

Childhood Household Environment and Later-Life Plasma p-Tau Across Canadian Ethnoracial Groups

Rohina Kumar¹, Madeline W. Alexander¹, Krisha Khanna¹, Simran Malhotra¹, Valery Sit¹, Angelina Zhang¹, Ravetta Ravichandran¹, Ella Kim¹, Mikayla Lisi¹, Tulip Marawi¹, Katie L. Vandeloo¹, Rachel Yep¹, Walter Swardfager^{1,2}, Maged Goubran^{1,3,4}, Sandra E. Black^{1,5,6} & Jennifer S. Rabin^{1,3,5,6}

¹Hurvitz Brain Sciences Program, Sunnybrook Research Institute, ²Department of Pharmacology & Toxicology, University of Toronto, ³Harquail Centre for Neuromodulation, Sunnybrook Research Institute, ⁴Department of Medical Biophysics, University of Toronto, ⁵Division of Neurology, Department of Medicine, Sunnybrook Health Sciences Centre, ⁶Rehabilitation Sciences Institute, University of Toronto

Background

- Early-life experiences may influence brain health decades later.¹
- Childhood household composition varies across ethnoracial groups and may have different implications for later-life health.²⁻⁴
- Multigenerational living is more common in South Asian and Chinese communities than in White populations.⁵⁻⁸
- Whether childhood household size is associated with later-life Alzheimer's disease (AD) biomarkers, and whether these associations differ by ethnicity, remains unknown.

Objective

To examine whether associations between childhood household size and blood-based AD biomarkers differ by ethnicity

