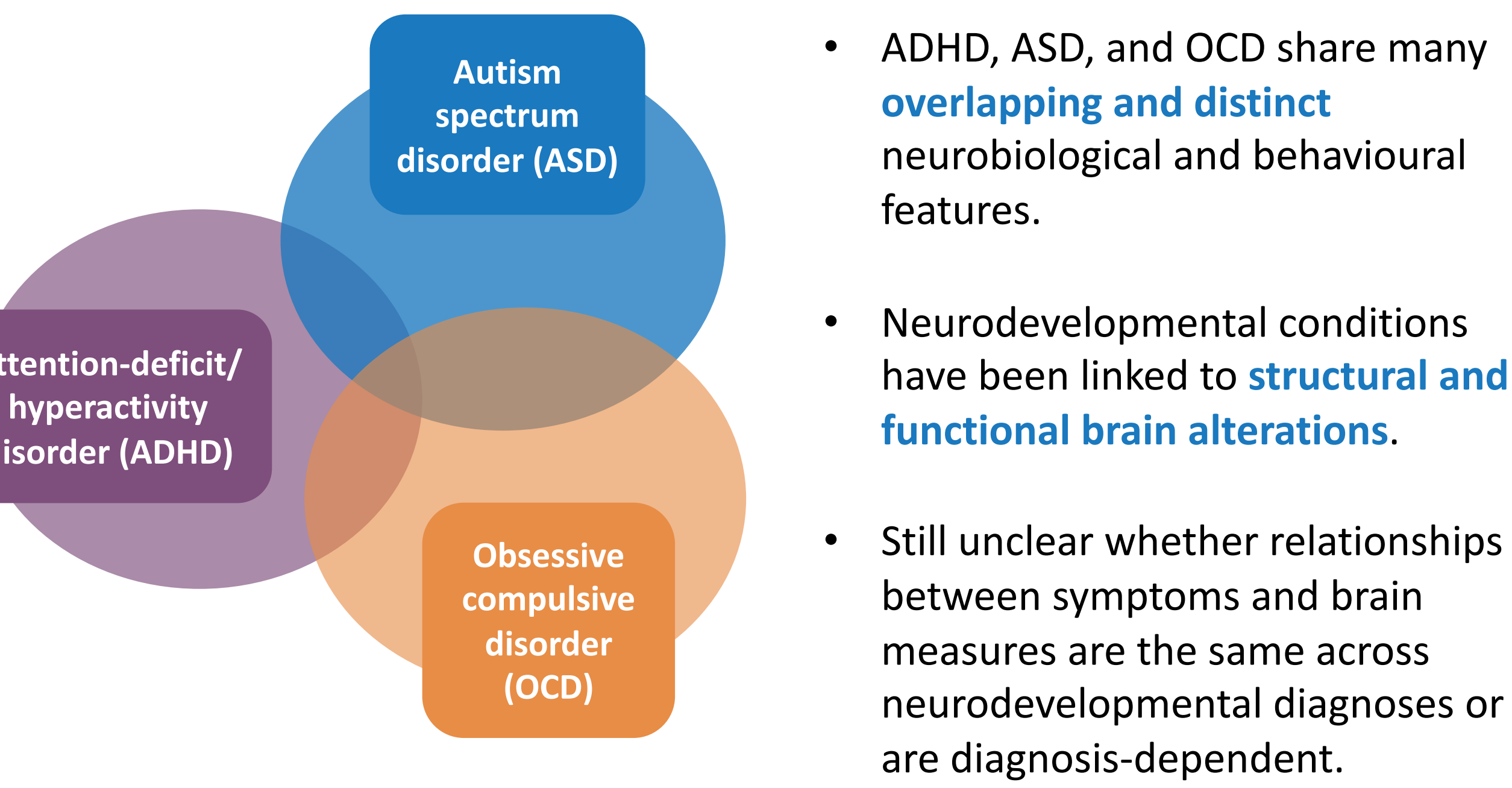


Where Neurodevelopmental Disorders Diverge: Multimodal Brain Alterations Across Youth With ADHD, ASD, and OCD

