Adolescent Brain Cognitive Development (ABCD) Community MRI Collection and Utilities
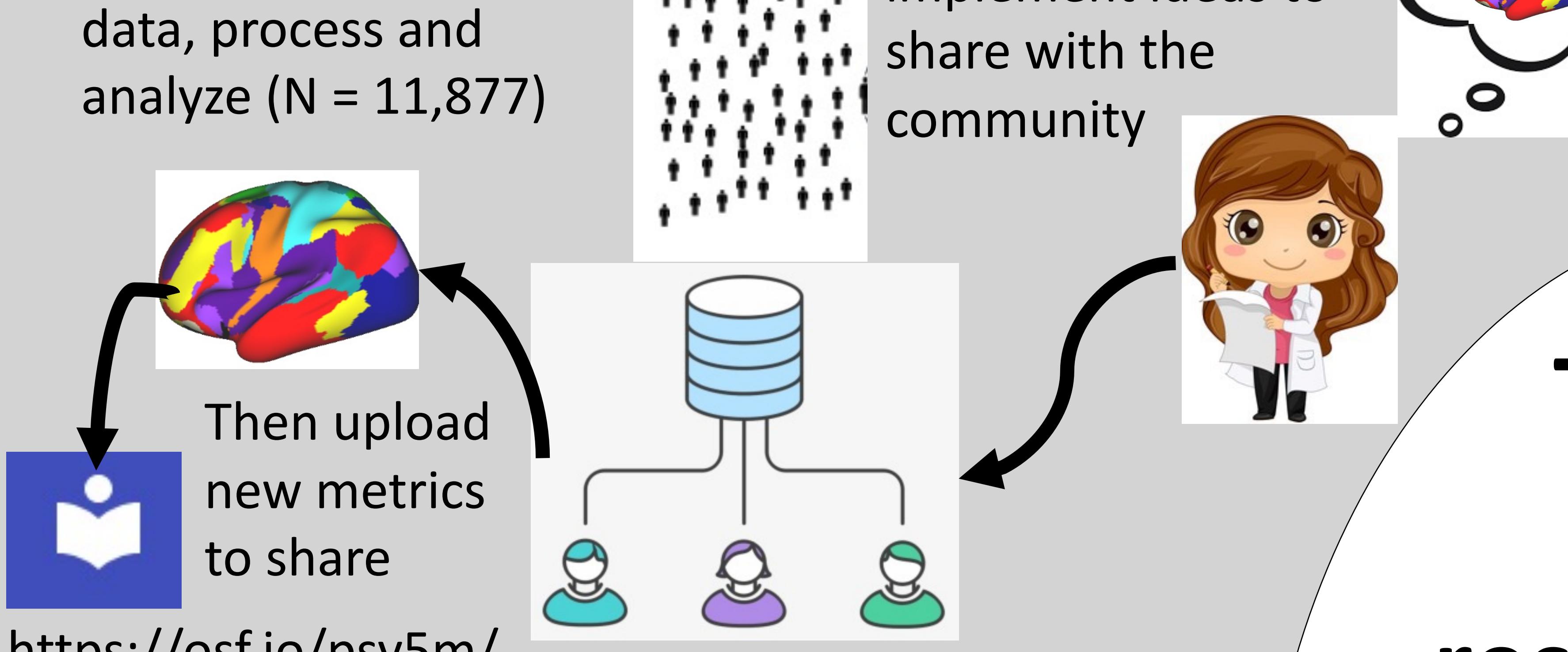
