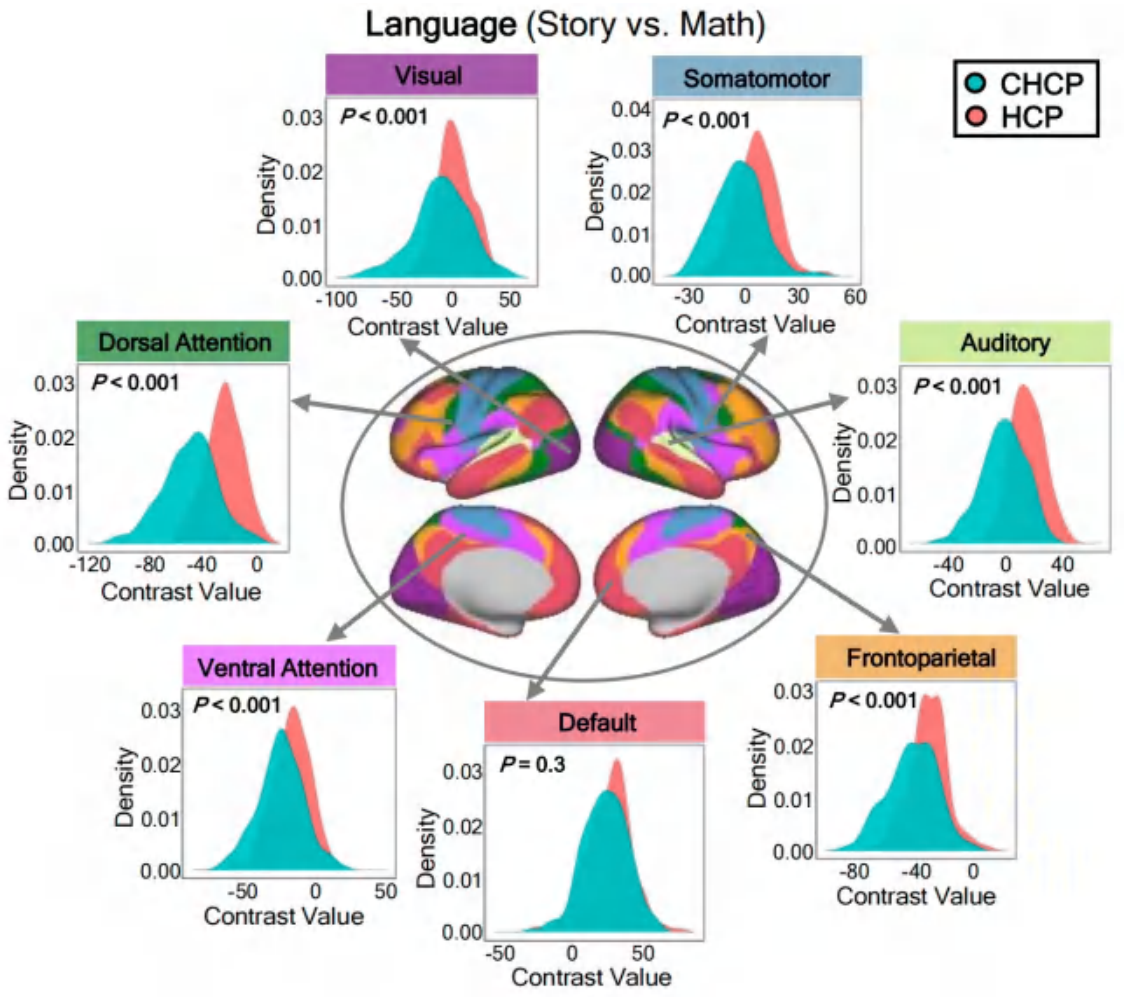


CASB: Effect Size (CHCP versus HCP)



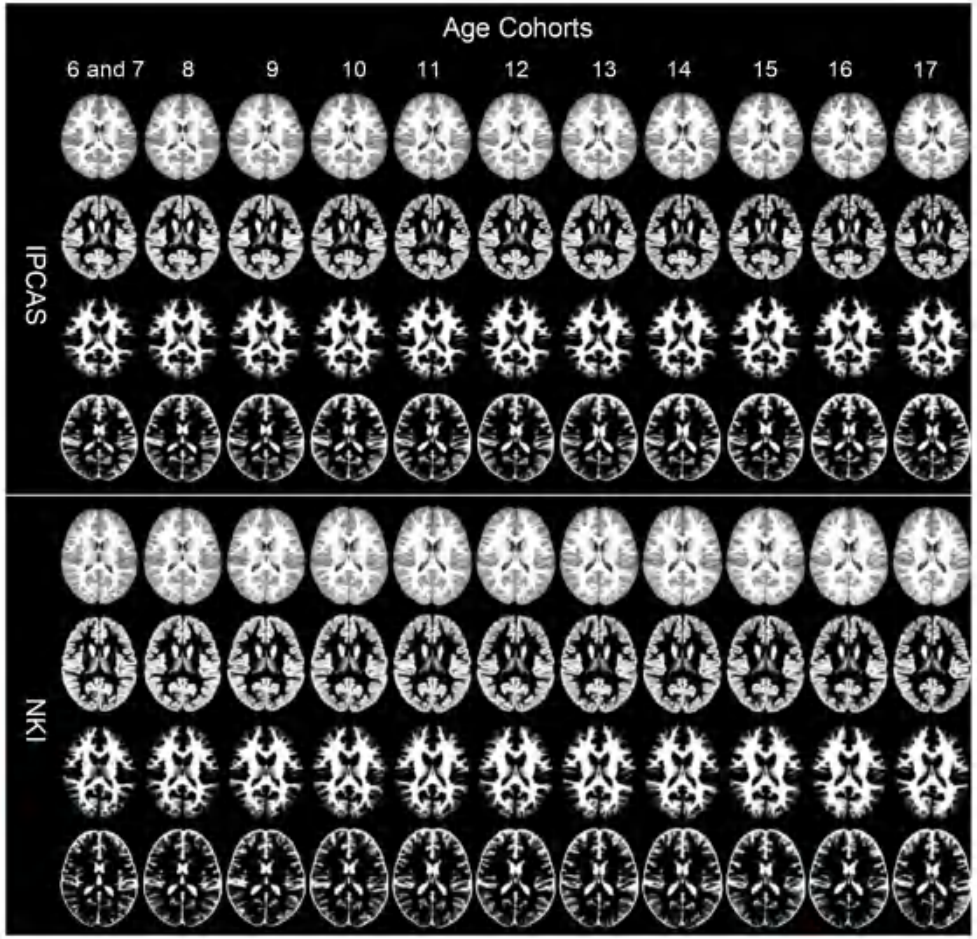
CASB: CHCP versus HCP

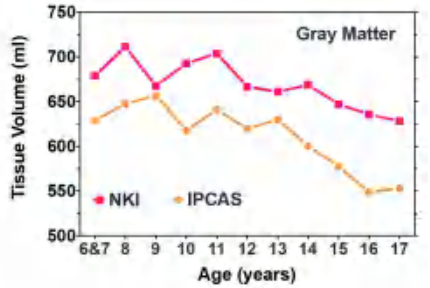


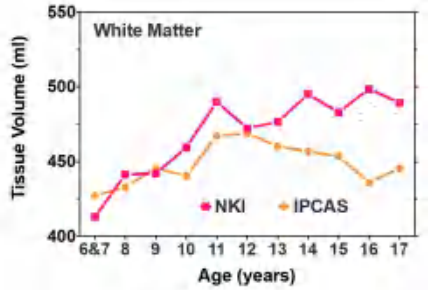


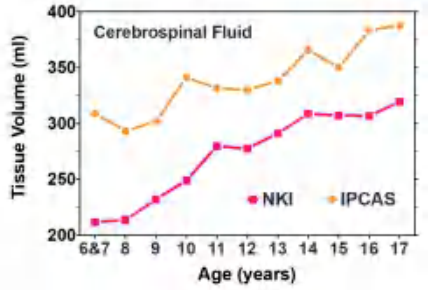

CHCP
Home
Introduction
Dataset
Documentation
Analysis
Contact
Login
Register
English | 中文
http://chinesehcp.org
Chinese Human
Connectome Project
CHCP aims to provide large sets of multimodal neuroimaging, behavioral and genetic d
ata on the Chinese population that are comparable to the data of the HCP.
Get Data

