

# The interaction of socioeconomic status and race/ethnicity in predicting whole-brain volumes among children ≤18 with neurodevelopmental disorders in the POND Network cohort

Reem Saleh<sup>1,2,3</sup>, Jacob Ellegood<sup>1,2</sup>  
1. Bloorview Research Institute. 2. Holland Bloorview Kids Rehabilitation Hospital 3. University of Guelph

## Background & Rationale

Health inequities persist in Ontario despite the increasingly diverse demographic- **52% of Torontonians identify as visible minorities.**



Existing research is **U.S.-centric**, concentrated on **ASD**, and typically investigates social determinants of health (SDOH) in **isolation**.

SDOH interactions + transdiagnostic lens + Canadian paediatric population → fill gaps

## Research Question

To what extent do SES and race/ethnicity interact to predict whole-brain volume among children aged ≤18 with neurodevelopmental disorders (NDDs)?

## Design & Methods

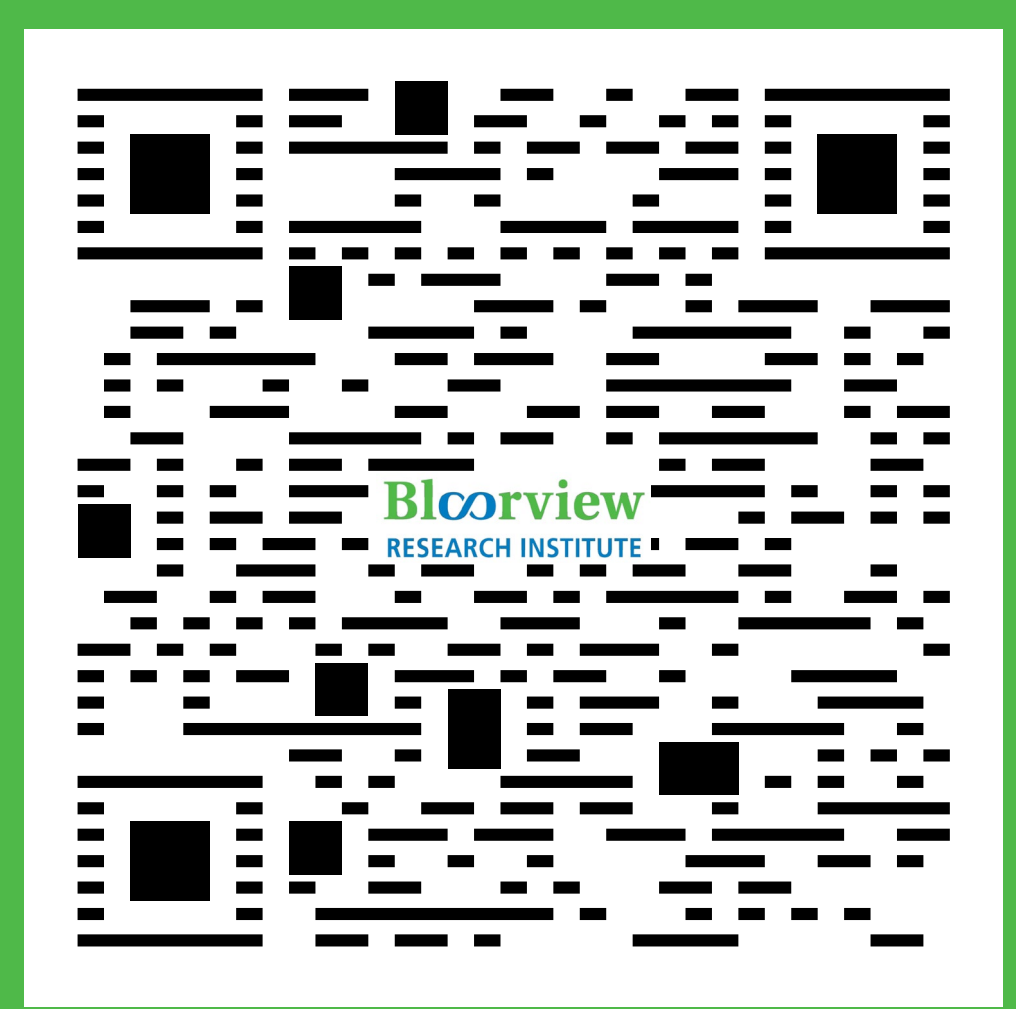
**789 participants** (≤18 yrs) with NDDs (e.g., ASD, ADHD, OCD, etc.) from the Province of Ontario Neurodevelopmental Disorders (POND) Network

