

Children with persistent OCD symptoms have differences in Cortical Surface Area and White Matter Microstructure



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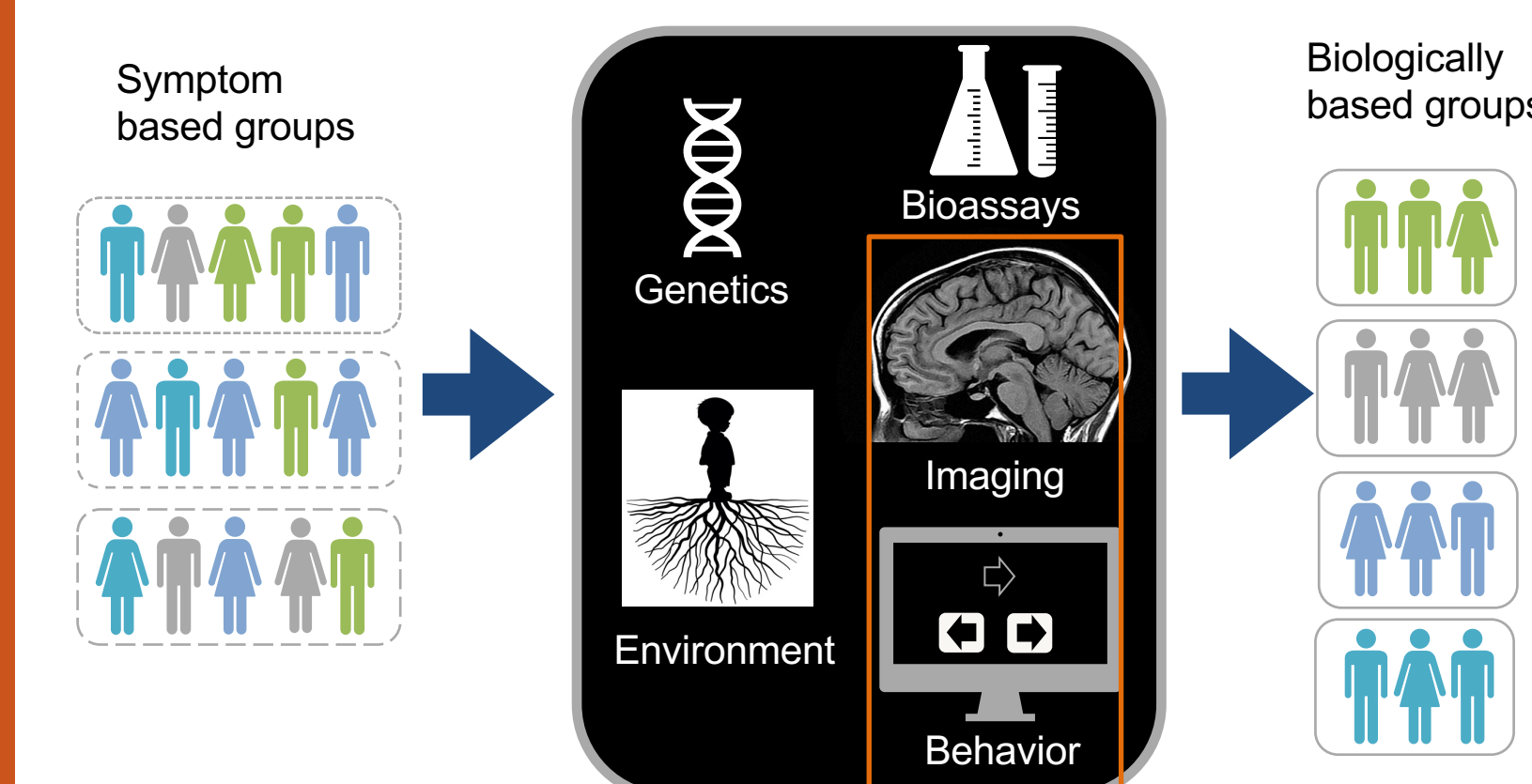
Cortical and White Matter Associations of OCD Symptoms in the Adolescent Brain and Cognitive Development Study (ABCD)

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Motivation and Aims:

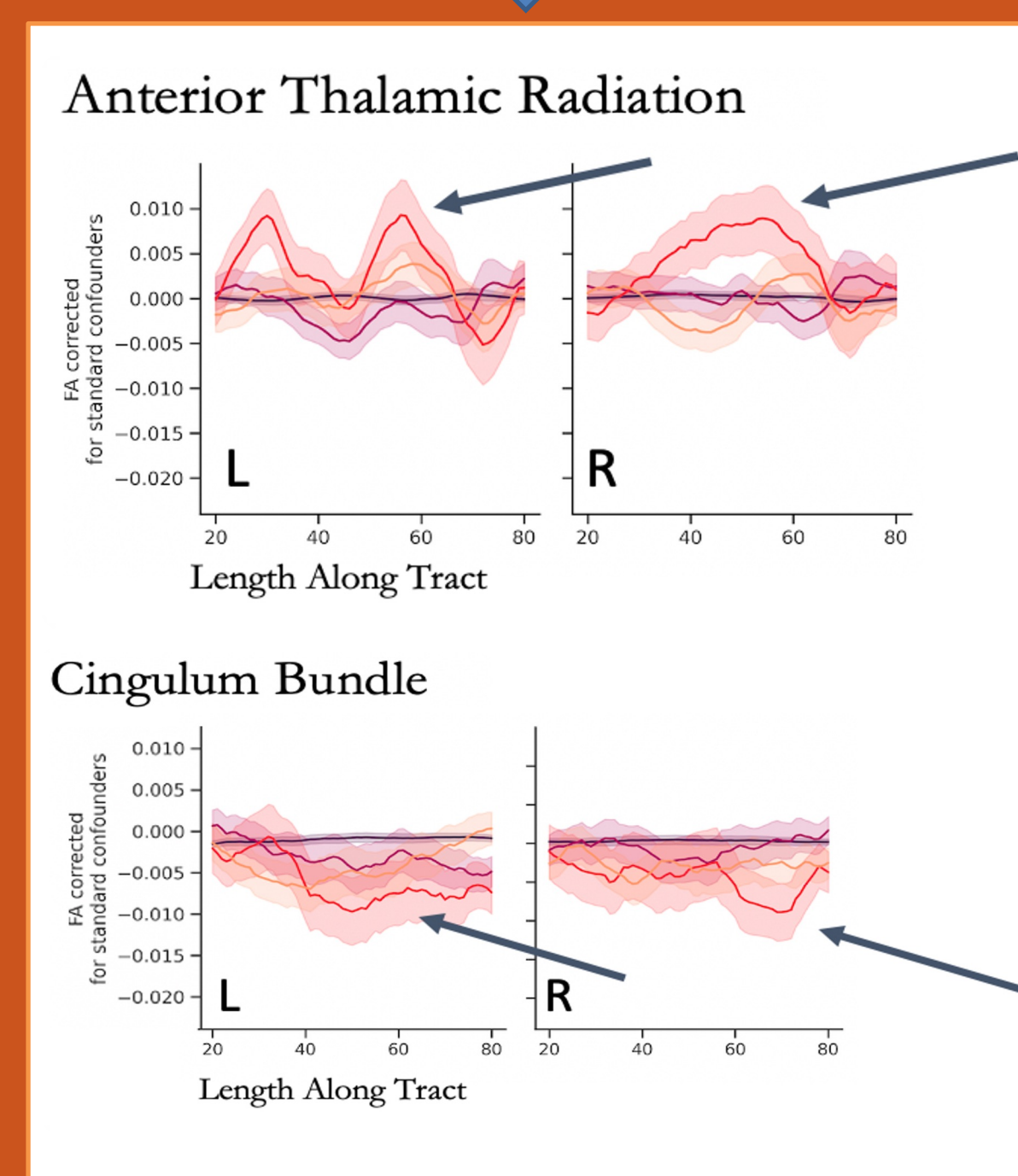
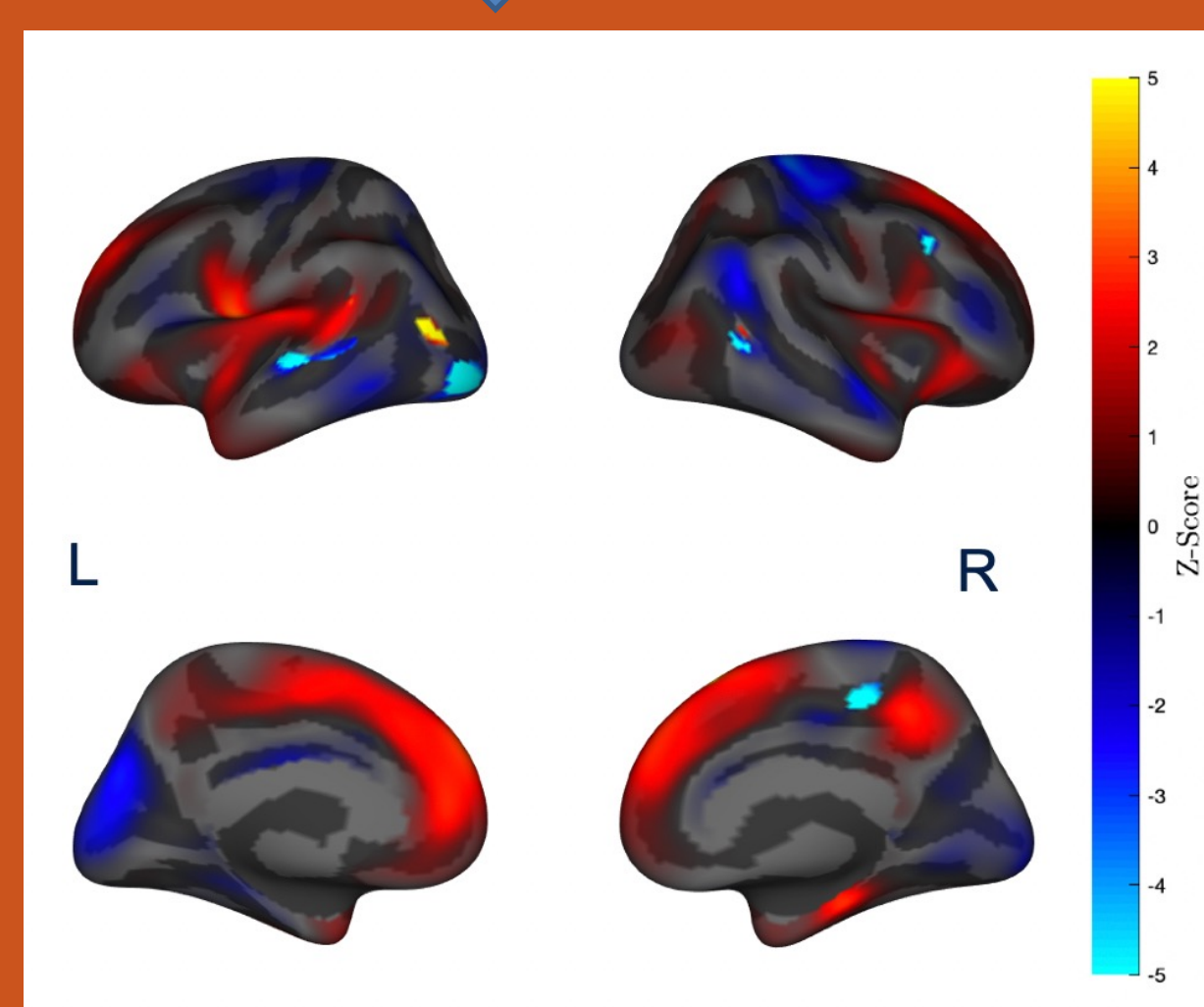
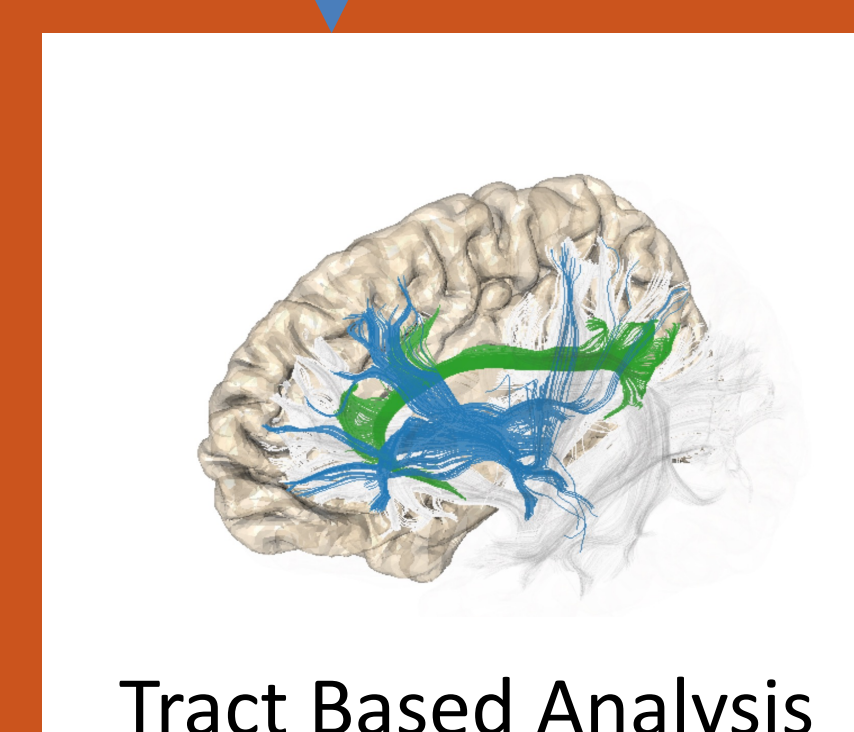
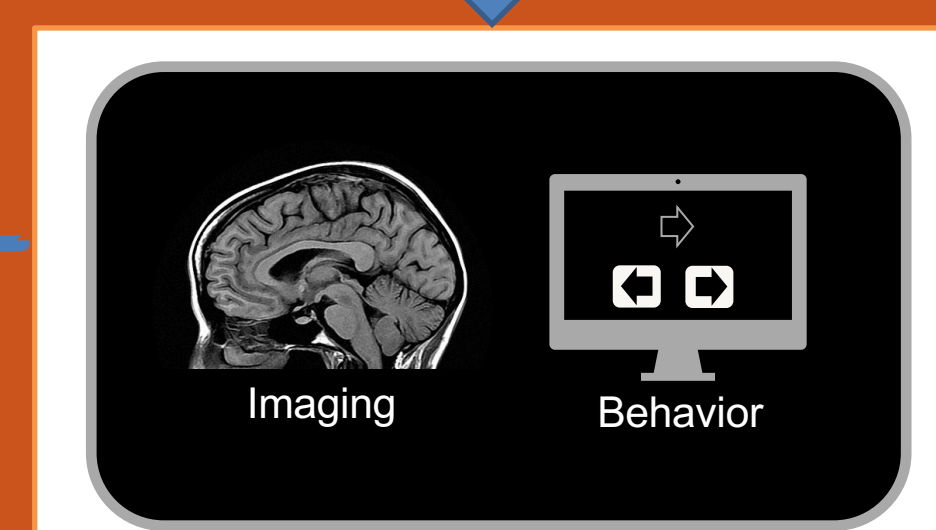
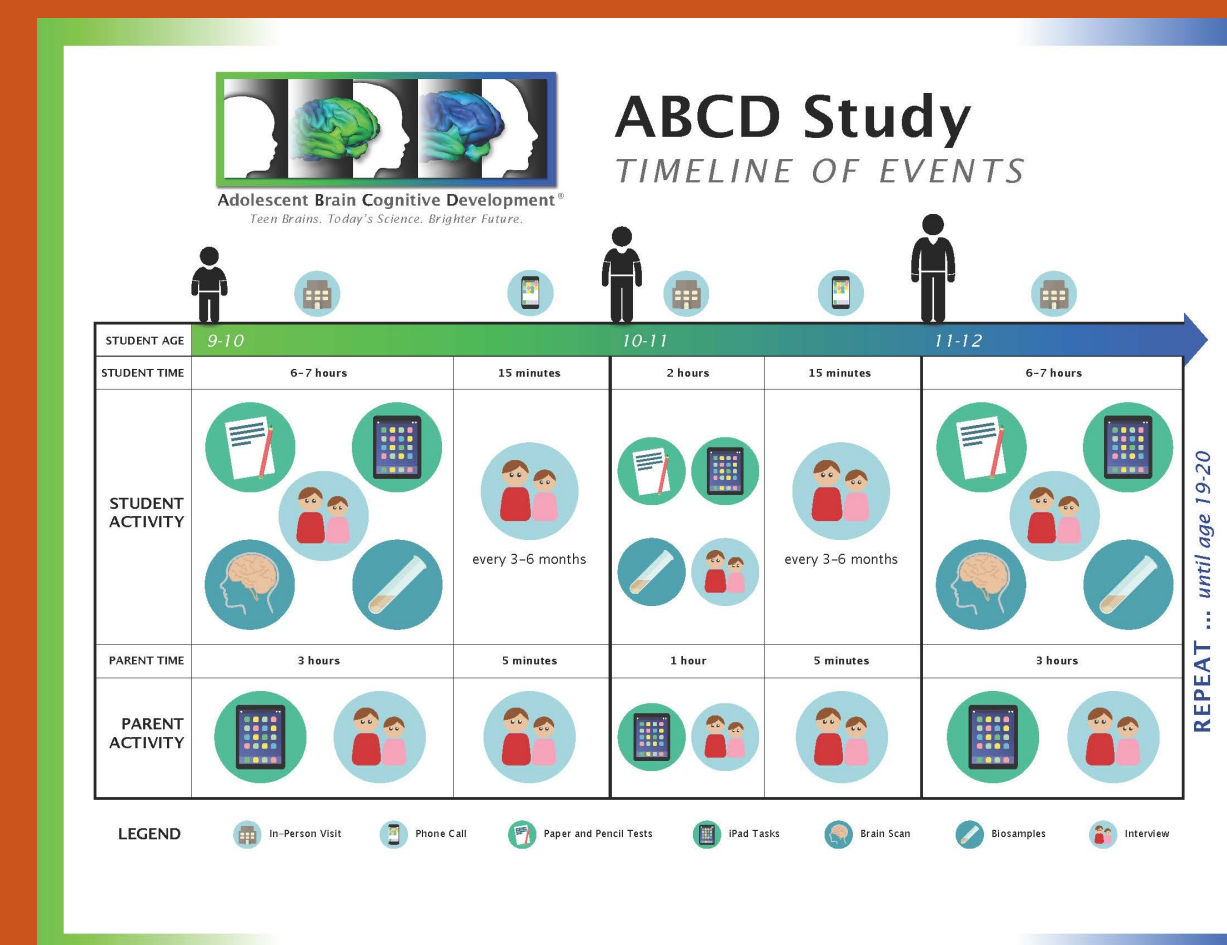
- Obsessive compulsive disorder (OCD) is a highly morbid condition that has a lifetime prevalence of up to 3% that often develops during childhood or adolescence
- Pathophysiology and developmental trajectory of this disorder and its symptoms are not fully understood
- Neuroimaging studies have the potential to advance our understanding, but their impact has been limited by small sample sizes and methodological heterogeneity
- Aim:** Leverage a diverse cohort with homogenously collected data to develop imaging biomarkers of OCD symptoms