devCCNP versus devNKI-RS



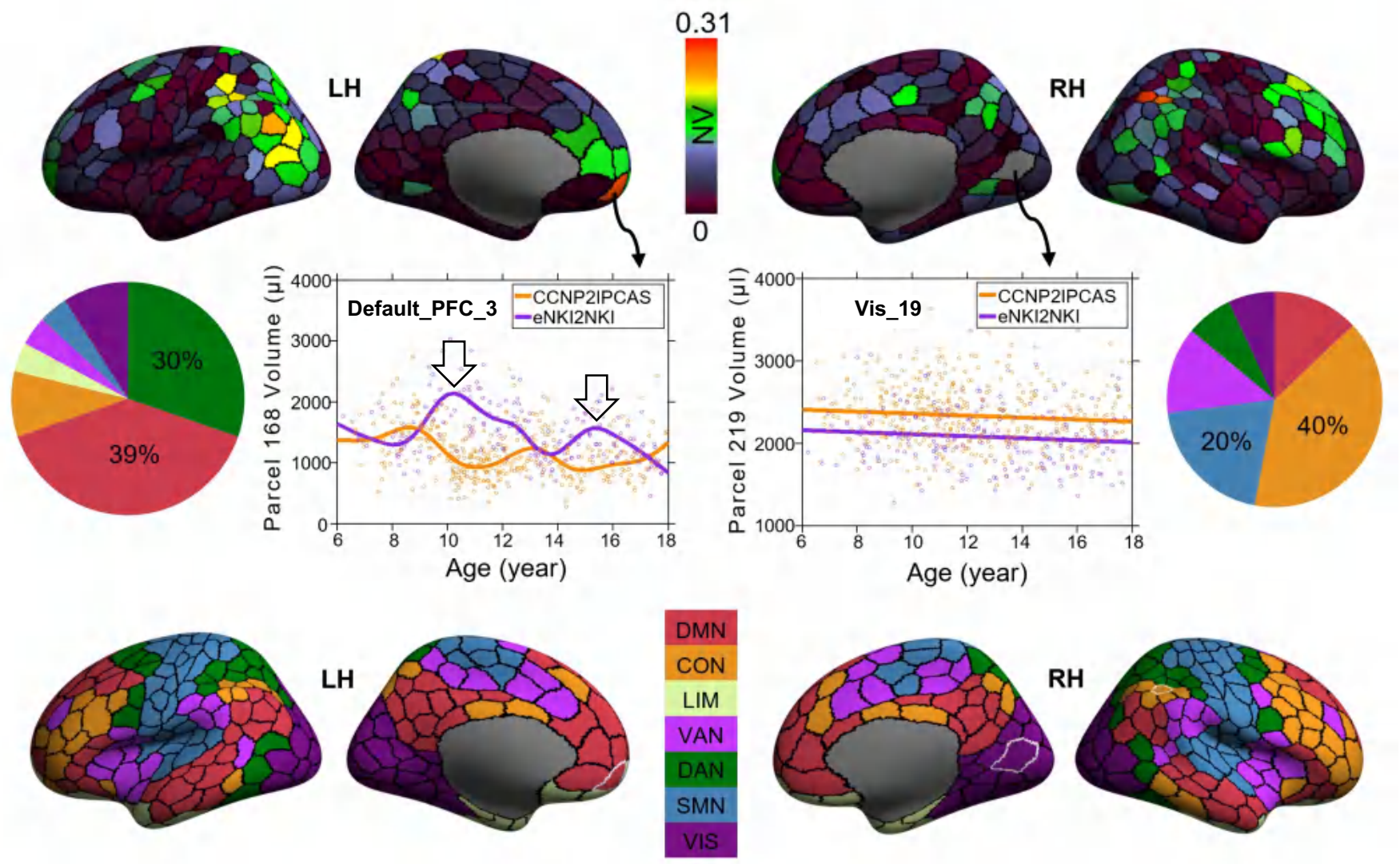






Science Bulletin (2020) **22**:1924-1934

devCCNP versus devNKI-RS



- Shape analyses revealed volumetric differences in growth curves between the two samples primarily in lateral frontal-parietal areas.
- These regions spatially distributed into default and control networks and are most variable across individuals in regard to their structure and function.
- Temporally, the shape distinction of growth mostly occurred around the puberty period.

Science Bulletin (2020) **22**:1924-1934

A Deep Resource for Reliable, Reproducible and Replicable MRI

3R-BRAIN

https://github.com/zuoxinian/3R-BRAIN

Xi-Nian Zuo (左西年)

3R-BRAIN to Close the Course

The 3R Concept
Reproducible Research

Nature Human Behaviour 1,0021 (2017); 3,650-652 (2019)

Population: the complete collection of units for which information is sought

Question: the statement we wish to address in the population of interest

Hypothesis: the proposed explanation of our question that we wish to test

Experimental design: procedure for sampling and measuring units

Analysis Plan: the manner to extract information to answer the question

Data: the manifestation of the experimenter carrying out the design

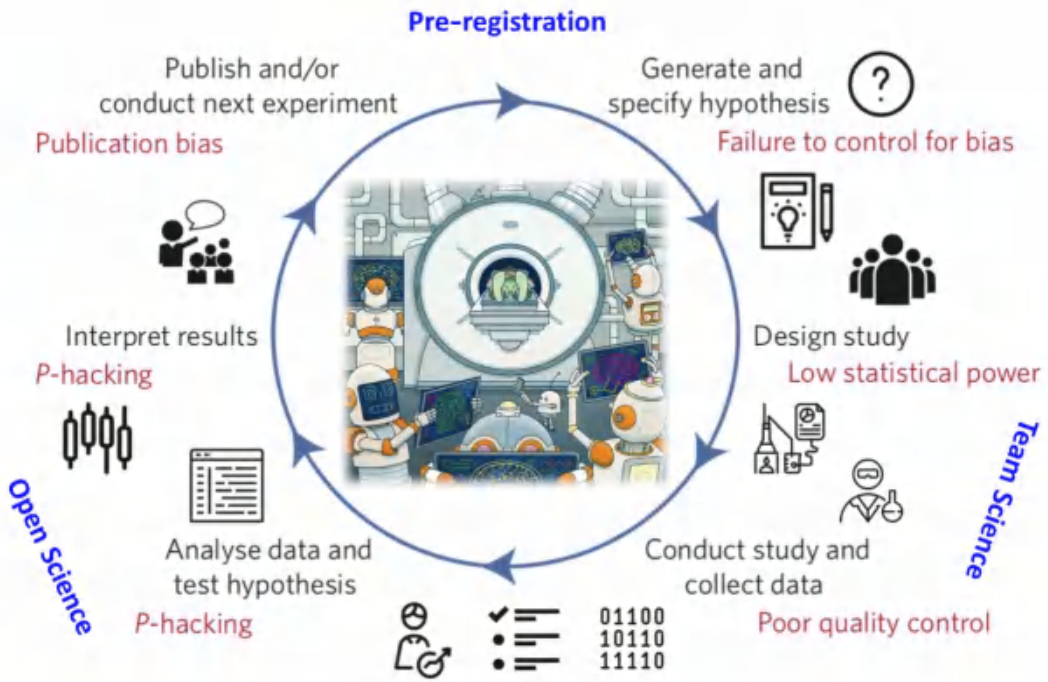
Experimenter: the scientist who will carry out the experimental design