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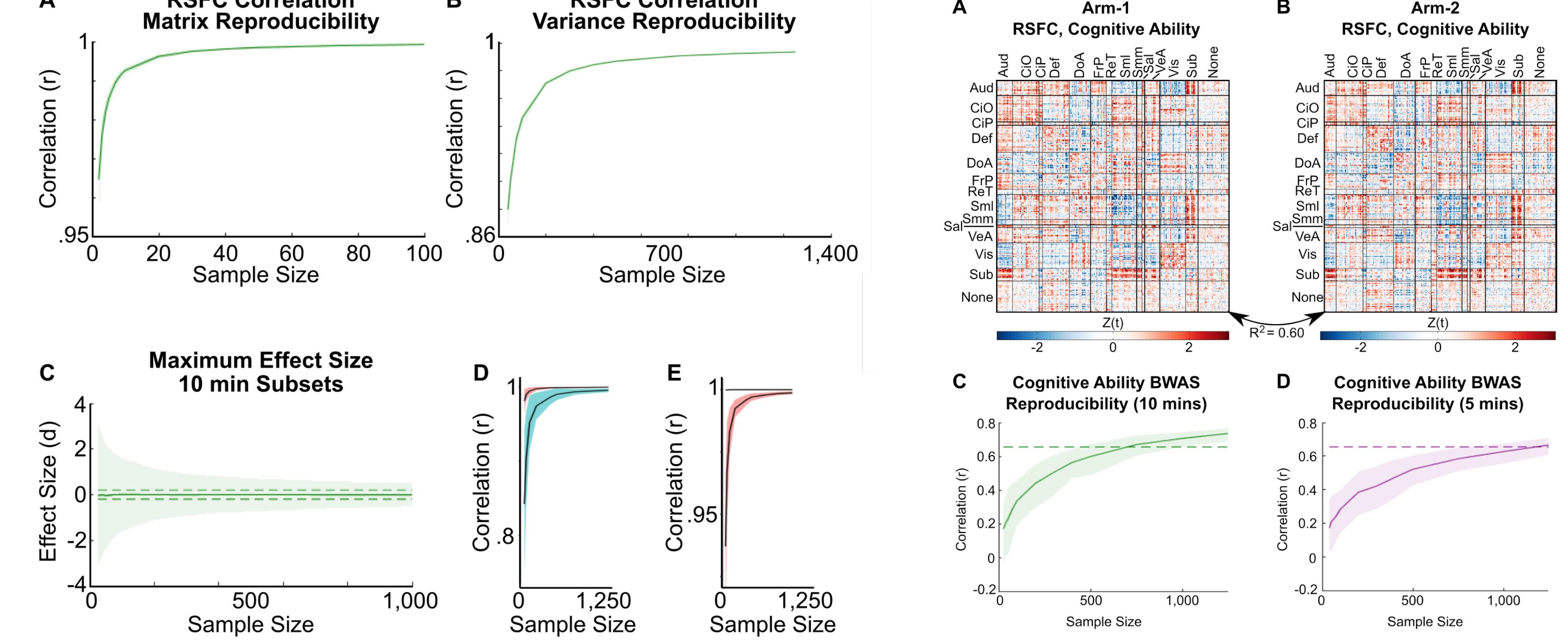
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ABCC