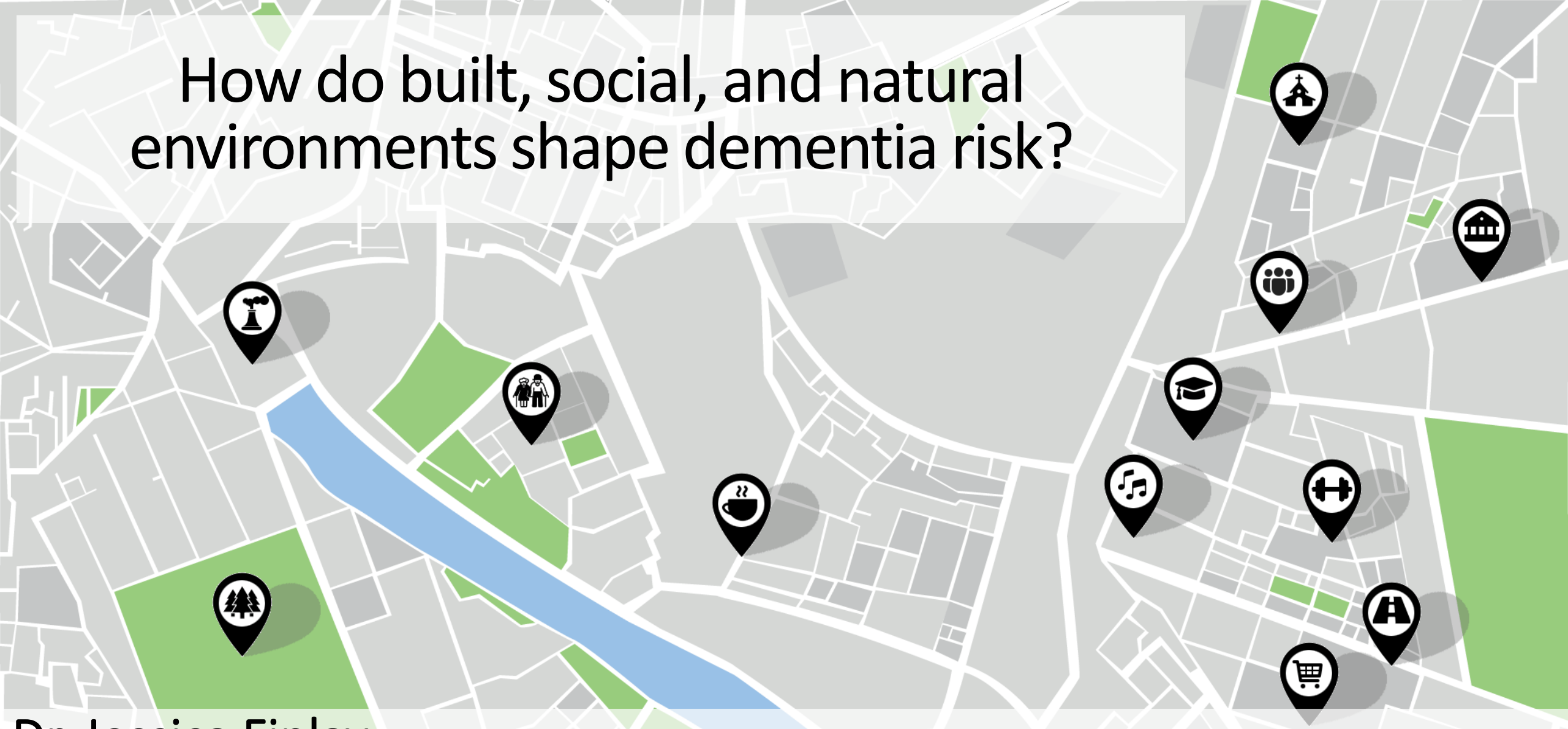
How do built, social, and natural environments shape dementia risk?



