

The Early Life Social Exposome and Brain Health in Aging and Dementia in Latin America

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Introduction

- The exposome defines the totality of environmental exposures impacting health.
- Latin America's (LA) pronounced socioeconomic heterogeneity may drive both adverse early-life social exposomes and brain health burden.
- Few studies have characterized the early life social exposome alongside expanded clinical, cognitive, and neuroimaging indicators in LA.

Objectives

- Construct a latent early life social exposome factor.
- Test whether the exposome factor relates to late-life cognition, functional ability, mental and cardiometabolic health, and dementia severity.
- Examine whether the exposome factor is associated with gray matter volumes in individuals with dementia.

Results I

- More adverse early life social exposomes were linked to lower cognitive performance, functional impairment, worse mental health, greater dementia severity, and smaller gray matter volumes.
- Cognition was the most impacted domain across the sample ($\beta = -0.38, p < .001$); education disadvantage was the primary driver of associations ($\beta = 0.86, p < .001$).

Results II

Figure 1. Structural equation model of early life social exposomes and clinical and cognitive indicators

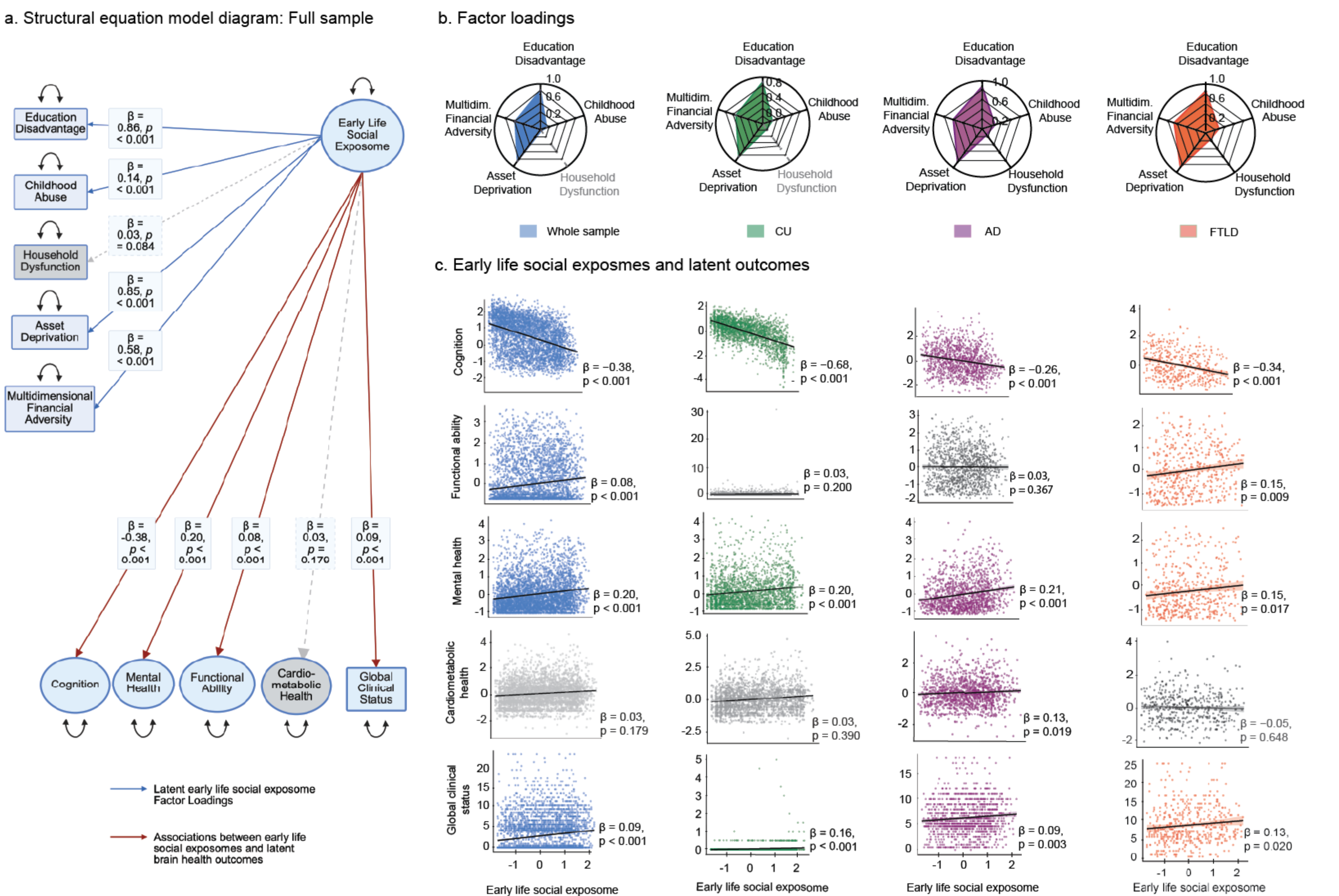
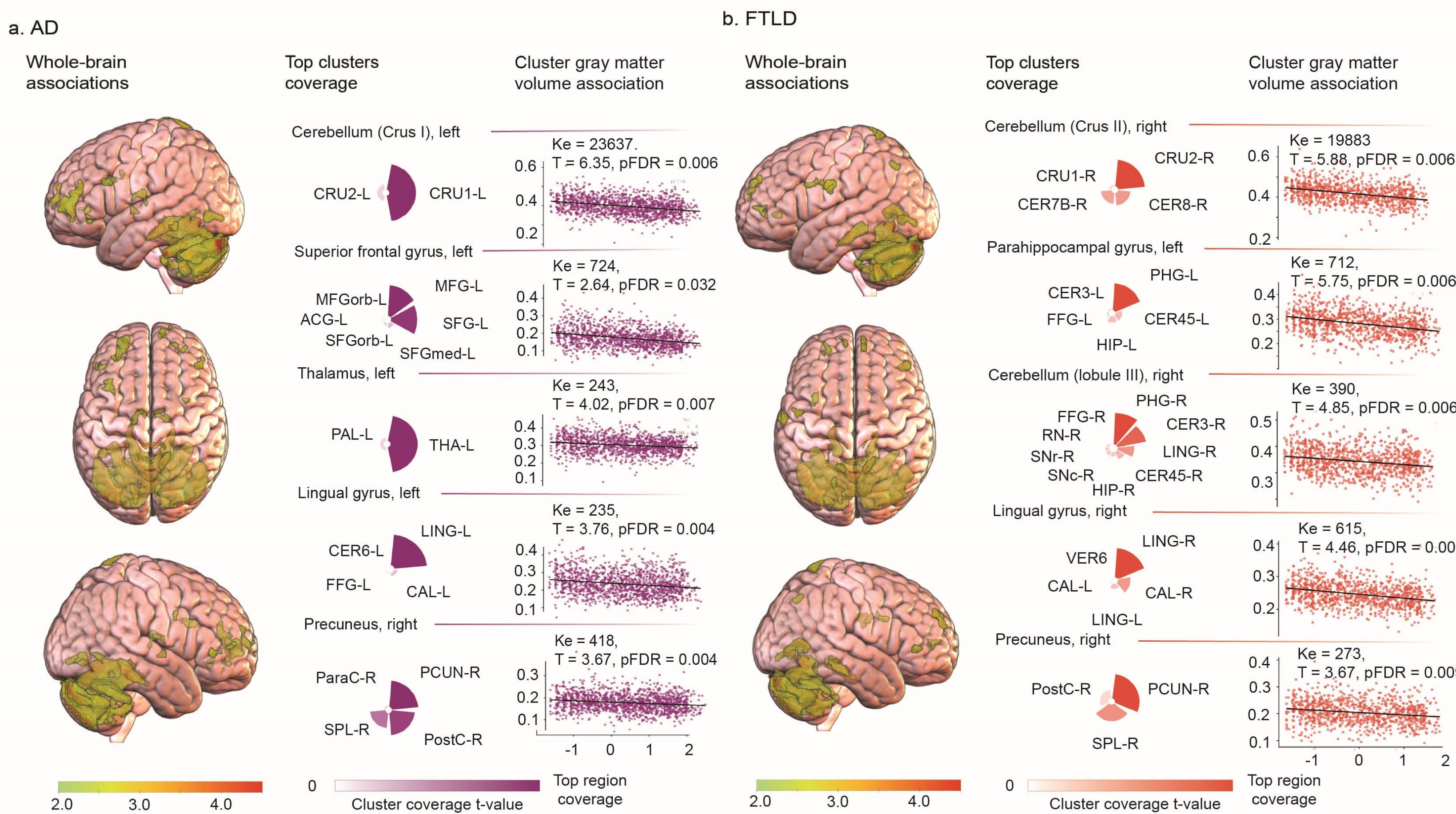