Analyst: the scientist who will carry out the analysis plan

Code: the manifestation of the analyst carrying out the analysis plan

Estimate: the statistical result(s) obtained from the code

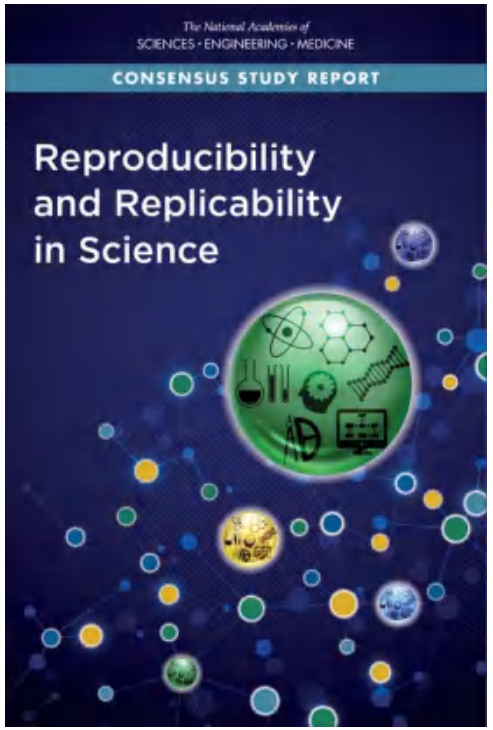
Claim: the conclusion about the research question implied by the estimate

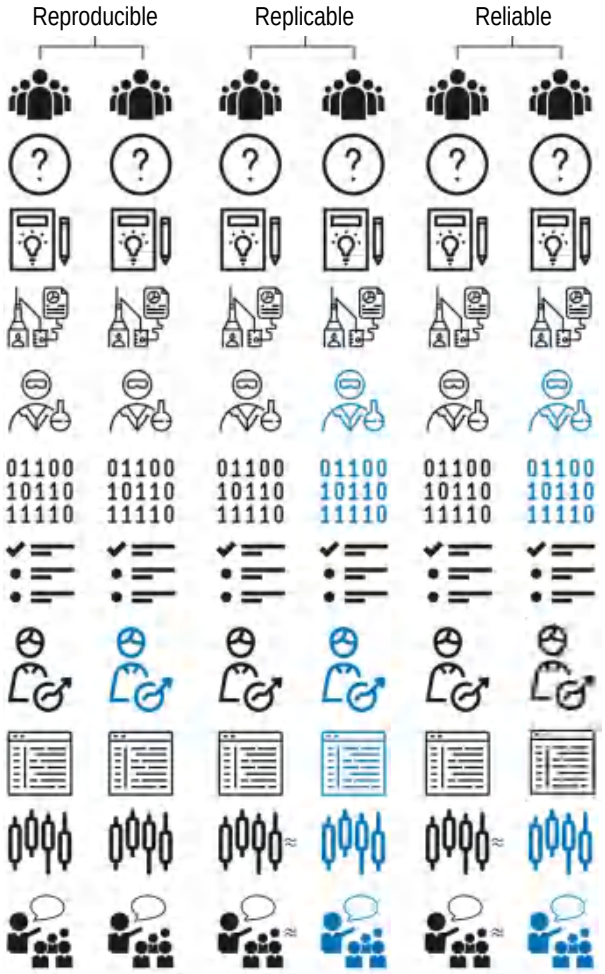


Threats to reproducible science, elements and solutions. An idealized version of the hypothetico-deductive model of the scientific method is shown. Various threats to this model exist (indicated in red), accompanied by 11 research elements (black icons) and potential solutions (indicated in blue).

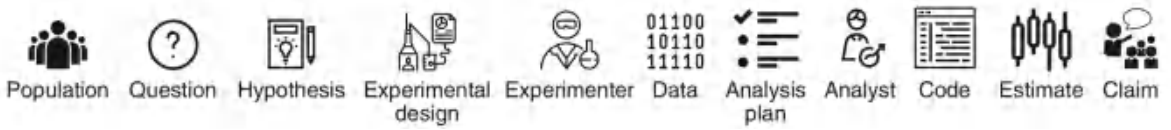
The 3R Concept
Formal Definition & Visual Representation

Nature Human Behaviour 3,650-652 (2019)



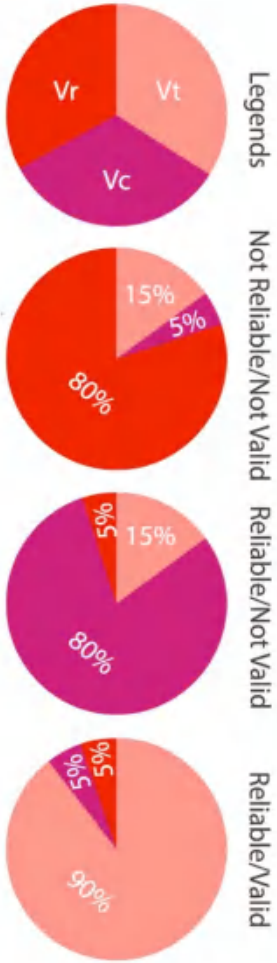


- **Reproducibility**: Re-performing the same analysis with the same code using a different analyst.
- **Replicability**: Re-performing the experiment and collecting new data. Changes of the study elements can happen to Experimenter, Data, Analyst, Code, Estimate and Claim.
- **Reliability**: A special form of replicability for the question of individual differences with the same analyst and individuals - the replicability of inter-individual variability across different occasions.



The 3R Concept
Reliability & Validity

Science Bulletin 63,1606-1607 (2018)
Nature Human Behaviour 3,768-771 (2019)



