

Examining the relationship
between HERITABILITY
and EVOLUTION

Nadia Blostein

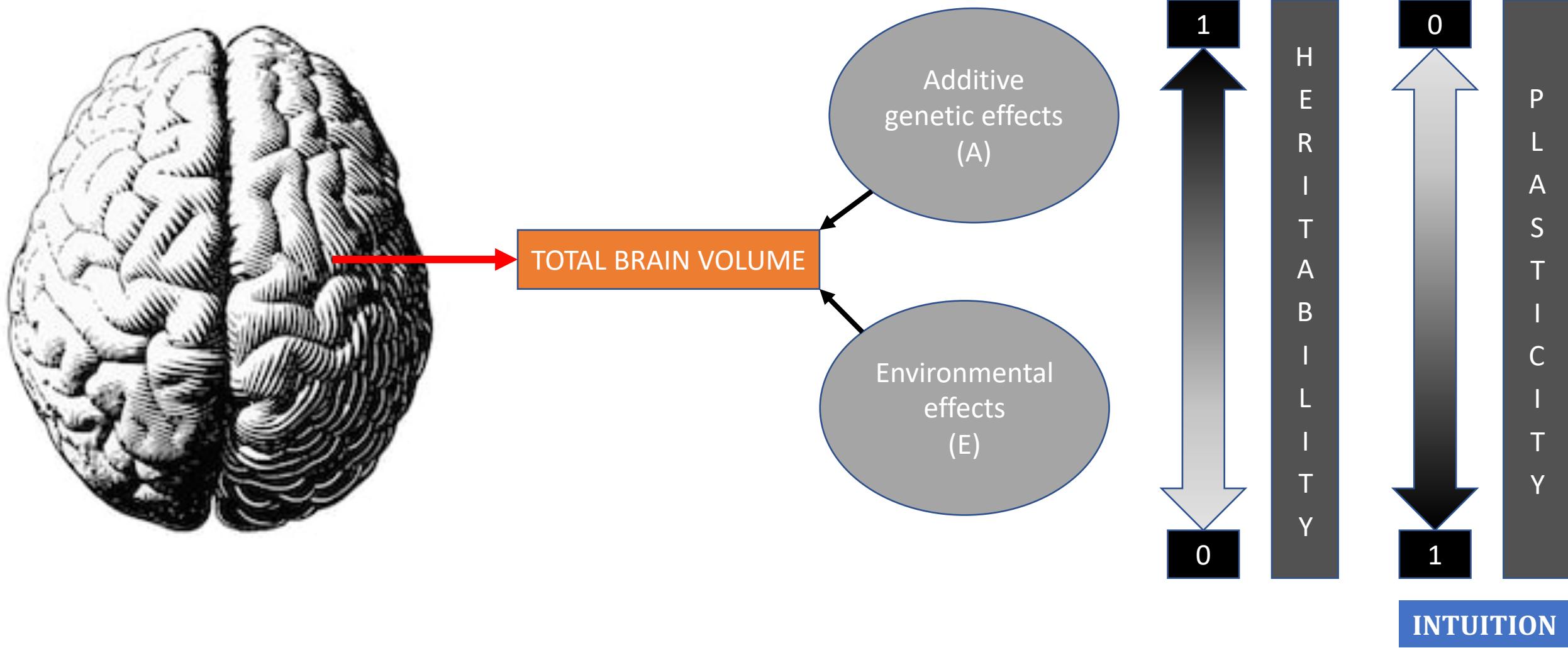
Supervisor: Dr. Mallar
Chakravarty

BRAINHACK SCHOOL 2020

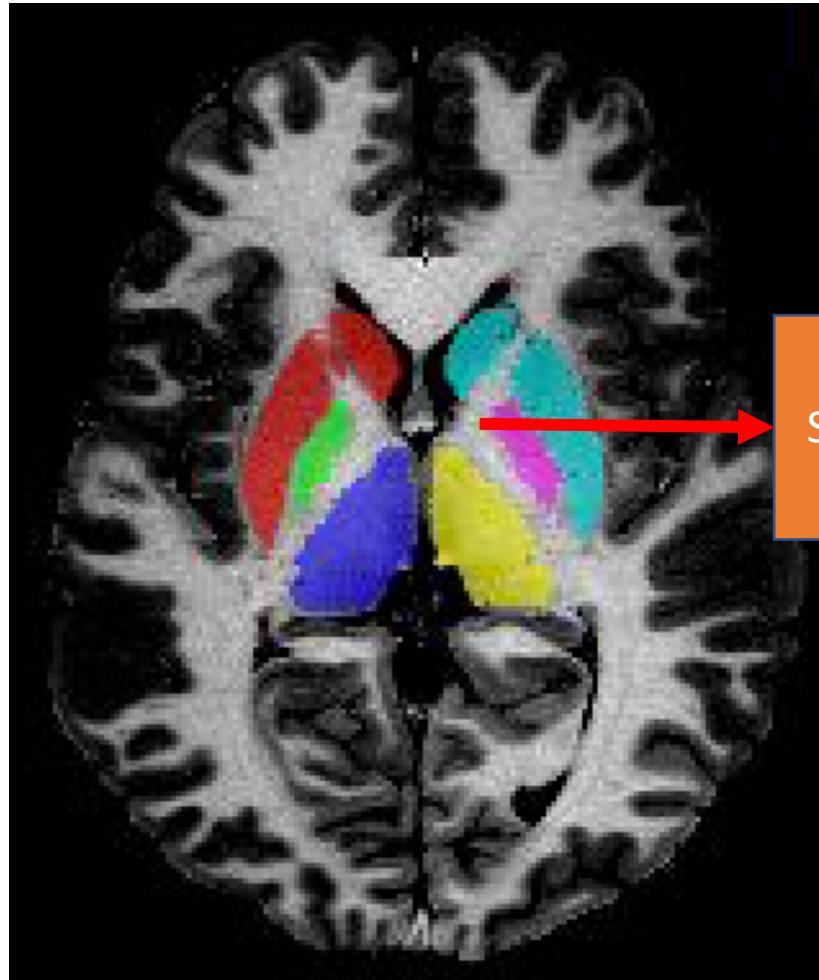


CoBrA Lab

Computational Brain
Anatomy Laboratory at the
Douglas Institute



Intuition: quantification of “NATURE VS NURTURE”



SUBCORTICAL
STRUCTURE VOLUME
& SHAPE

Additive
genetic effects
(A)

→ *vertex-wise surface area*
→ *vertex-wise displacement*

effects
(E)