removes barriers to community sharing
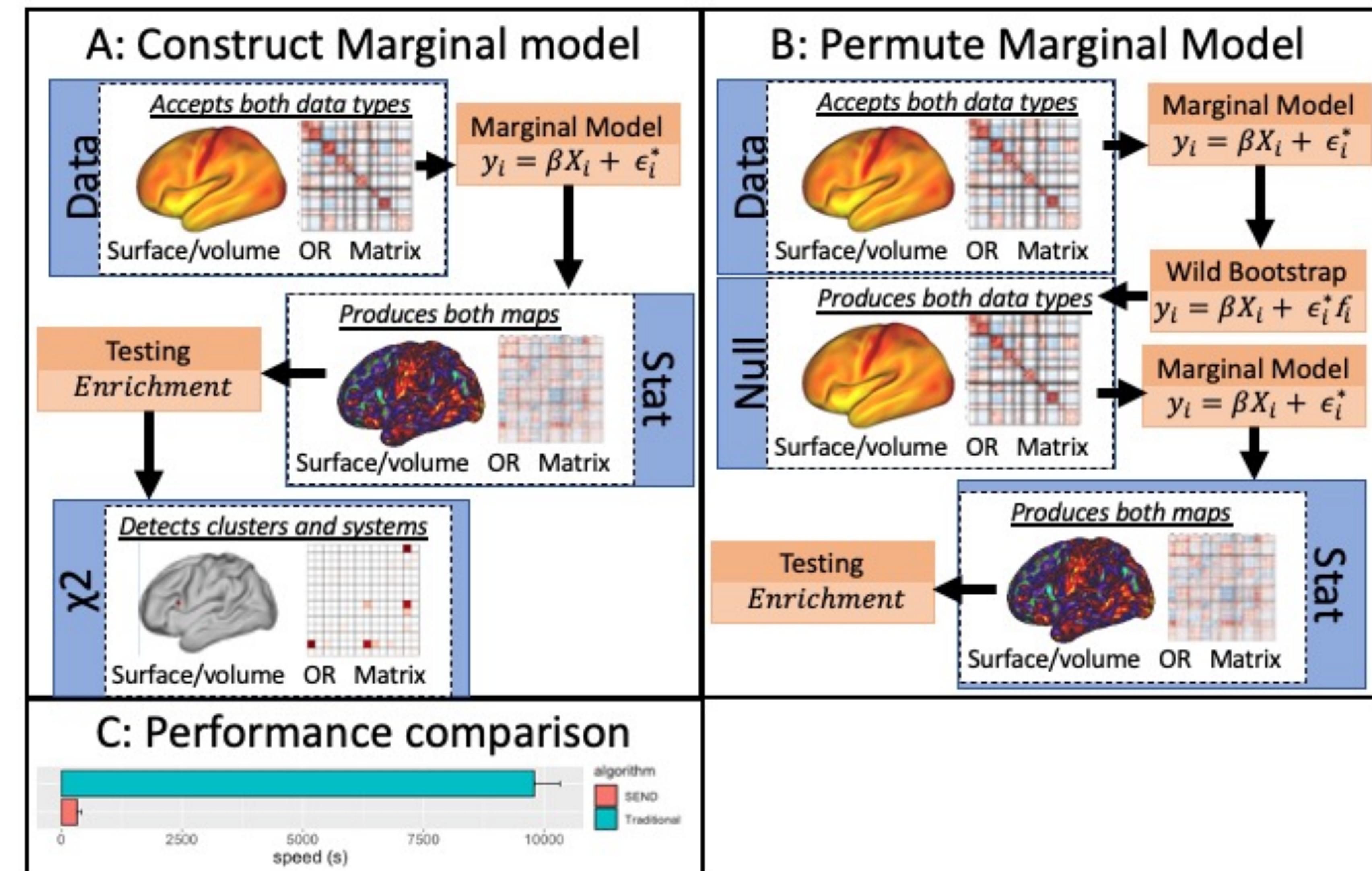
They can pull the ABCD data, process and analyze (N = 11,877)

