

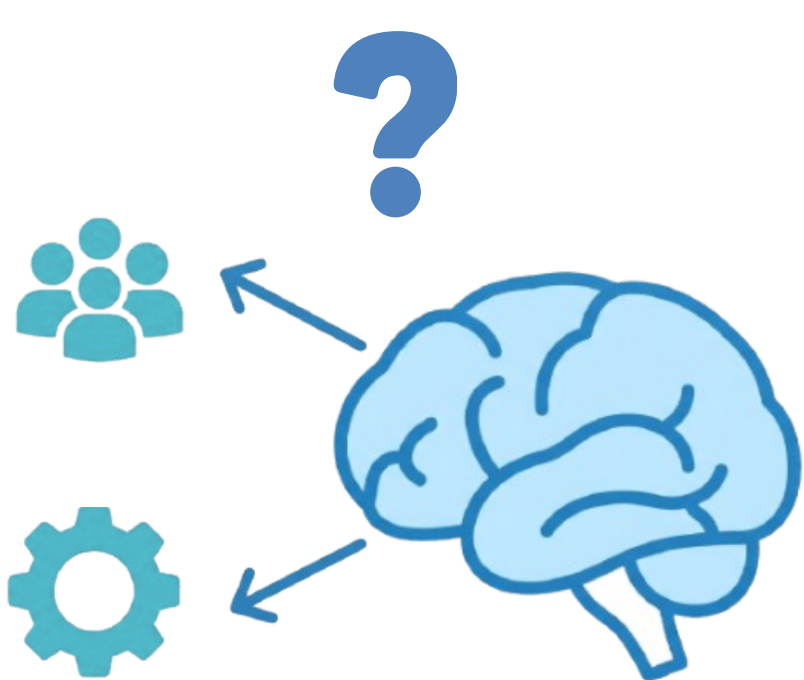
Brain Aging and Structural MRI Predictors of Cognitive and Functional Outcomes in Autism: A Cross-Sectional Study

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Background and Rationale



- Autism is a lifelong condition, yet **less than 1% of autism research** focuses on adults.¹
- Prior studies mostly report **similar brain aging** in autistic and neurotypical adults, but group differences in brain-outcome associations **remain unclear**.^{2,3,4}

Research Questions

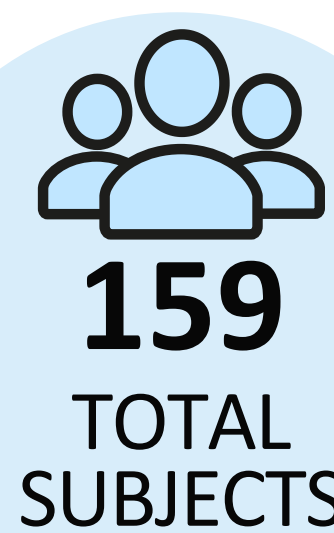
- Do **brain aging trajectories** differ between autistic and neurotypical adults?
- Do **brain structure-outcome associations** differ by diagnosis?



Methods

AUTISTIC (n=76)

M age (SD): 48.74 (9.54)
47% Males
27-76 years



159
TOTAL
SUBJECTS

CONTROL (n=83)

M age (SD): 54.95 (11.75)
37% Males
25-78 years

Neuroimaging Pipeline



T1-weighted MRI

CIVET

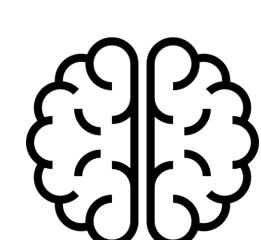
cortical thickness, volume, surface area

MAGeT-Brain

subcortical volumes, gyrification index

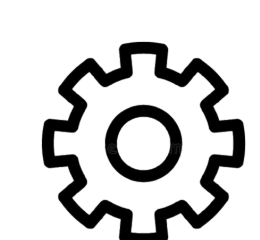
All volumes were corrected for intracranial volume.

Outcome Measures



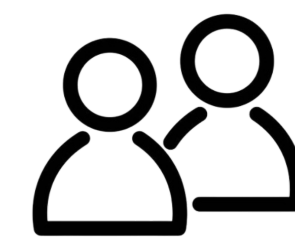
Memory:

Wechsler Memory Scale 4th Edition (WMS-IV)



Executive Function:

BRIEF - Global Executive Composite (GEC) score



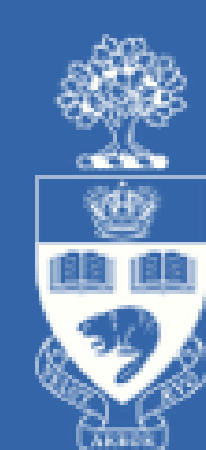
Social/Functional:

Social Responsiveness Scale (SRS), Overall Social Outcome (OSO)

Statistical Analysis

- Linear regression models tested: **age-by-diagnosis interactions** in brain structure, **brain-structure-by-diagnosis interactions** predicting cognitive and functional outcomes.
- Adjusted for age and sex, with false discovery rate (FDR) correction applied for multiple comparisons.