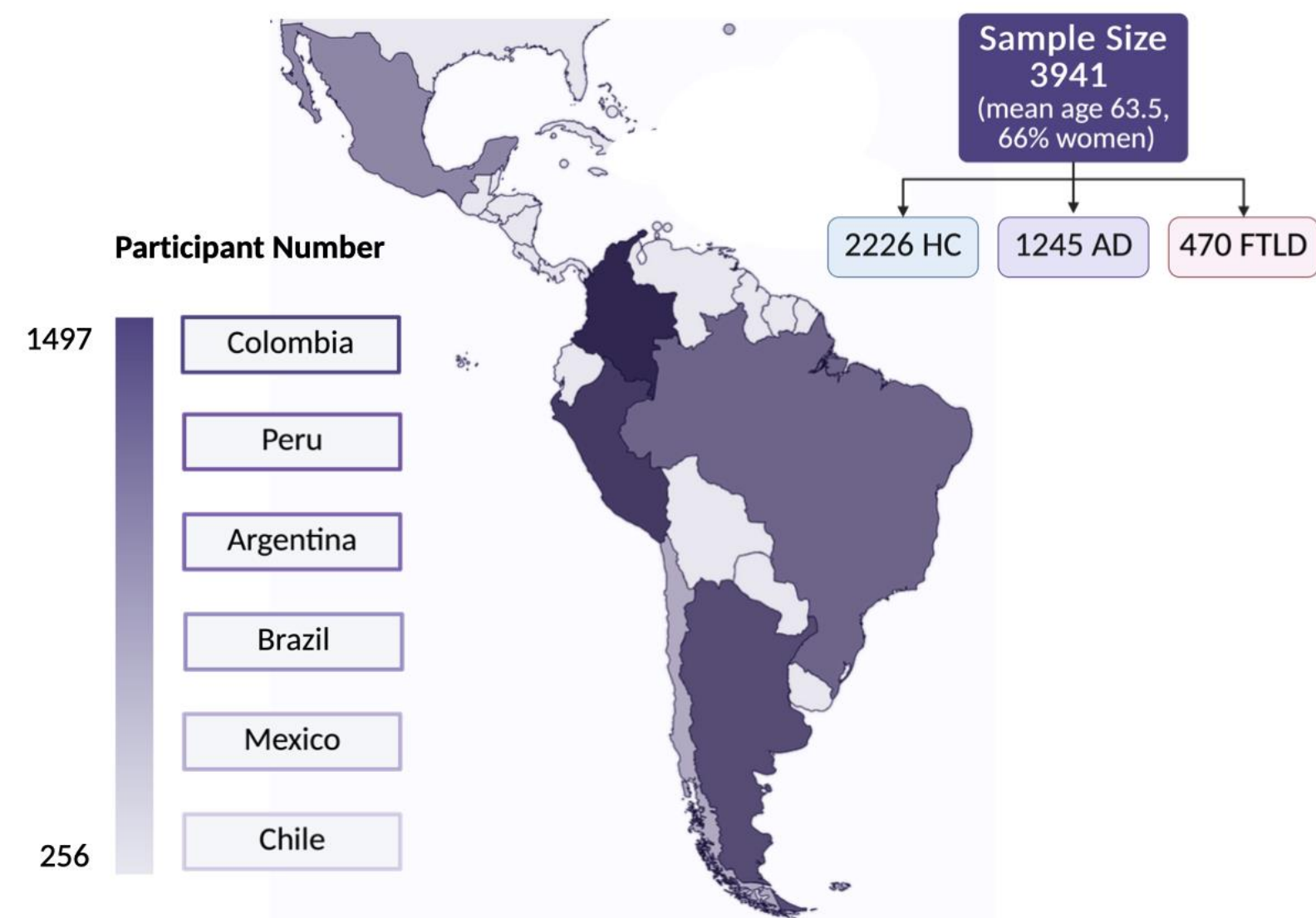
Figure 2. Early life social exposomes and gray matter volumes.



Methods

- Structural equation model (SEM): latent early-life social exposome predicted latent multidimensional brain health.
- Exposome factor loadings: education disadvantage, childhood abuse, household dysfunction, asset deprivation, multidimensional financial adversity.
- Latent brain health indicators: cognitive functioning, functional ability, mental health, cardiometabolic health, dementia severity.
- Voxel-based morphometry (VBM): whole-brain associations with the early-life social exposome.

Figure 3. ReDLat sample characterization



Discussion

- Findings support that early-life social exposome adversity becomes biologically embedded in late-life brain health burden.
- Distinct gray matter atrophy signatures in dementia suggest adverse early life social exposomes act through both shared and disease-specific pathways.

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