Total

$Vs = Vt + Vc + Vr$

Disorder/Trait

Vt

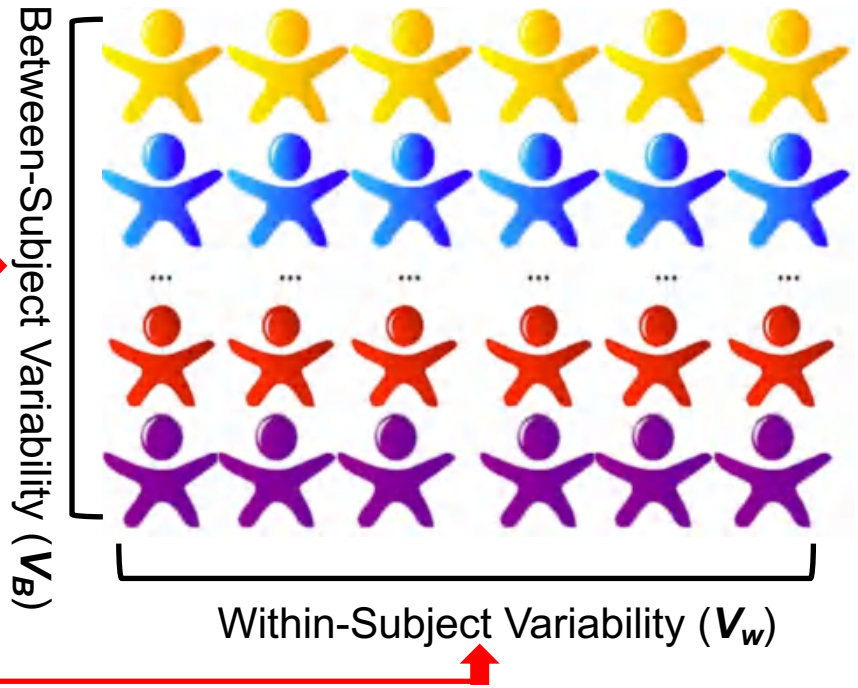
Contaminants

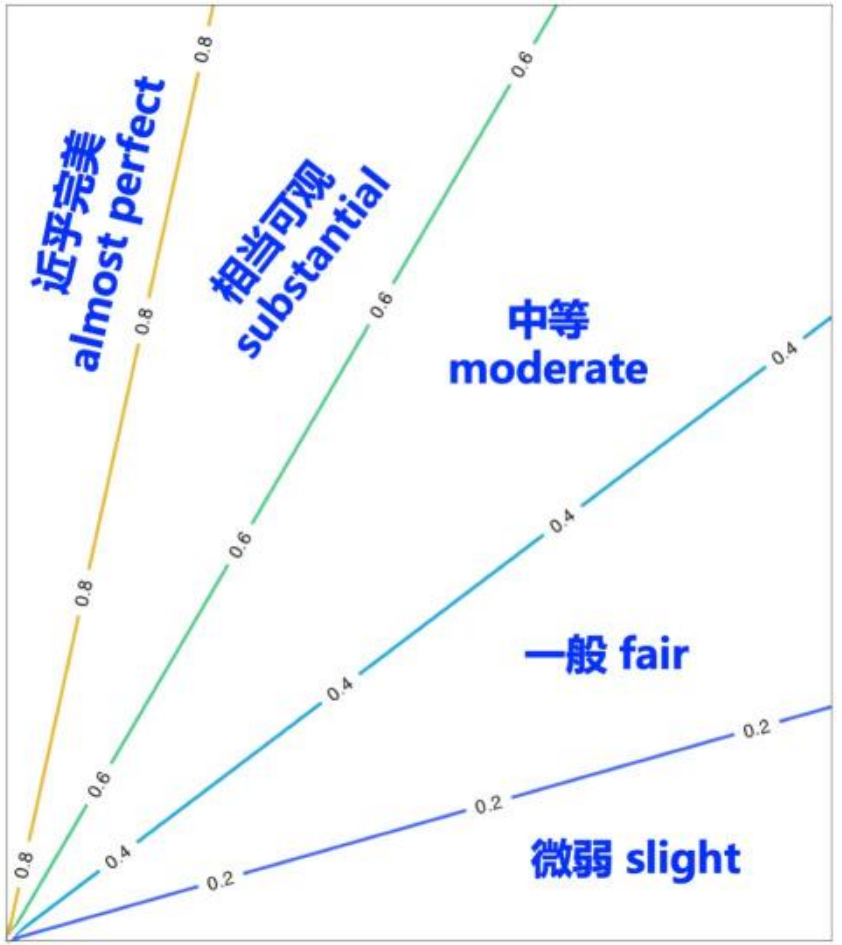
Vc

Random Error

Vr

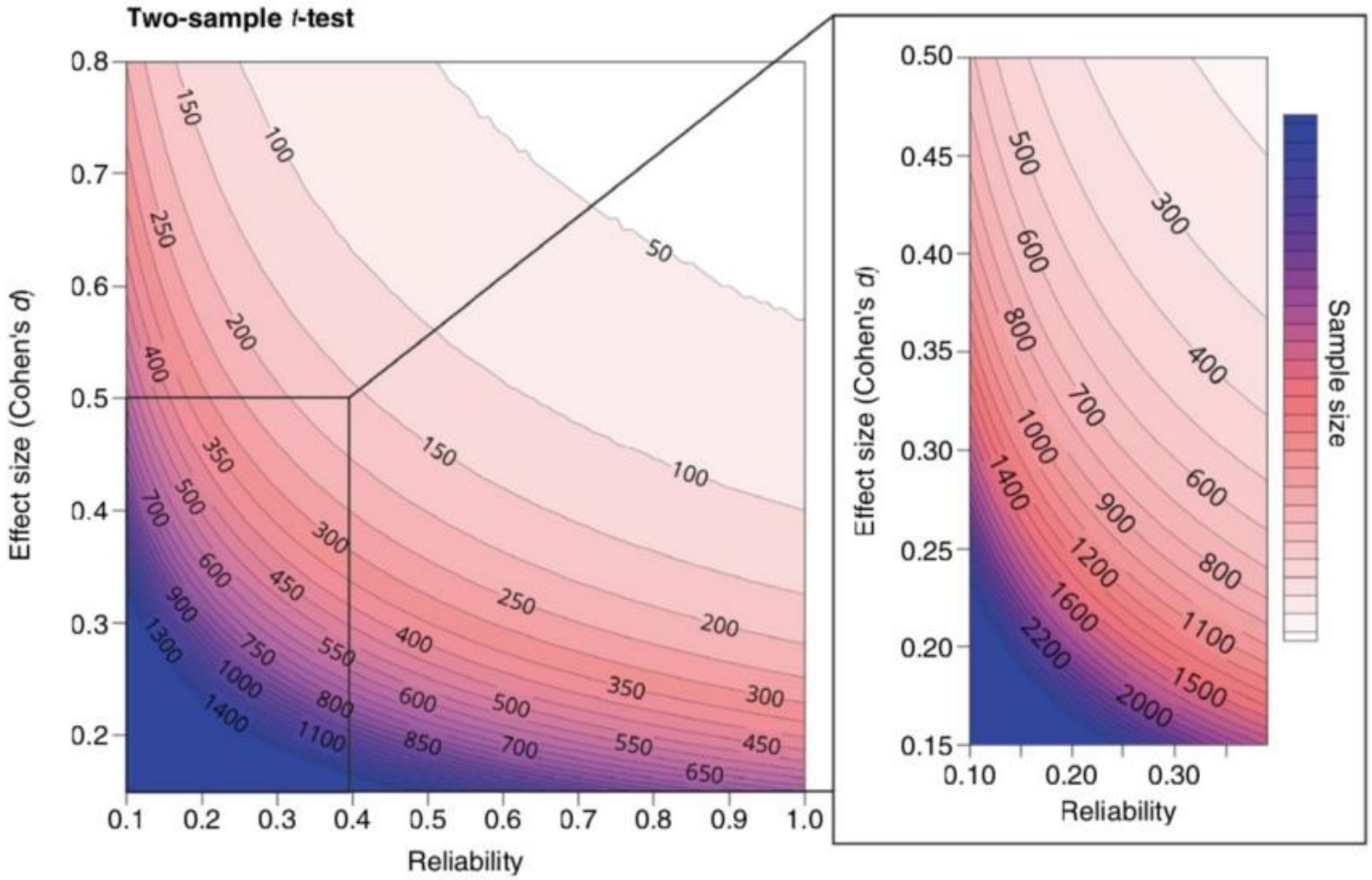
$$\text{validity} = \frac{V_t}{V_s} <= \text{reliability} = \frac{V_t + V_c}{V_s} = \frac{V_B}{V_B + V_W}$$





The 3R Concept
Reliability & Experimental Design

Nature Human Behaviour 3,768-771 (2019)