Different **brain aging patterns** and unique **brain-behavior relationships** may help explain the poorer outcomes in autistic adults



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Results

Autistic adults showed significantly poorer scores across the following measures ($p < 0.0001$):

↑ **Executive Dysfunction**

BRIEF GEC Score

↑ **Social Difficulties**

SRS Total Score

↓ **Overall well-being**

OSO Overall Score

Atypical aging in Left Postcommissural Caudate

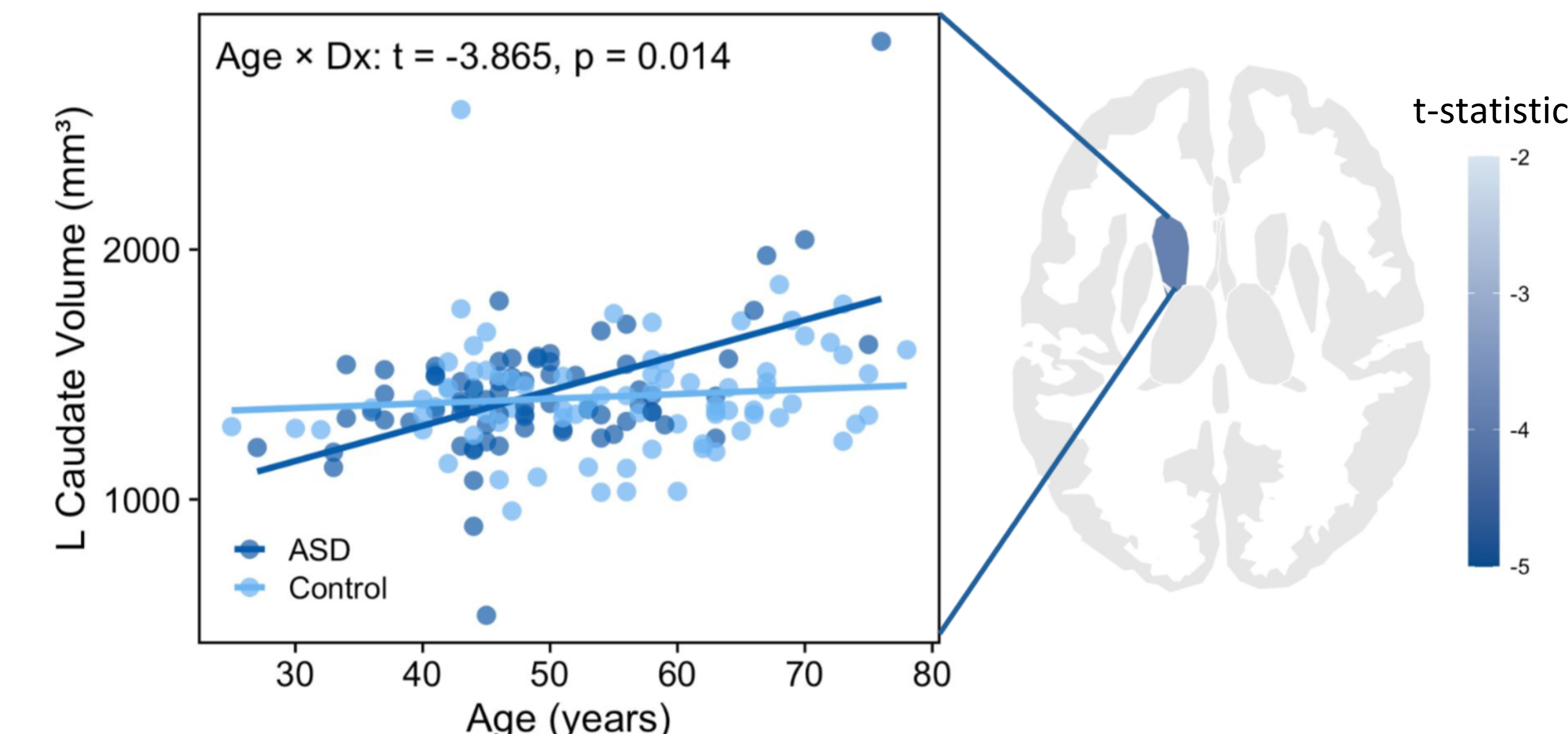
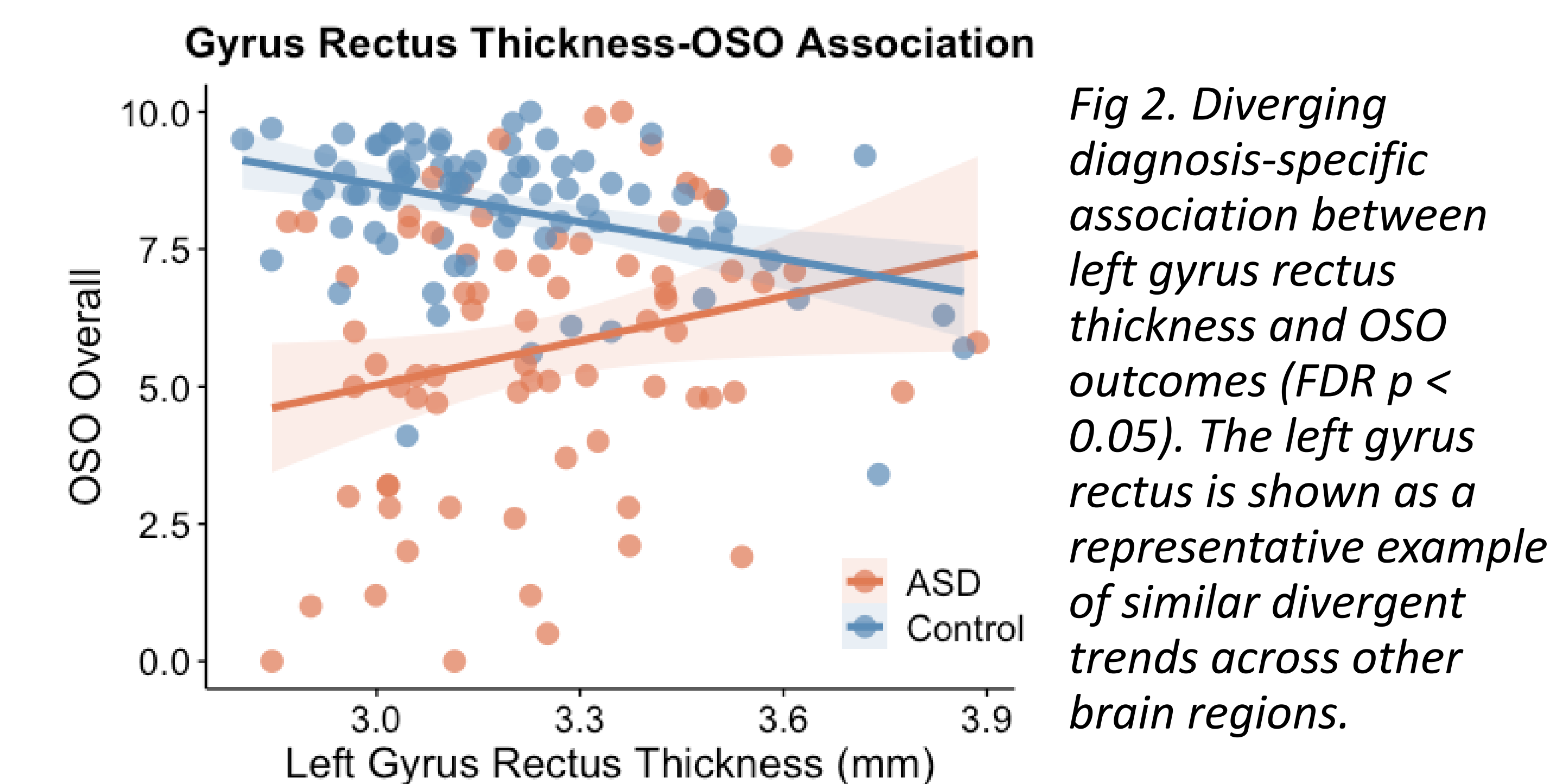


Fig 1. Significant Age $\times$ Diagnosis interaction in left postcommissural caudate.

Divergent Brain-Behaviour Relationships ($p < 0.05$)

Assessment	Outcome	Sig. Regions
WMS-IV	Visual Working Memory Index	1
BRIEF	Behavioural Regulation Index (BRI)	5
OSO	Overall Functioning Score	12



Conclusion & Relevance

Atypical growth trajectory of left caudate in autistic adults

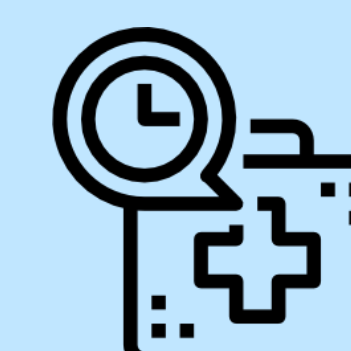
Differences in brain-behaviour relationships

These unique aging patterns and associations with outcomes may help explain the poorer outcomes observed in autistic adults

Relevance to Clients and Families



Informs future care for children as they become adults



Supports individualized, long-term monitoring and care



Establishes key baseline data for an 8-year longitudinal study