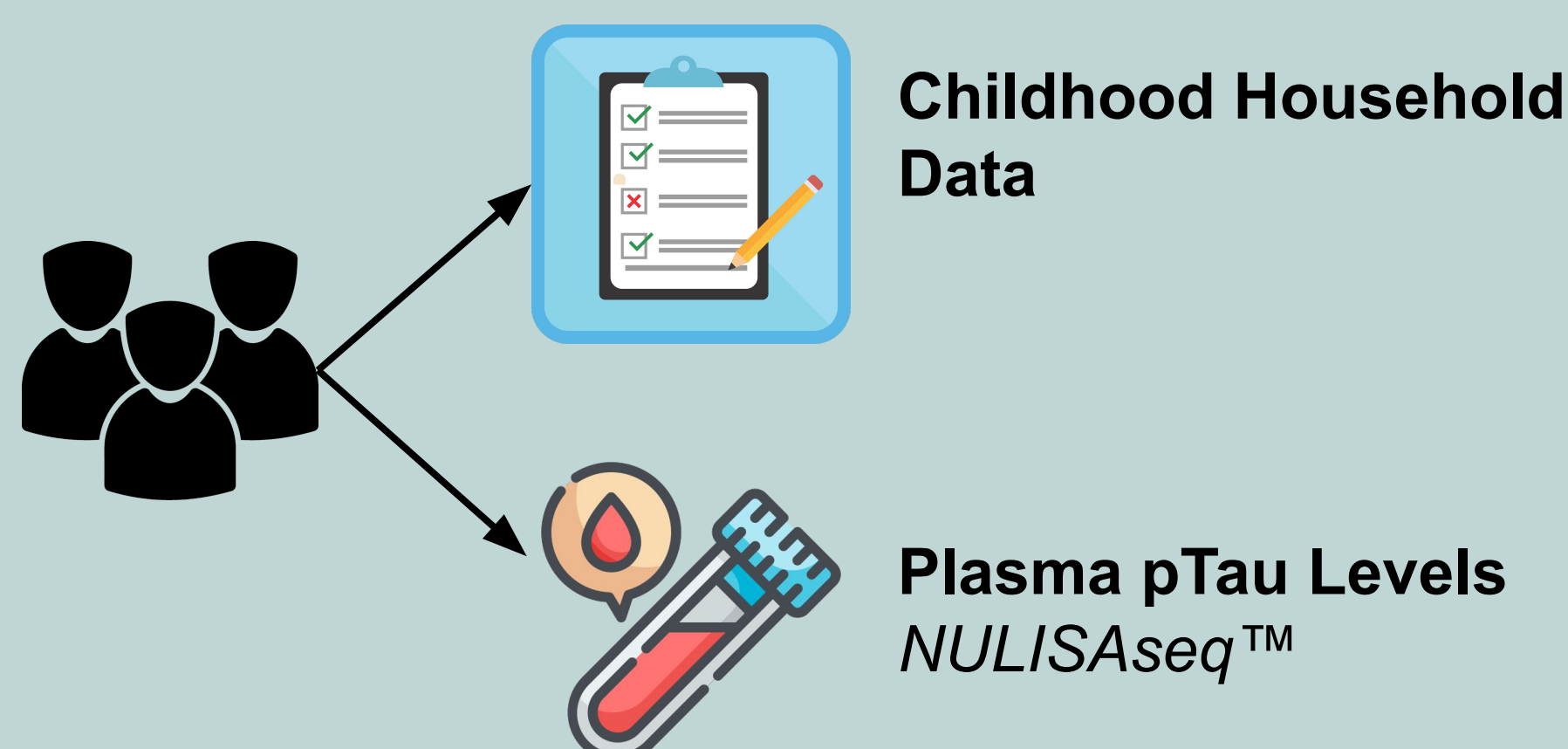
Methods



CAmerican Multi-Ethnic Research
on Aging (CAMERA) study

Cognitively healthy
individuals aged
55-85 who
self-identify as:

- South Asian
- Chinese
- White



- South Asian and Chinese participants were combined, given that larger, multigenerational households are culturally normative in these populations relative to White populations.⁸⁻¹⁰

Statistical Analyses

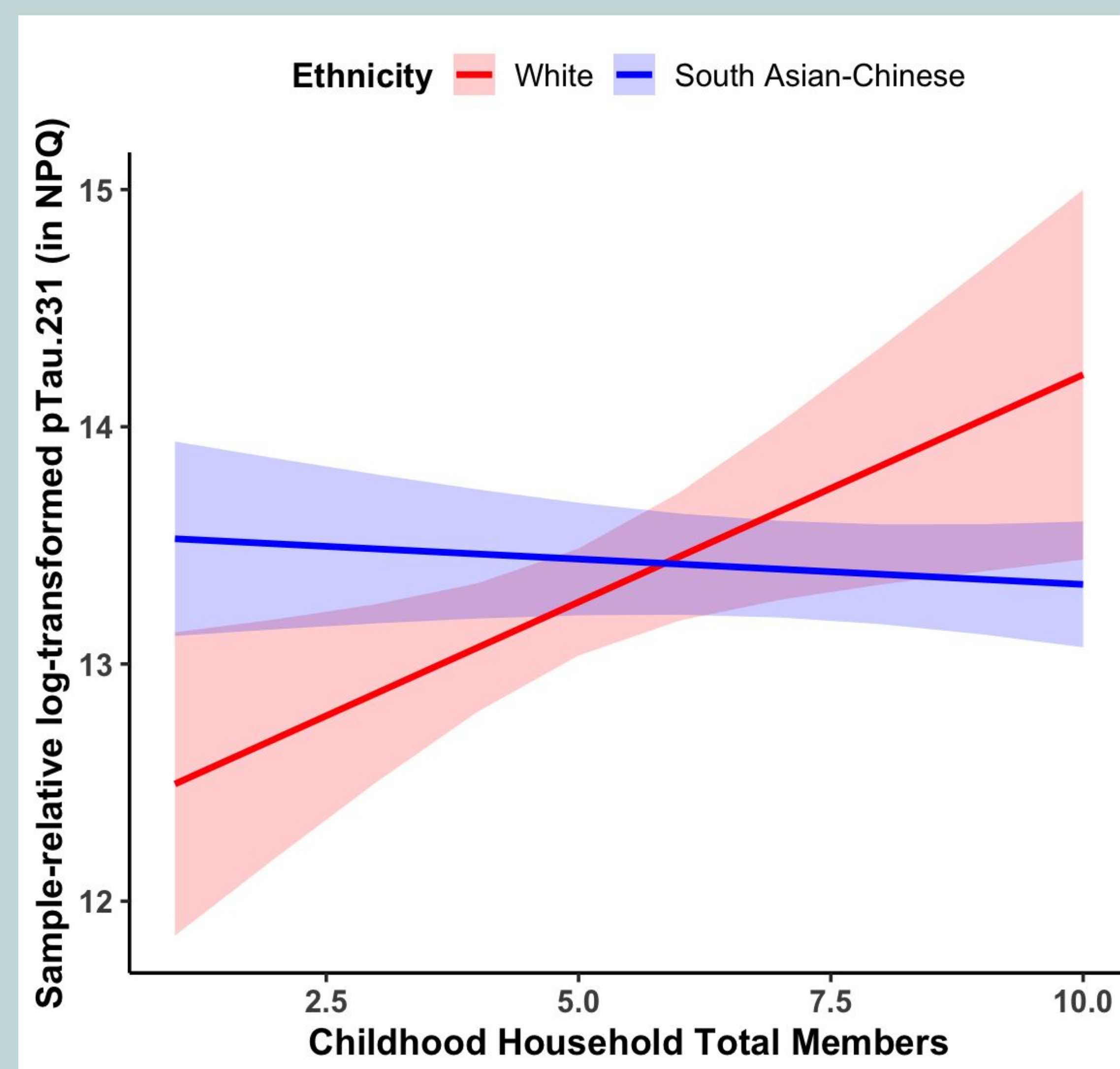
- Linear regression examined the ethnicity x childhood household size interaction on plasma pTau231, an early marker of AD pathology.¹¹
- Models adjusted for age, sex, years of education, APOE ε4 status, childhood urban/rural residence, and childhood household happiness.