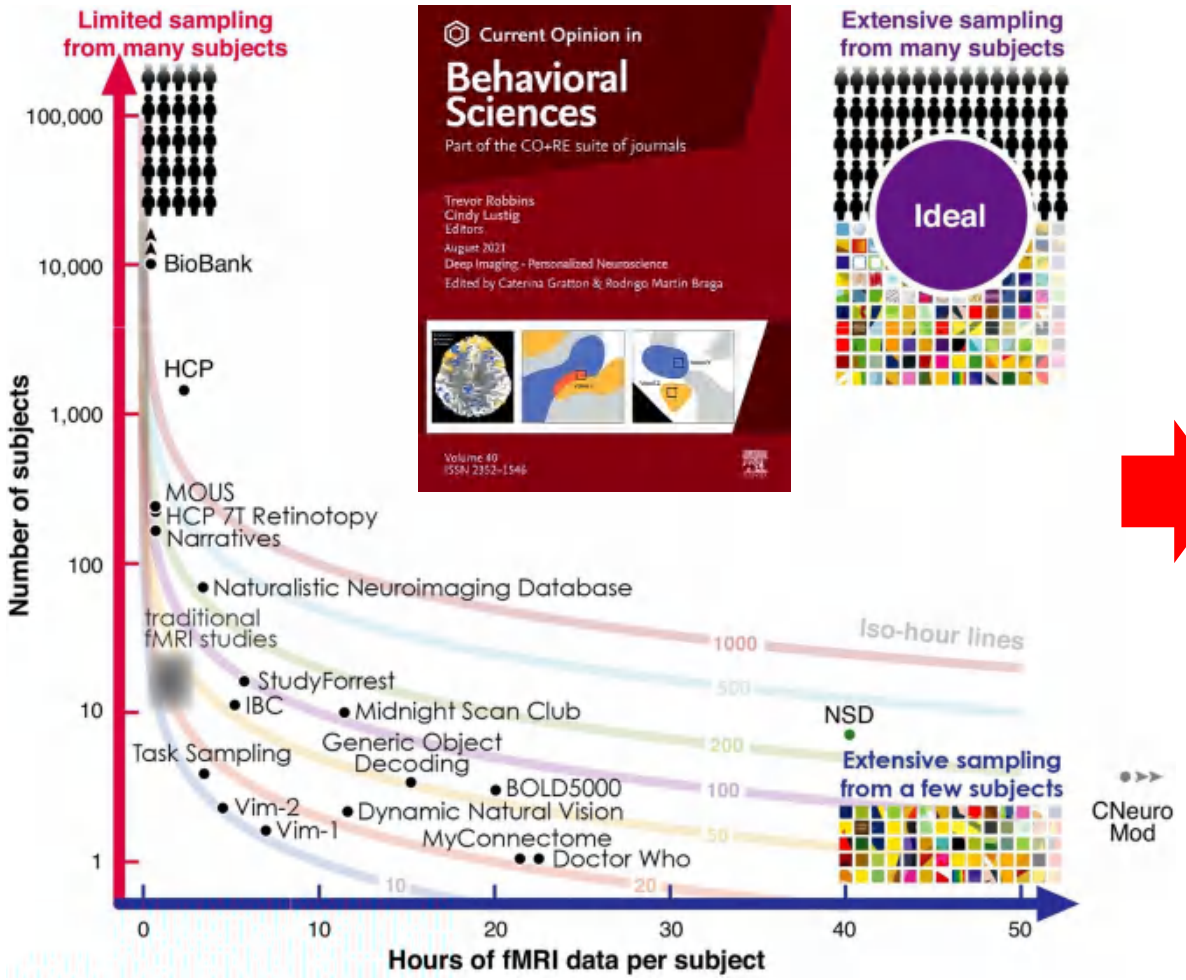
- ✓ $ES_{observed}$ = *Reliability* x ES_{true}
- ✓ Given an *ES*, studies with more reliable measures need less samples
- ✓ Given measures with the **almost perfect** reliability (>0.8), **300** samples can offer a study 80% power to detect small effect sizes
- ✓ Given measures with the **slight** reliability (< 0.2), **big data** (>1000 samples) are required for a study to detect small effect sizes

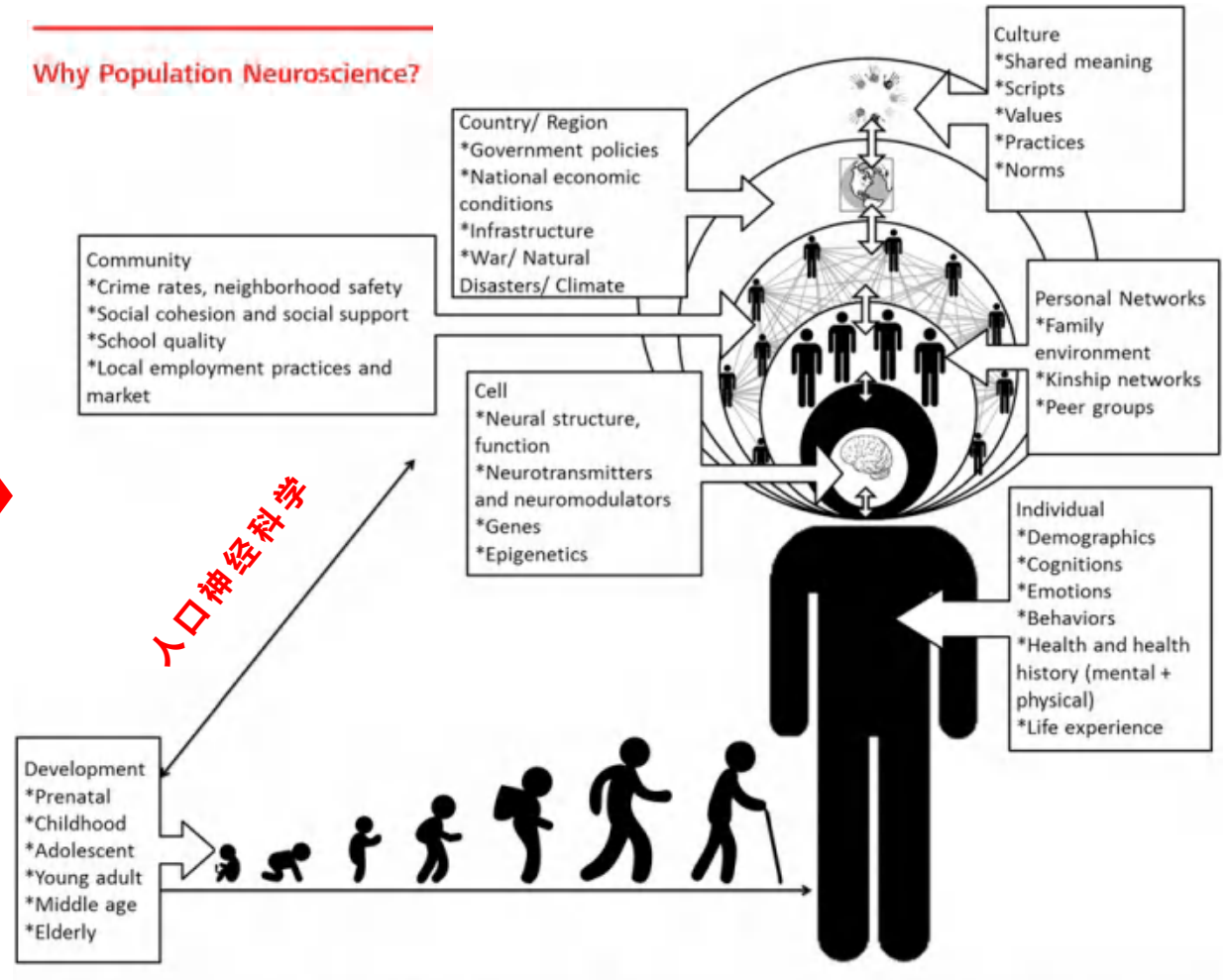
Deep Phenotyping
Lifespan Brain Charts Consortium

Nature 604,525-533 (2022)

Deep Phenotyping
Representative Individual Differences

Proc Natl Acad Sci U S A 110,17615-17622 (2013)