1

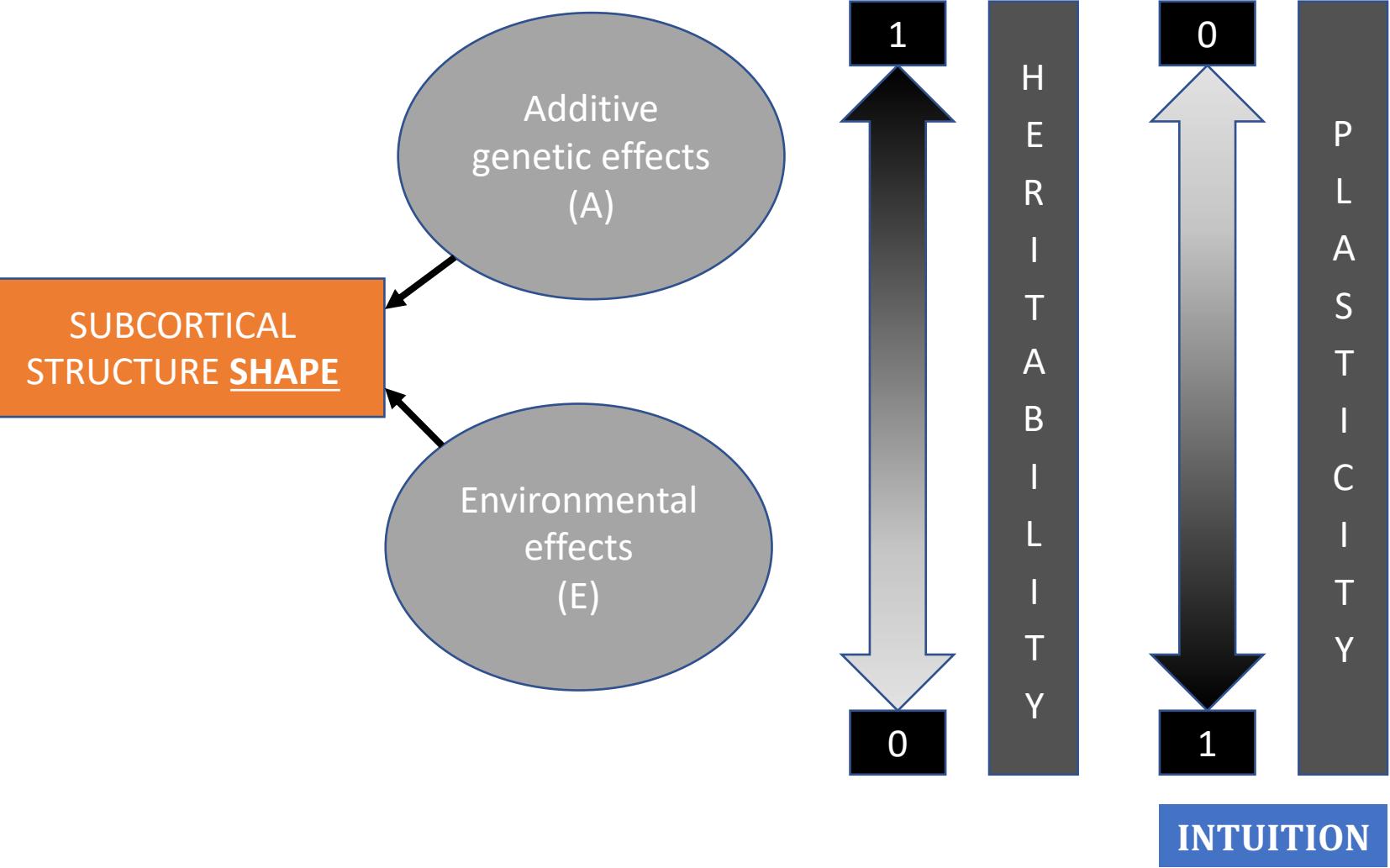
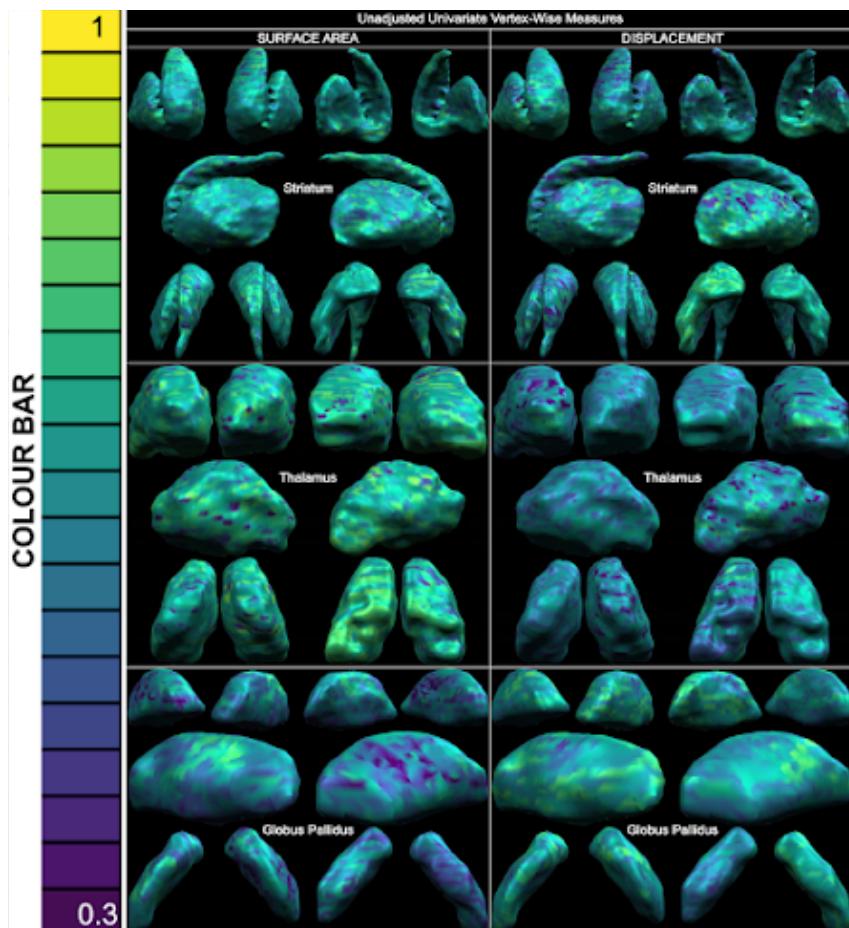
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BACKGROUND