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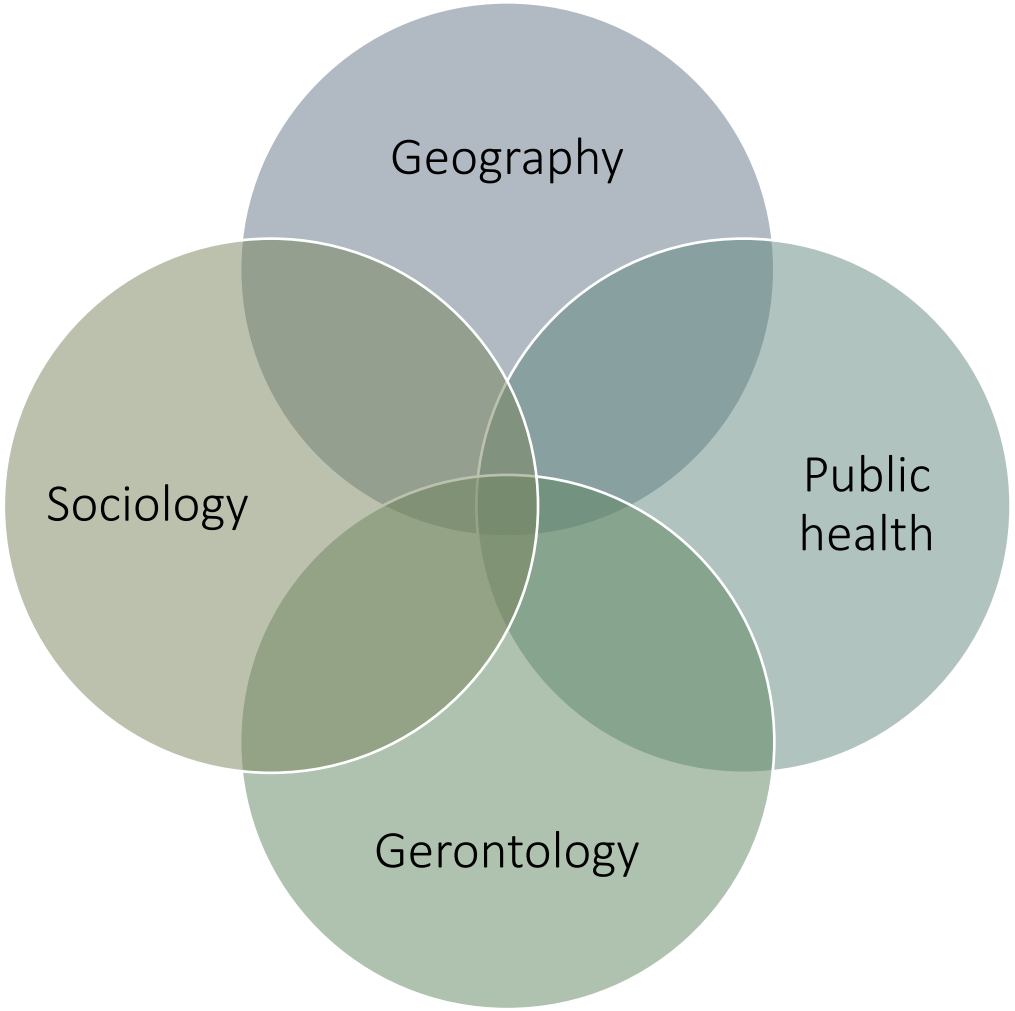
Environments, health and aging



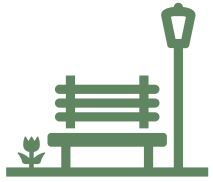
Interdisciplinary perspectives

Mixed methods research on social, behavioral, and biological pathways

Early-life environments

Early educational environment

Residential segregation



Park access

Neighborhood social cohesion

- Palms et al. 2022. Links between early-life contextual factors and later-life cognition and the role of educational attainment. *Innov Aging.*
- Walsemann & Ailshire. 2020. Early educational experiences and trajectories of cognitive functioning among mid-life and older U.S. adults. *Am J Epidemiol.*
- Caunca et al. 2020. Association of racial residential segregation throughout young adulthood and cognitive performance in middle-aged participants in the CARDIA study. *JAMA Neurol.*
- Cherrie et al. 2018. Green space and cognitive ageing: A retrospective life course analysis in the Lothian Birth Cohort 1936. *Soc Sci Med.*
- Cherrie et al. 2019. Association between the activity space exposure to parks in childhood and adolescence and cognitive aging in later life. *Int J Environ Res Public Health.*
- Peng C, Han SH, Burr JA. 2022. Perceptions of childhood neighborhood social cohesion and cognitive function in middle and late adulthood. *Gerontologist.*