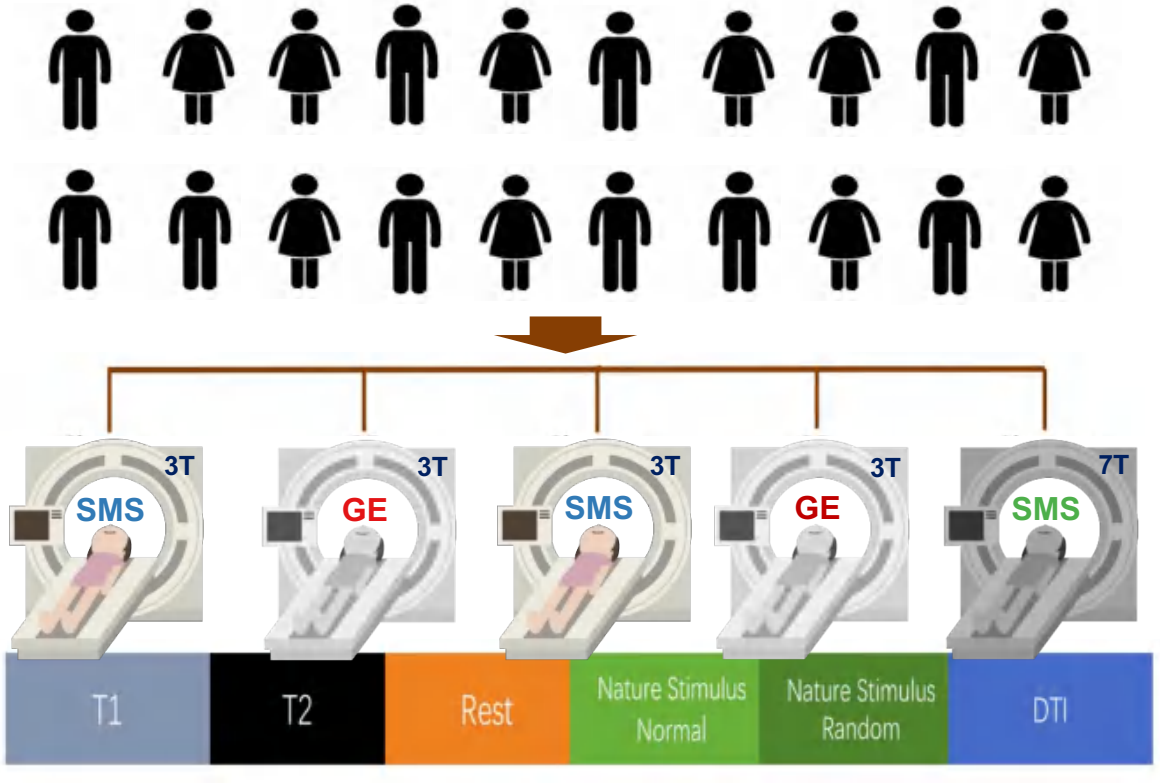




3R-BRAIN

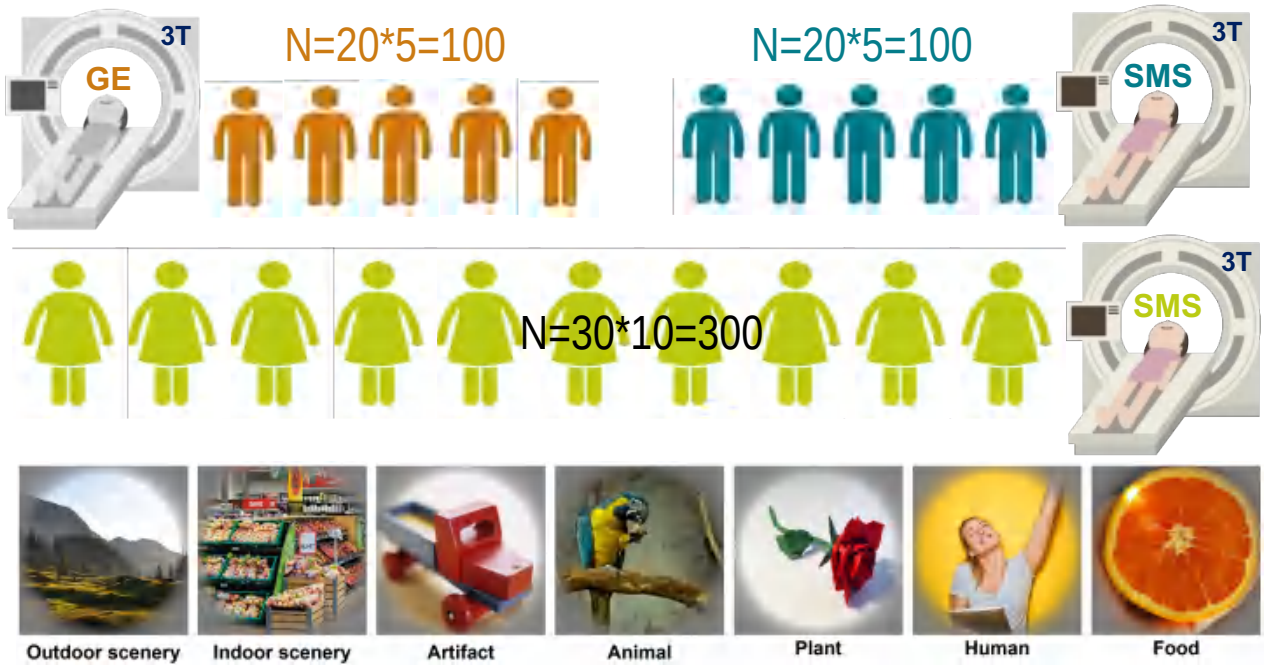
A Deep Design for 3R MRI

Design-I: 100 participants, N=500 scans



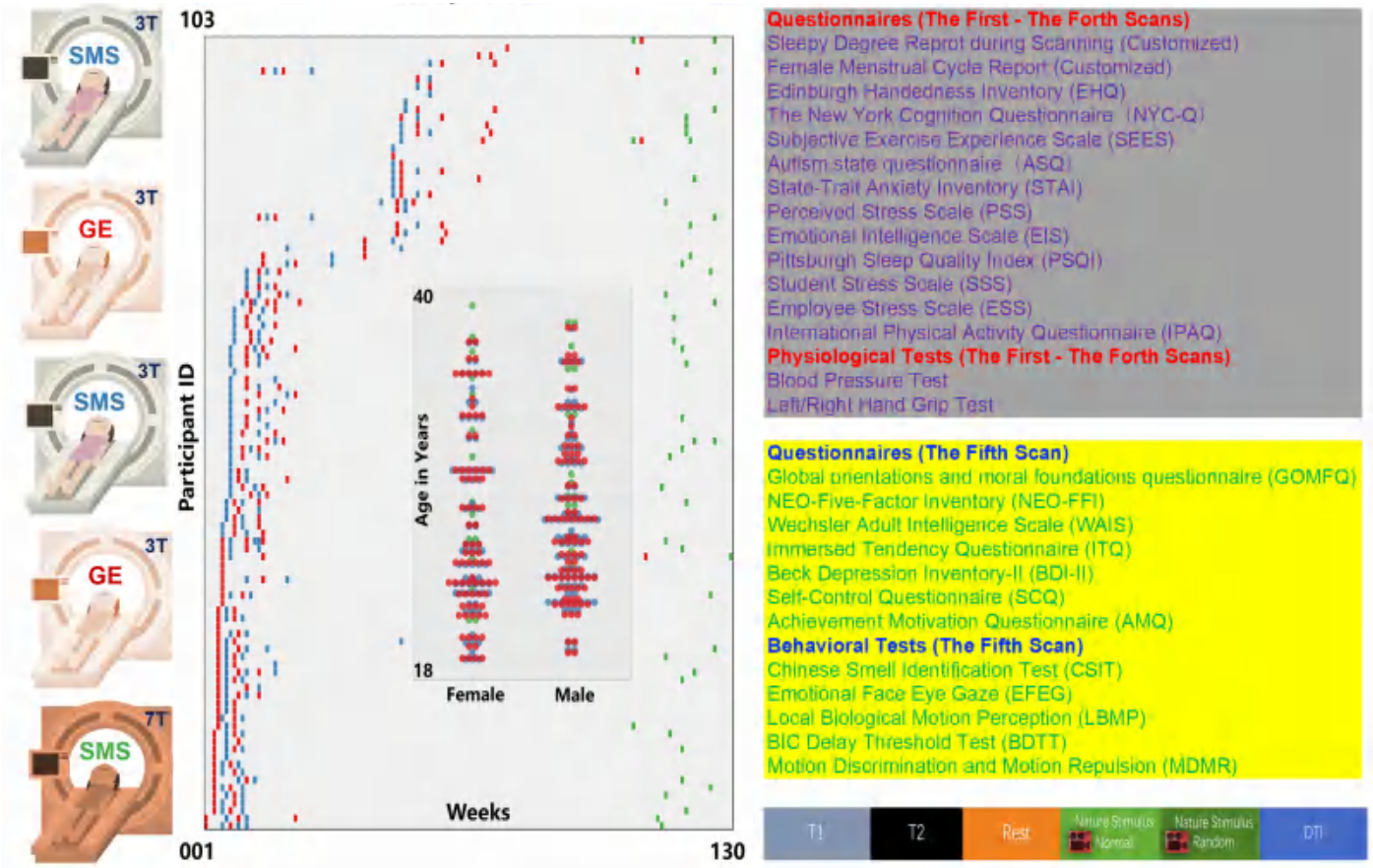
Design-II: 50 participants, N=500 scans