DATA

TOOLS



BABOON

- Template: HAIKO 89 T1w population-based average MRI
- Labels: none

RHESUS

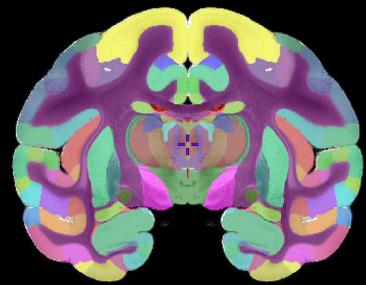
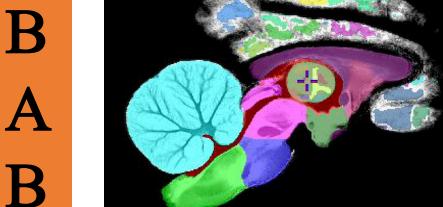
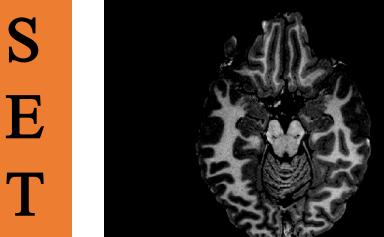
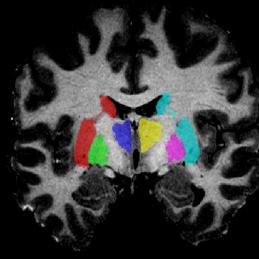
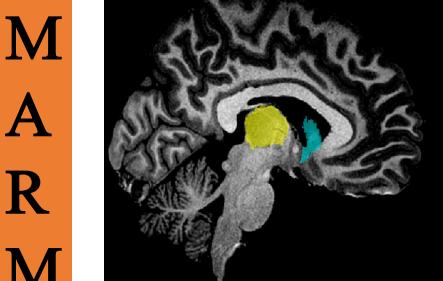
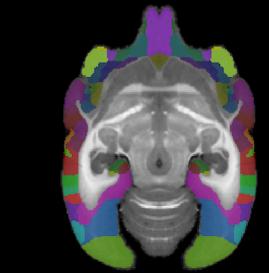
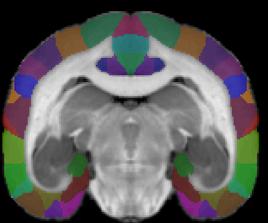
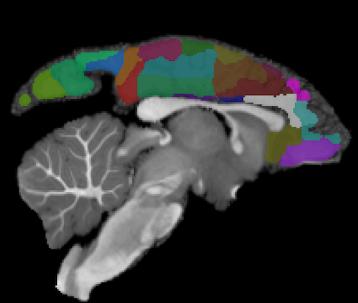
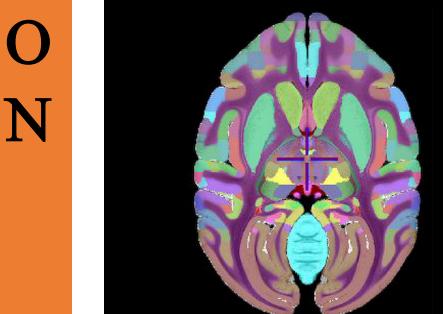
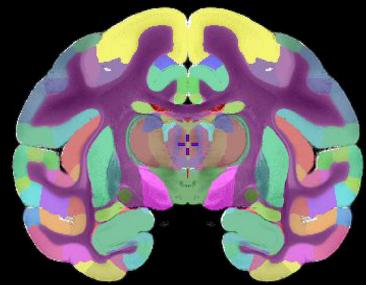
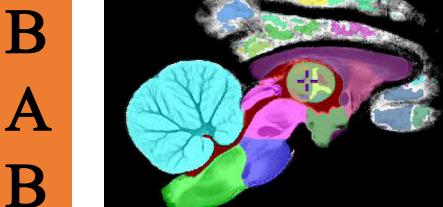
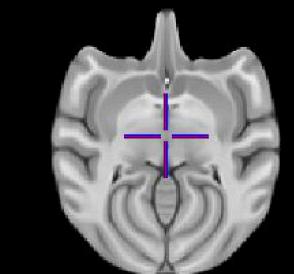
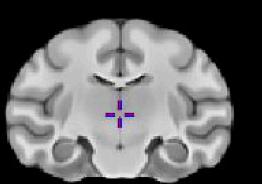
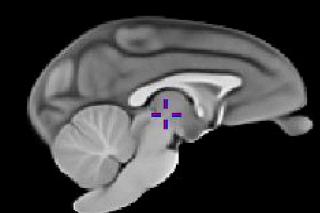
- Template: NMT T1w MRI population-based average MRI
- Labels: surrogate D99