Demographic Characteristics

	South Asian-Chinese (<i>n</i> = 56)	White (<i>n</i> = 31)
Age (years), mean (SD)	69.9 (7.3)	67.2 (6.6)
Sex (female), <i>N</i> (%)	38 (67.9)	23 (74.2)
Education (years), mean (SD)	17.1 (2.5)	17.0 (2.1)
APOE ε4 status (carrier), <i>N</i> (%)	8 (14.3)	6 (19.4)
Urban/Rural Residence (urban), <i>N</i> (%)	52 (92.9)	26 (83.9)
Childhood Household Happiness, mean (SD)	8.0 (2.0)	8.7 (1.6)
Childhood Household Size, mean (SD)	7 (2)***	5 (1)
pTau 231 (adjusted for age, sex, and APOE ε4 status), mean (SD)	13.4 (0.6)**	13.1 (0.5)

***p* < 0.01
****p* < 0.001

Results



- South Asian/Chinese participants reported larger childhood households than White participants (7 vs. 5 members, *p* < 0.001).
- A significant ethnicity × childhood household size interaction was observed for plasma pTau231 (β = -0.85, *p* = 0.01, see plot).
- Larger childhood households showed a trend toward higher pTau231 in White participants (β = 0.34, *p* = 0.06), but not in South Asian/Chinese participants (β = -0.13, *p* = 0.28).
- Similar patterns were observed across other pTau species (pTau181, pTau212 and pTau217).

Discussion

- Childhood household size was differentially associated with later-life pTau231 across ethnoracial groups, with a trend toward higher pTau231 in White participants living in larger childhood households.
- These differences may reflect household composition, as larger households are more likely to include extended kin in South Asian and Chinese populations.⁸
- However, household size alone may not capture important differences in family structure, social support, and socioeconomic circumstances across populations.
- Future research should examine household composition and its relationship with AD biomarkers in larger samples, analyzing South Asian, Chinese, and White participants separately.

References

(1) Livingston et al., 2024; (2) Palms et al., 2023; (3) Lee et al., 2020; (4) Zhang et al., 2017; (5) Molborn et al., 2012; (6) Pew Research Centre, 2026; (7) Molborn et al., 2013; (8) Galbraith & Laflamme, 2025; (9) Sharma et al., 2012; (10) Sun & Mulvaney., 2021; (11) Ashton et al., 2021

Acknowledgements

Société
Alzheimer
Canada

CIHR IRSC
Canadian Institutes of Health Research
Institut de recherche en santé de Canada

ALZHEIMER'S
ASSOCIATION

Contact information

✉ rohina.kumar@sri.utoronto.ca
in Rohina Kumar
X rohina_kumar

CAMERA Study Website