The Goal: Precision Medicine in Psychiatry



Methods:

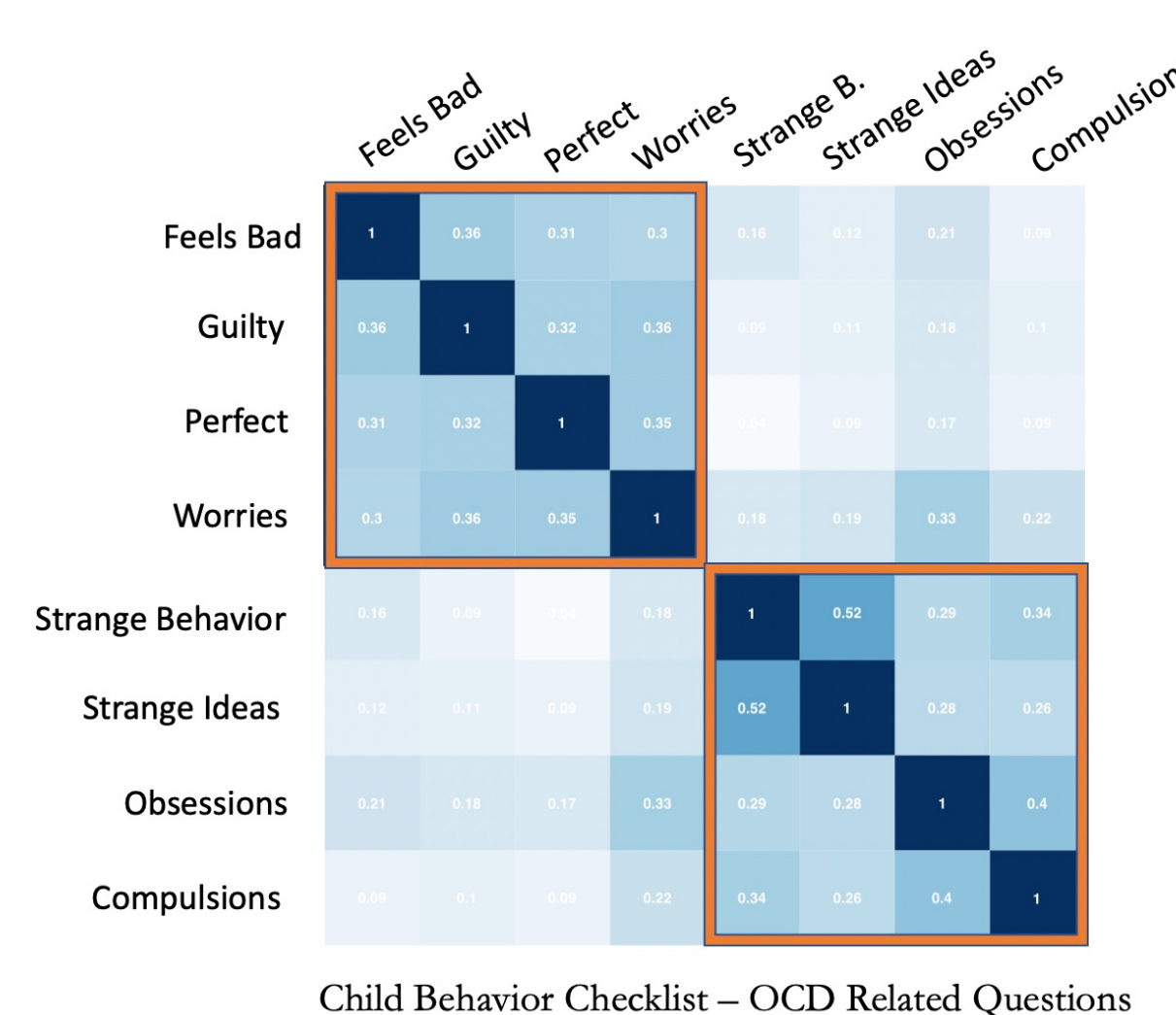
- Longitudinal study of ~12,000 children
- Standardized brain imaging and harmonized behavioral and cognitive assessments every 2 years
- This study focuses on baseline imaging data and behavioral assessments from baseline and year 2 timepoints
- Analyzed subgroups based on whether or not they met OCD criteria at baseline and year 2 timepoints
- OCD symptom scale derived from Child Behavior Checklist (CBCL), a validated, dimensional assessment of behavioral problems
- OCD diagnosis derived from categorical KSADs assessment
- In children meeting KSADS, OCD symptoms fall into 2 clusters – anxiety related symptoms and obsessions/compulsions related symptoms
- Cortical surface area is derived from from high resolution 3D structural t1-weighted MRI
- White matter fractional anisotropy (FA) values are derived from multi-shell diffusion weighted MRI
- FA values calculated along the length of major white matter tracts



Results:

- Linear Mixed Effects (LME) analysis shows increases in cortical surface area (CSA) associated with obsessions/compulsions related symptom cluster in the Superior Frontal Gyrus and the Ventrolateral Prefrontal Cortex
- Analysis of white matter (WM) tracts shows changes in diffusion measures in the Anterior Thalamic Radiation and Cingulum Bundle

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Discussion:

- Longitudinal analyses of dimensional obsessive/compulsive symptoms in those with persistent OCD revealed reliable CSA and WM markers
- Cortical areas and white matter tracts implicated here form cognitive networks whose dysregulation has previously been hypothesized to underlie OCD
- Proximity to these white matter tracts have been previously shown to discriminate between response and non-response to deep brain stimulation for OCD