ComBat-harmonized **MRI scans**

SES measured by **household income**

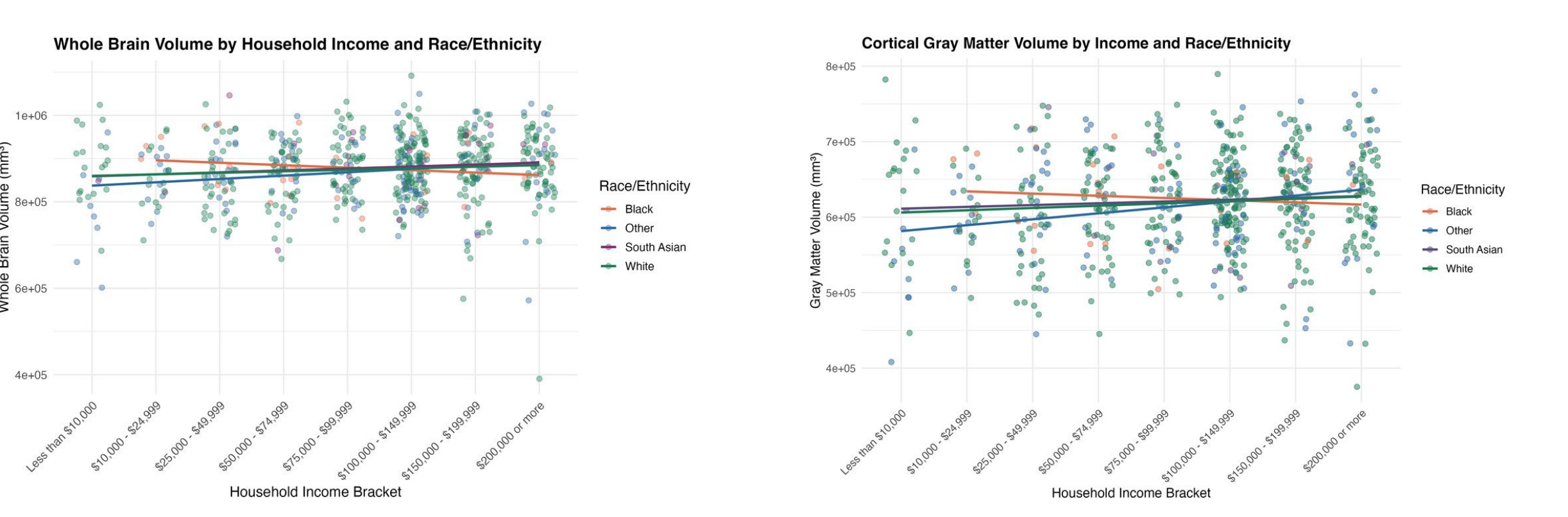
We used multiple linear regression to examine how **SES and race/ethnicity interact to predict brain volume**, adjusting for **age, sex, and diagnosis**. Models were applied to whole-brain, gray matter, and 76 harmonized brain subregions.

Even with higher income, children from racially marginalized groups with neurodevelopmental conditions may not experience the same brain development benefits, pointing to systemic barriers that undermine equity in child health



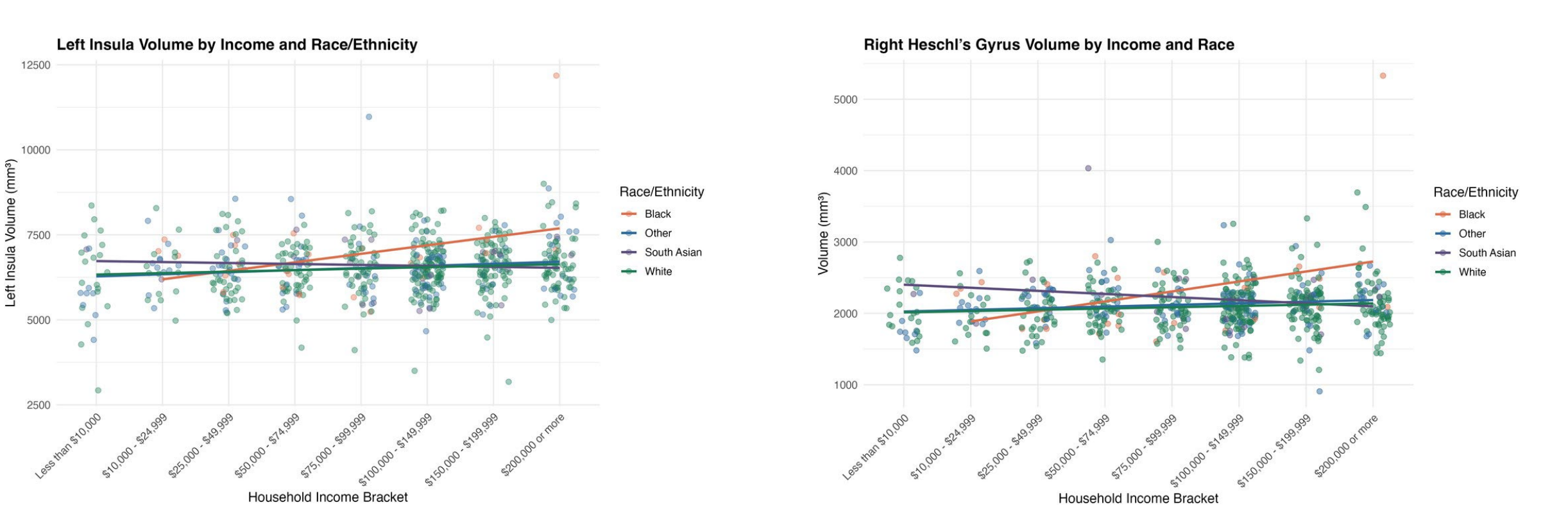
## Results & Key Themes

We observed significant **SES × race/ethnicity interaction** effects on **whole-brain, cortical gray matter, and specific cortical subregion volumes**, even after adjusting for age, sex, and diagnosis.



Higher income → greater brain volume; **gains were blunted among racialized groups.**

Disparities are most apparent in **cortical gray matter** volume across race/ethnicity.



Significant interaction ( $p < 0.00005$ ); **pattern mirrored broader cortical trends.**

“Strongest effect ( $p < 0.00001$ ); **income-related gains plateaued in some racial/ethnic groups.**

## Conclusions & Next Steps

**Key Finding:** Income does not confer equal neurodevelopment across all race/ethnic groups.

**Interpretation:** Structural inequities may disrupt brain development even in higher-SES racialized children.

**Next Steps:** Expand sample, explore functional outcomes, and develop targeted supports based on region-specific brain-behaviour links.

## Relevance to Holland Bloorview Clients & Families

Understanding how race and income intersect to shape brain development in children with NDDs reveals disparities that persist even at higher income levels.



Our findings advance HB's commitment to inclusive, equity-informed research and socially accountable care, supporting clinicians in developing **more precise, culturally responsive interventions** for clients and families.