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Background and Rationale

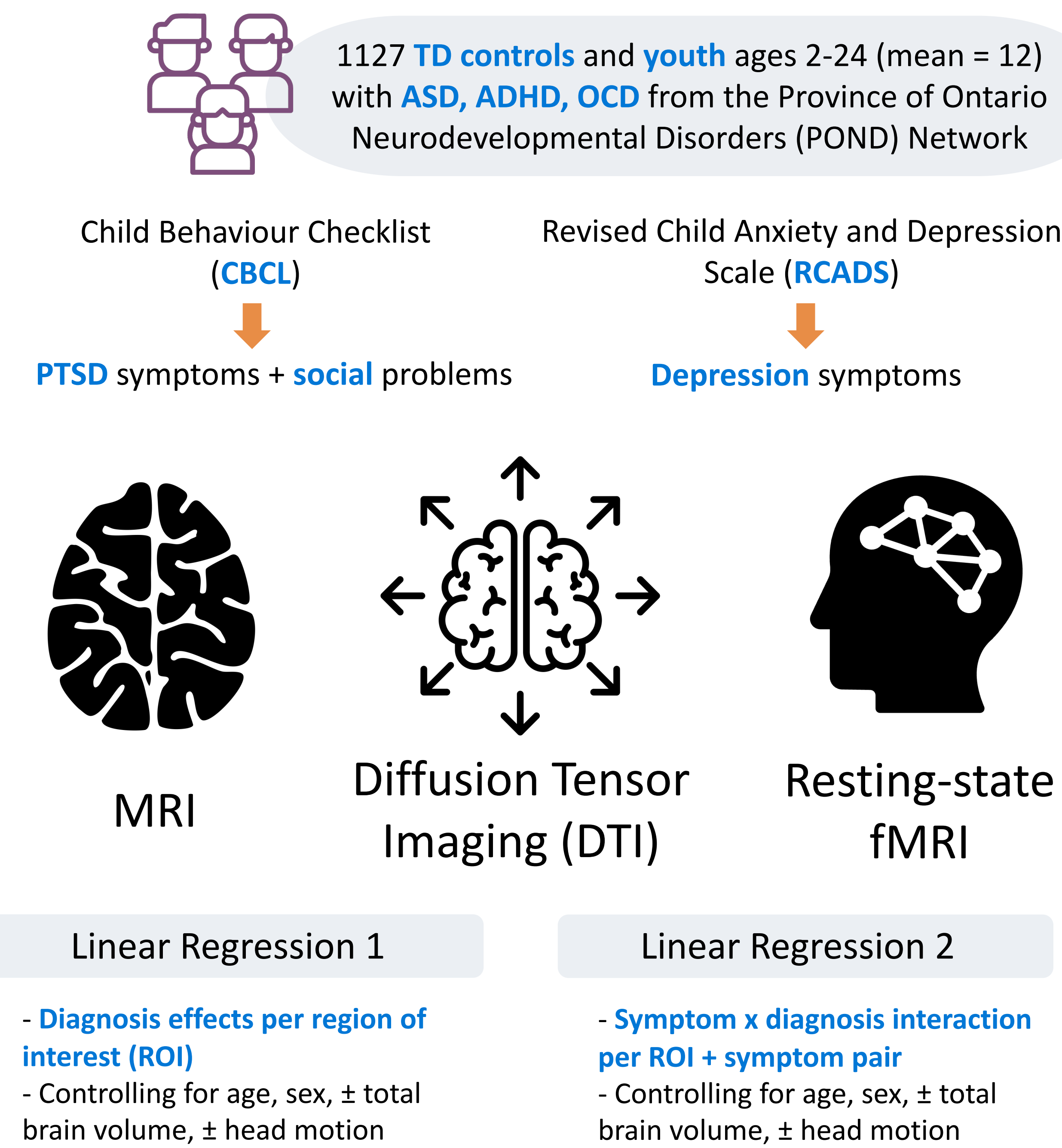


Research Question

- Do youth with **ADHD, ASD, and OCD** differ from typically developing (TD) peers and each other in **multimodal brain measures**?
- Does diagnosis moderate the relationship between brain alterations and symptom severity of **depression**, post-traumatic stress disorder (**PTSD**), and **social problems**?



Methods and Analyses



Although youth with neurodevelopmental conditions show some shared brain patterns, depression and PTSD symptom severity predict diagnosis-dependent brain alterations, highlighting that symptom-brain relationships are not one size fits all.