Each subject views 5000 pictures in 5/10 hrs FMRI

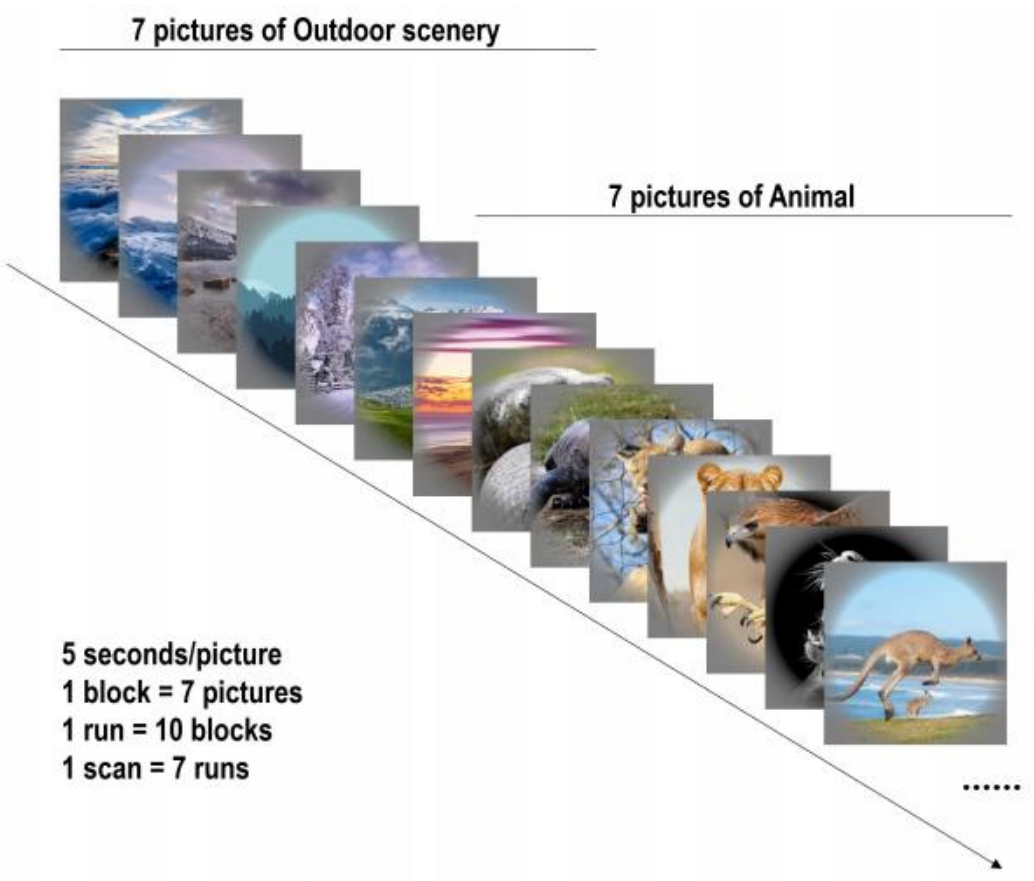


3R-BRAIN
Outcomes

Design-I: 103 participants, N=392 scans



Design-II: 50 participants, N=520 scans



3R-BRAIN
BIDS & MRI-QC

Scientific Data 3,160044 (2016); *PLoS One* 12, e0184661 (2017)