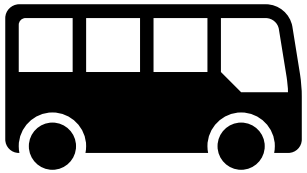
Midlife

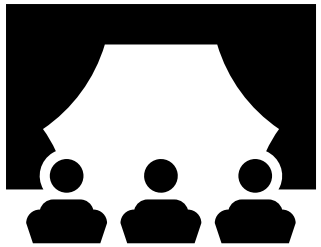
Access to green space

Urban density and walkability

Pollution exposure

- Pescador Jimenez et al. 2024. Midlife residential greenness and late-life cognitive decline among Nurses' Health Study participants. *Environ Health Perspect.*
- Besser et al. 2021. Longitudinal associations between the neighborhood built environment and cognition in US older adults: The Multi-Ethnic Study of Atherosclerosis. *Int J Environ Res Public Health.*
- Cerin et al. 2022. Urban Neighbourhood Environments, Cardiometabolic Health and Cognitive Function: A National Cross-Sectional Study of Middle-Aged and Older Adults in Australia. *Toxics.*
- Franz et al. 2023. Associations Between Ambient Air Pollution and Cognitive Abilities from Midlife to Early Old Age: Modification by APOE Genotype. *J Alzheimers Dis.*
- Estrella et al. 2020. Associations between perceived neighborhood environment and cognitive function among middle-aged and older women and men: Hispanic Community Health Study/Study of Latinos Sociocultural Ancillary Study. *Soc Psychiatry Psychiatr Epidemiol.*
- Aneshensel et al. 2011. The urban neighborhood and cognitive functioning in late middle age. *J Health Soc Behav.*
- National Academies. 2024. Identifying Midlife Social Exposures that Might Modify Risk for Cognitive Impairment Associated with Early Life Disadvantage





Later life

- Access to retail, services, and recreational sites
- Public transit infrastructure
- Walkability
- Green/blue space and park access
- Air and noise pollution
- Senior centers, civic and social organizations, eateries
- Museums and arts centers
- Neighborhood socioeconomic status

- Besser et al. 2018. Neighborhood built environment and cognition in non-demented older adults: the multi-ethnic study of atherosclerosis. *Soc Sci Med.*
- Wu et al. 2012. Community environment, cognitive impairment and dementia in later life: results from the Cognitive Function and Ageing Study. *Age Ageing.*
- Clarke et al. 2012. Cognitive function in the community setting: the neighbourhood as a source of 'cognitive reserve'? *J Epidemiol Community Health.*
- Luo et al. 2019. Neighborhood environments and cognitive decline among middle-aged and older people in China. *J Gerontol B Psychol Sci Soc Sci.*
- Besser et al. 2020. Associations between neighborhood park space and cognition in older adults vary by U.S. location: the Multi-Ethnic Study of Atherosclerosis. *Health & Place.*
- Weuve et al. 2021. Long-term community noise exposure in relation to dementia, cognition, and cognitive decline in older adults. *Alzheimers Dement.*
- Yuchi et al. 2020. Road proximity, air pollution, noise, green space and neurologic disease incidence: a population-based cohort study. *Environ Health.*
- Michael et al. 2024. Systematic Review of Longitudinal Evidence and Methodologies for Research on Neighborhood Characteristics and Brain Health. *Public Health Rev.*