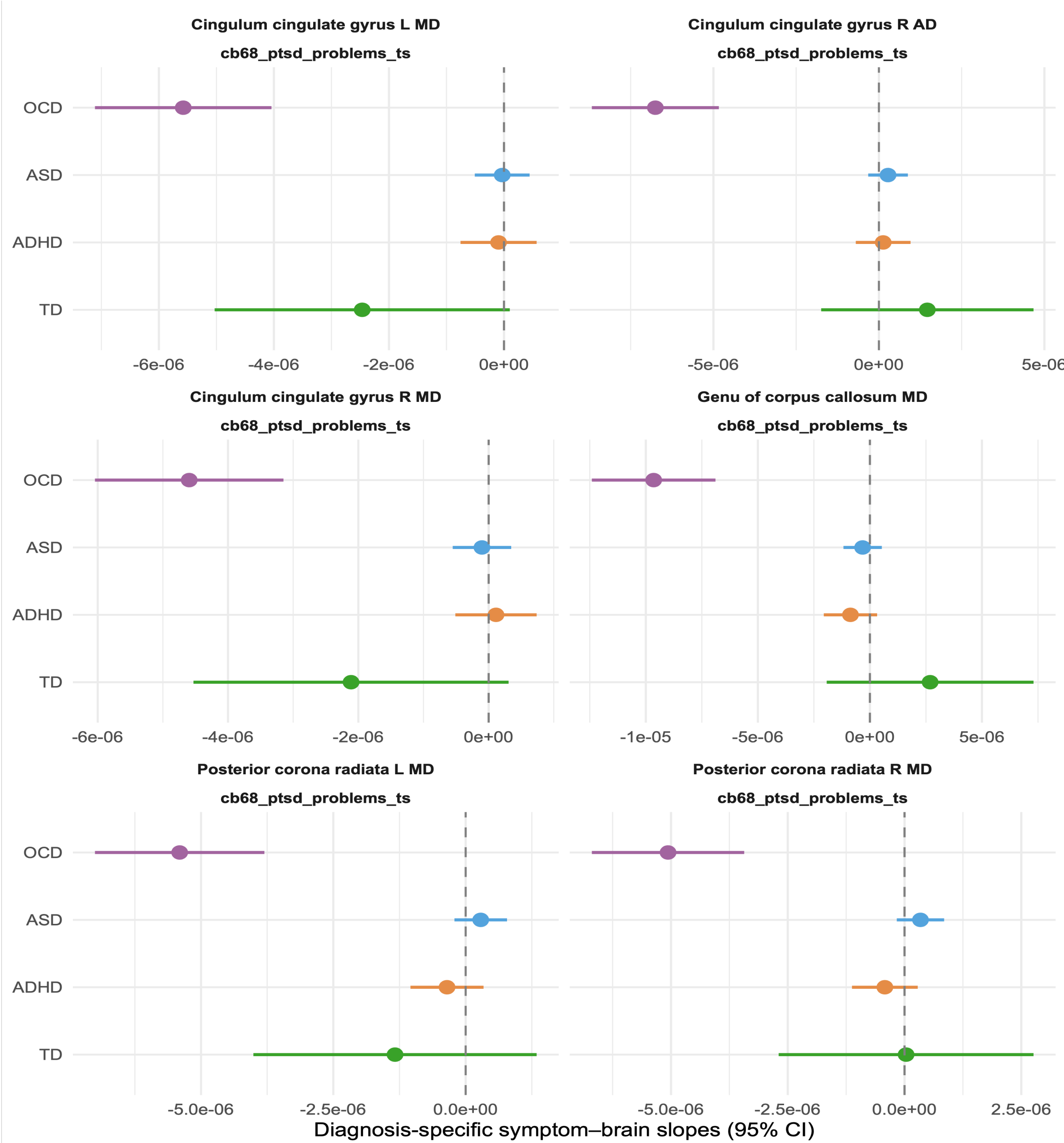


Results and Key Findings

In **linear regression 1** we found that:

- Most significant brain measures were **structural MRI**.
 - Posterior right hemisphere thickness alterations
 - Anterior cingulate cortex and paracingulate area alterations
- OCD** most consistently **differed** from the other groups.

In **linear regression 2**:



↑ PTSD symptoms = ↓ left postcentral gyrus cortical thickness **similarly, across all groups**.

↑ **PTSD problems** =

- ↓ cingulum mean diffusivity in **OCD**, ↓ limbic temporal pole connectivity in **ASD**,
- ↓ anterior globus pallidus volume in **ADHD**

↑ **depression problems** =

- ↓ corpus callosum mean diffusivity in **OCD**, ↑ superior parietal/precuneus volume in **ASD and TD**, and no significant ADHD slopes survived correction

Conclusion and Next Steps

Diagnosis strongly moderated PTSD-ROI and Depression-ROI associations, suggesting that symptom profiles may be more helpful than diagnostic category for understanding brain differences among youth with neurodevelopmental conditions.

- Follow youth with neurodevelopmental conditions longitudinally throughout treatment to examine whether symptom-ROI associations persist or resolve.
- Apply machine-learning approaches to test whether combining MRI, rs-fMRI, and DTI measures better predicts symptom severity or diagnosis than any single modality alone.

Relevance to Holland Bloorview



Partnering with patients and families at Holland Bloorview to improve outcomes for youth with neurodevelopmental conditions.



Findings suggest that a Holland Bloorview patient's symptoms, in addition to their diagnosis may carry meaningful neurobiological information to inform individualized care planning.

Support closer attention to PTSD and depression symptoms in neurodevelopmental care, regardless of primary diagnosis.