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      - sub-0099_ses-2_movie1_acq-multiband_bold.nii.gz
      - sub-0099_ses-2_movie2_acq-multiband_bold.json
      - sub-0099_ses-2_movie2_acq-multiband_bold.nii.gz
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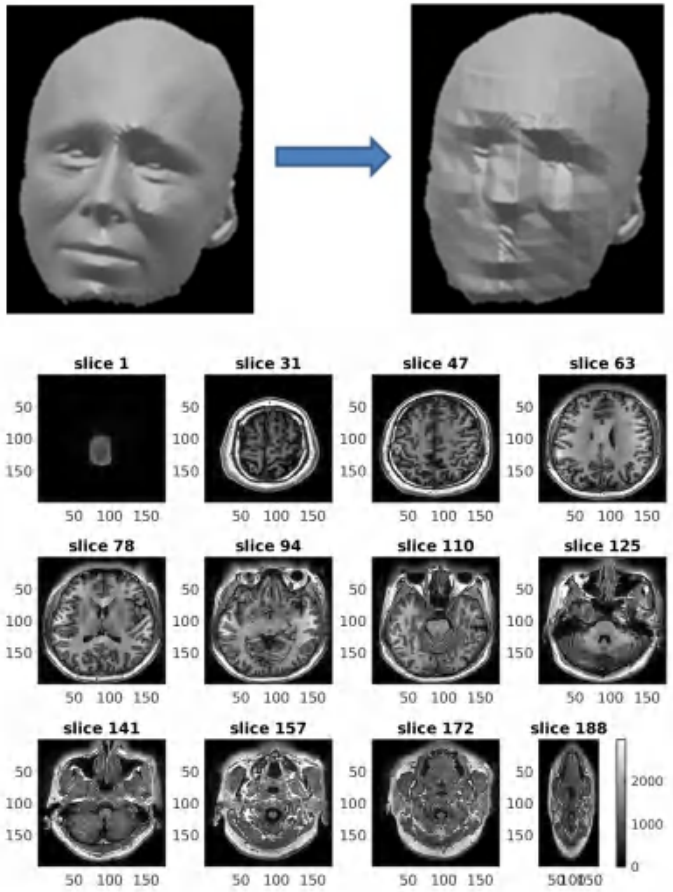
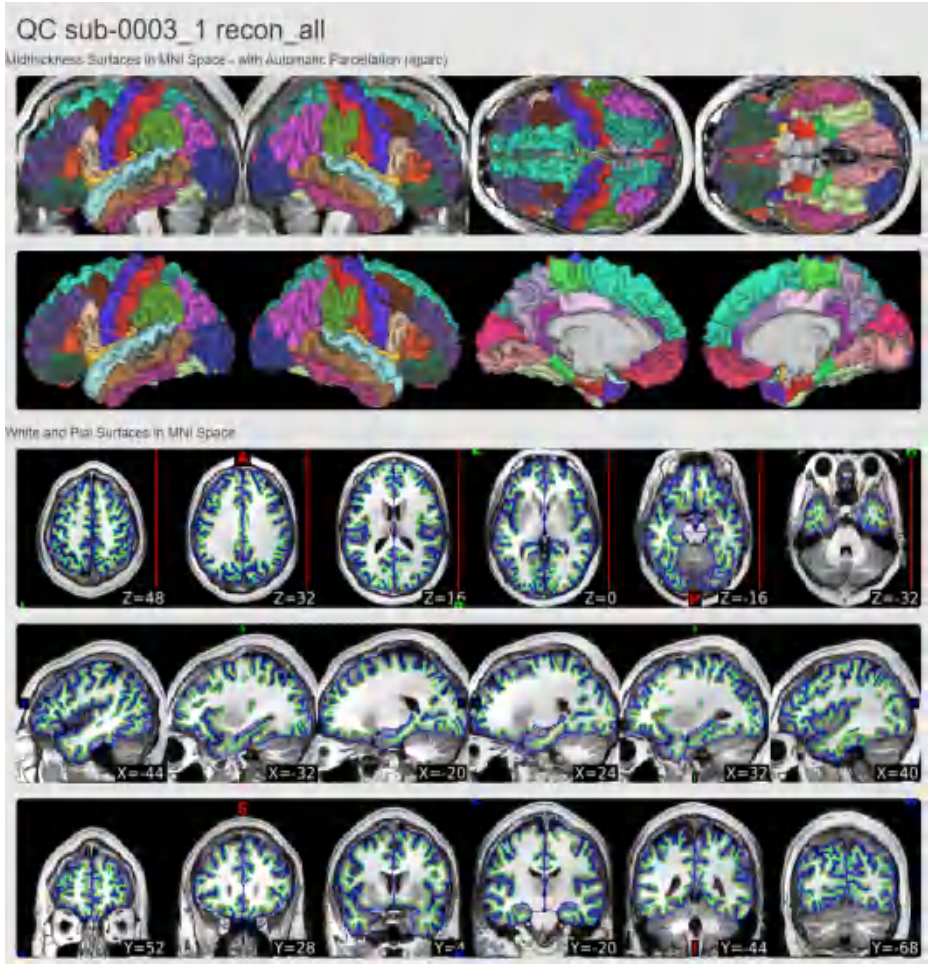
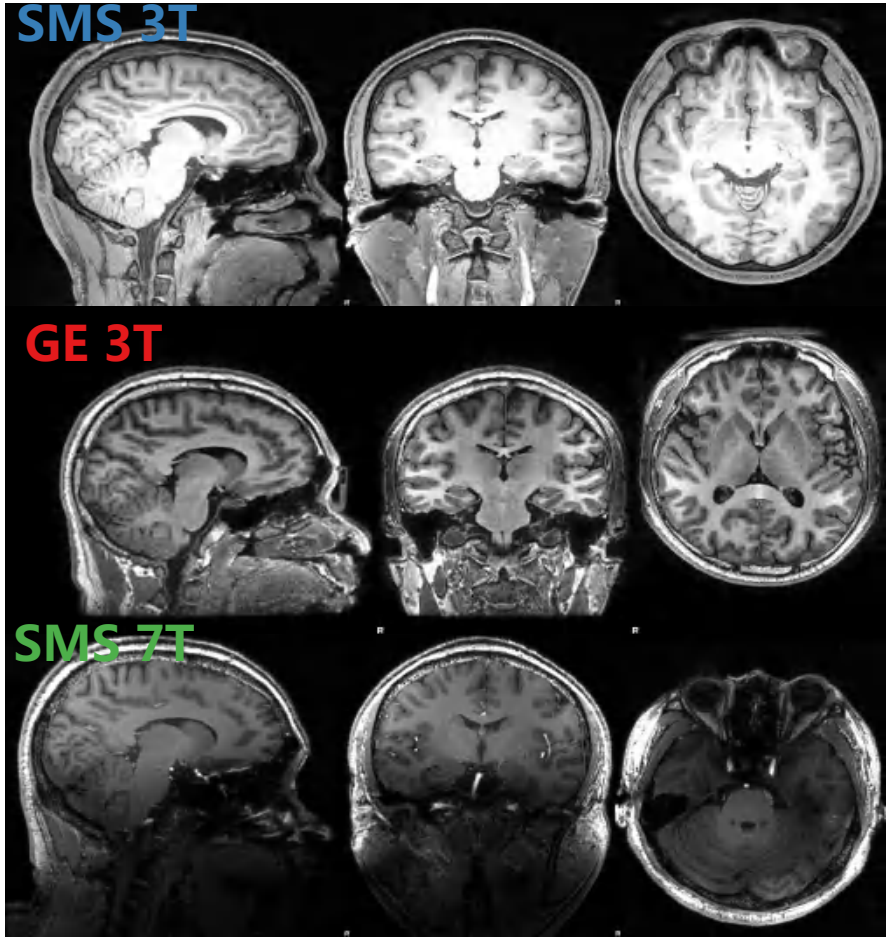
  - ses-3

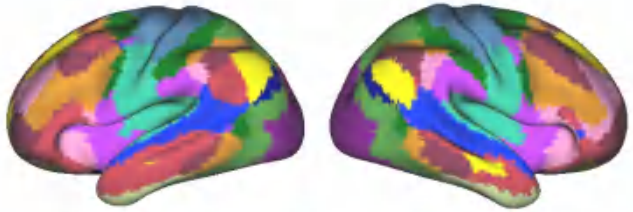


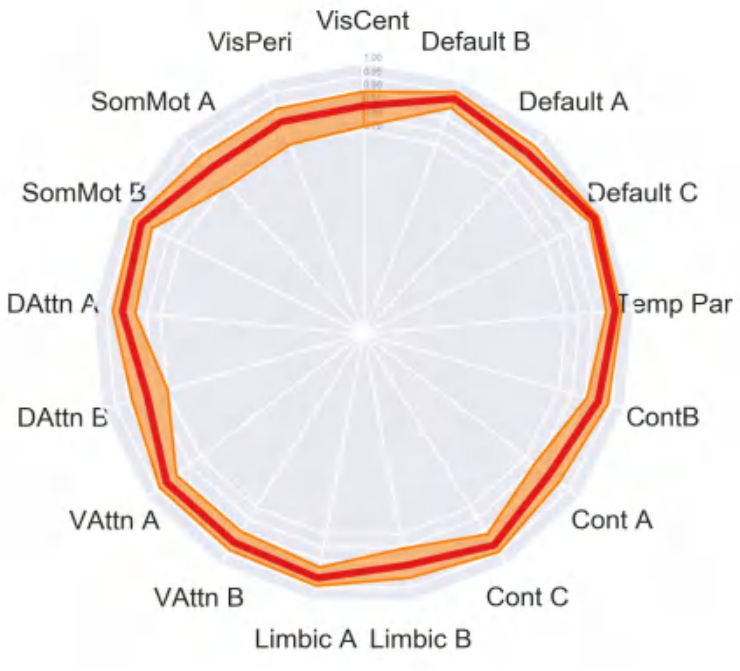


3R-BRAIN
Reliability Assessment

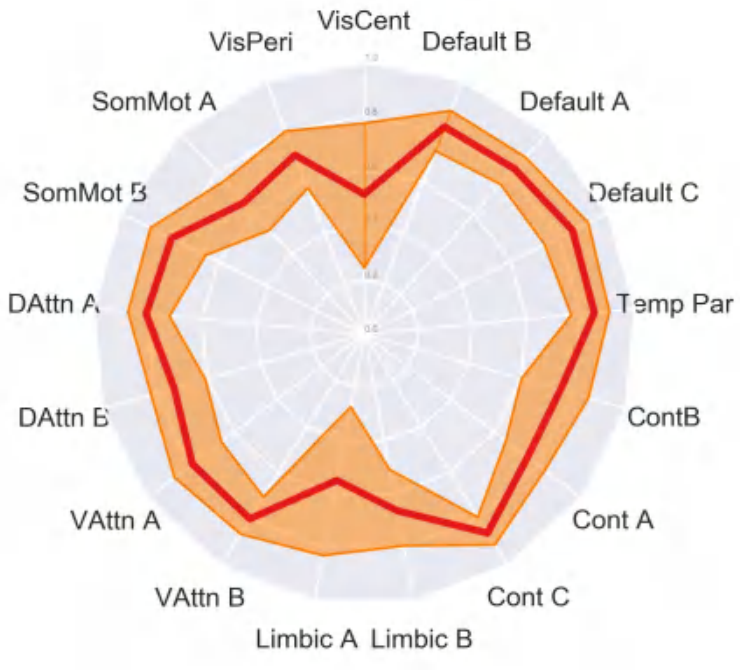


Reliability (Session)





Reliability (Scanner)



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