MARMOSET:

- Template: MBM single-subject MTR image
- Labels: beta-subcortical

HUMAN:

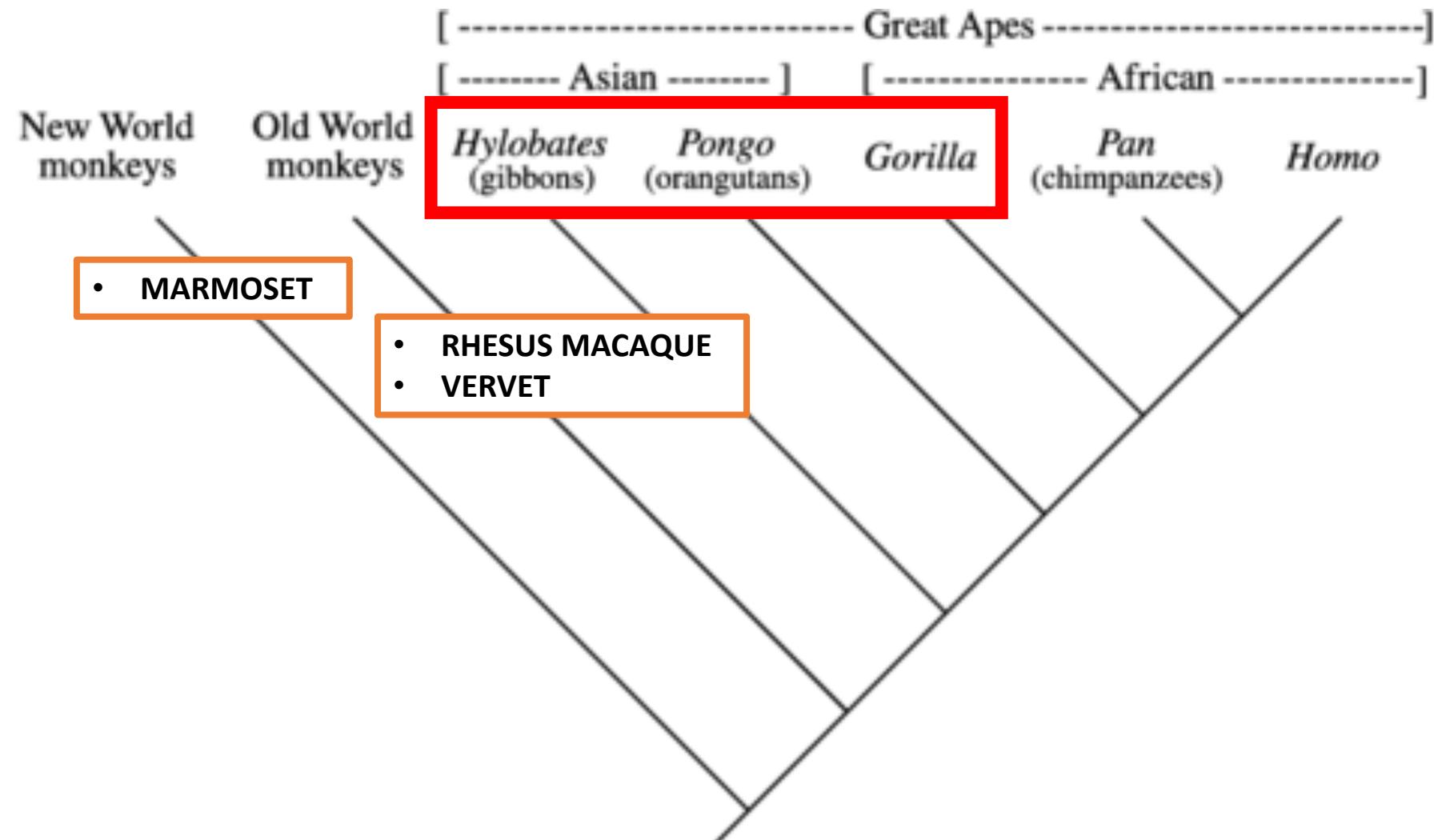
- Template: what would be a good template?
- Labels: CoBrA Lab subcortical labels



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- ▶ Advanced Normalization Tools (ANTS) to register brains to each other
 - using subcortical labels as brain masks
- ▶ Spatial permutation test (Alexander-Bloch et al. 2018)

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