Researchers want to implement ideas to share with the community

Then upload new metrics to share

https://osf.io/psv5m/

The ABCC enables researchers to access, process, reproduce, analyze, and share ABCD derived data

ABCD Reproducible Matched Samples for reproducing analyses

A RSFC Correlation Matrix Reproducibility

B RSFC Correlation Variance Reproducibility

C Maximum Effect Size 10 min Subsets

A Arm-1 RSFC, Cognitive Ability

B Arm-2 RSFC, Cognitive Ability

C Cognitive Ability BWAS Reproducibility (10 mins)

D Cognitive Ability BWAS Reproducibility (5 mins)

ABCD-BIDS processes ABCD data

A. PreFreeSurfer — BIDS Input (DICOM) → DCM to BIDS

B. FreeSurfer — Segmentation

C. PostFreeSurfer — FreeSurfer Output → MRI in CIFTI Space

D. fMRI Volume — Original fMRI → Registered to Atlas

E. fMRI Surface — fMRI in CIFTI Space

F. Preproc — Parcellated Connectivity

Sandwich Estimator for Neuroimaging Data analysis

A: Construct Marginal model

Accepts both data types

Marginal Model $y_i = \beta X_i + \epsilon_i^*$

Surface/volume OR Matrix

Produces both maps

Testing Enrichment

Detects clusters and systems

B: Permute Marginal Model

Accepts both data types

Marginal Model $y_i = \beta X_i + \epsilon_i^*$

Wild Bootstrap $y_i = \beta X_i + \epsilon_i^* f_i$

Marginal Model $y_i = \beta X_i + \epsilon_i^*$

Produces both maps

Testing Enrichment

C: Performance comparison

ABCD data can be accessed through the NDA

Researcher starts by *requesting access* from the NDA

NIMH Data Archive — Adolescent Brain Cognitive Development
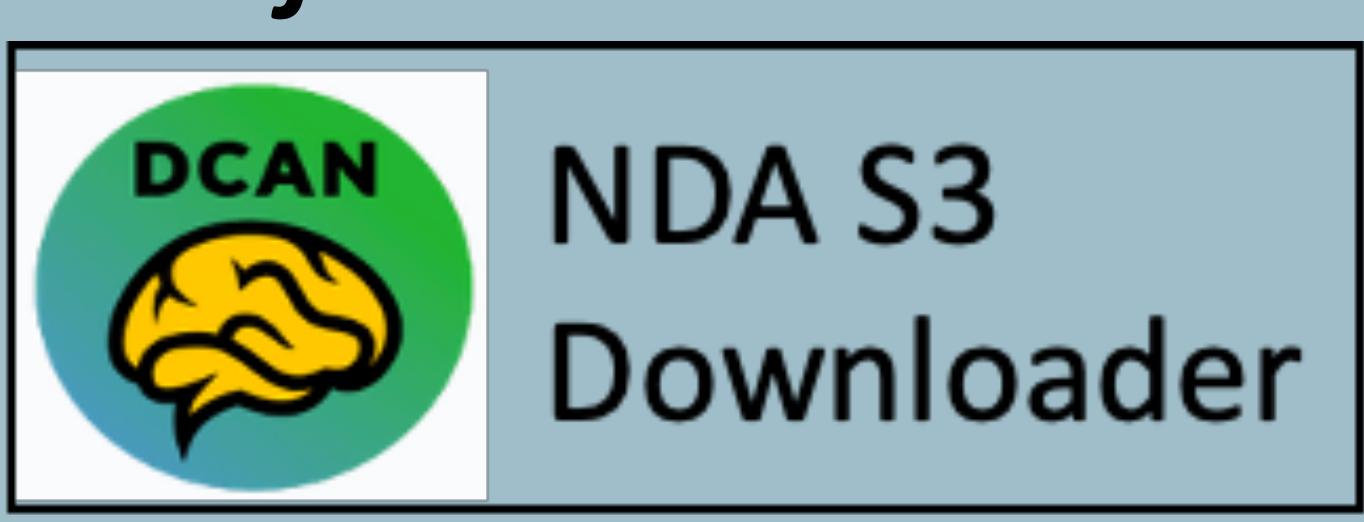
(https://nda.nih.gov/user/create_account.html).

Researcher can then *Download the NIH data manifest*

NIMH Data Archive — NDA

complete a data use certification (DUC) agreement for access

DCAN Labs S3 downloader can be used *to pull the data from the NDA*

DCAN NDA S3 Downloader

https://github.com/ABCD-STUDY/nda-abcd-s3-downloader

DCAN — DEVELOPMENTAL COGNITION AND NEUROIMAGING LAB

https://collection3165.readthedocs.io/en/stable/

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