Cognability

Dr. Michael Esposito

Physical activity

- Walkable destinations
- Parks
- Recreation centers

Social connection

- Civic/social organizations
- Senior centers

Cognitive stimulation

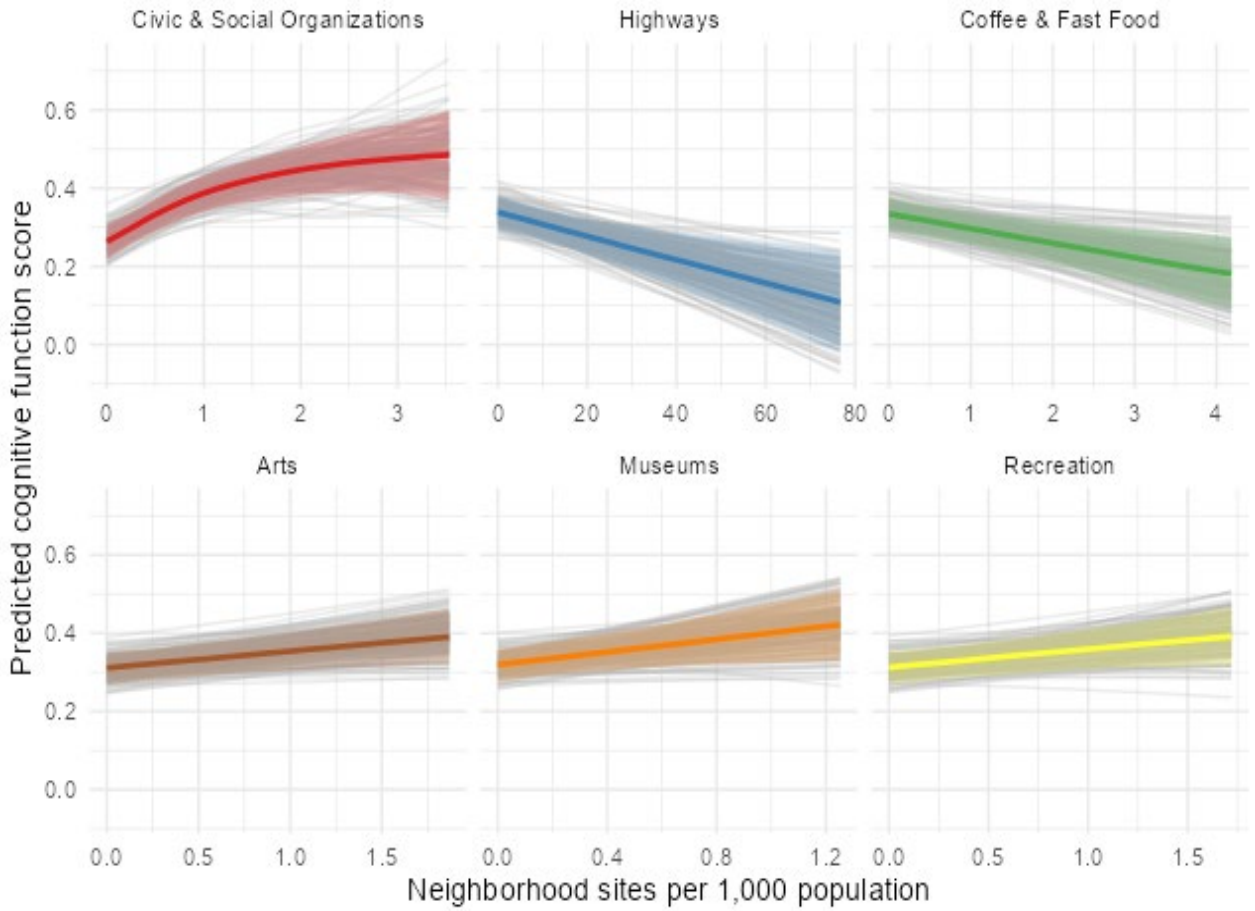
- Arts and cultural sites

Hazards

- Polluting sites
- Highways

- Finlay et al. 2020. Fast-Food for Thought: Retail Food Environments as Resources for Cognitive Health and Wellbeing Among Aging Americans? *Health & Place.*
- Finlay et al. 2021. Can Neighborhood Social Infrastructure Modify Cognitive Function? A Mixed-Methods Study of Urban-Dwelling Aging Americans. *Journal of Aging and Health.*
- Finlay et al. 2021. Neighborhood Active Aging Infrastructure and Cognitive Health. *Preventive Medicine.*
- Finlay et al. 2021. Neighborhood cognitive amenities? *Wellbeing, Space & Society.*
- Wu et al. 2023. Neighborhood 'disamenities'. *BMC Public Health.*

Civic/social organizations and highways most strongly associated with cognitive function



Finlay*, Esposito*, Langa, Judd & Clarke. 2022. Cognablity: An Ecological Theory of Neighborhoods and Cognitive Aging. *Social Science & Medicine.* (* co-first authors)

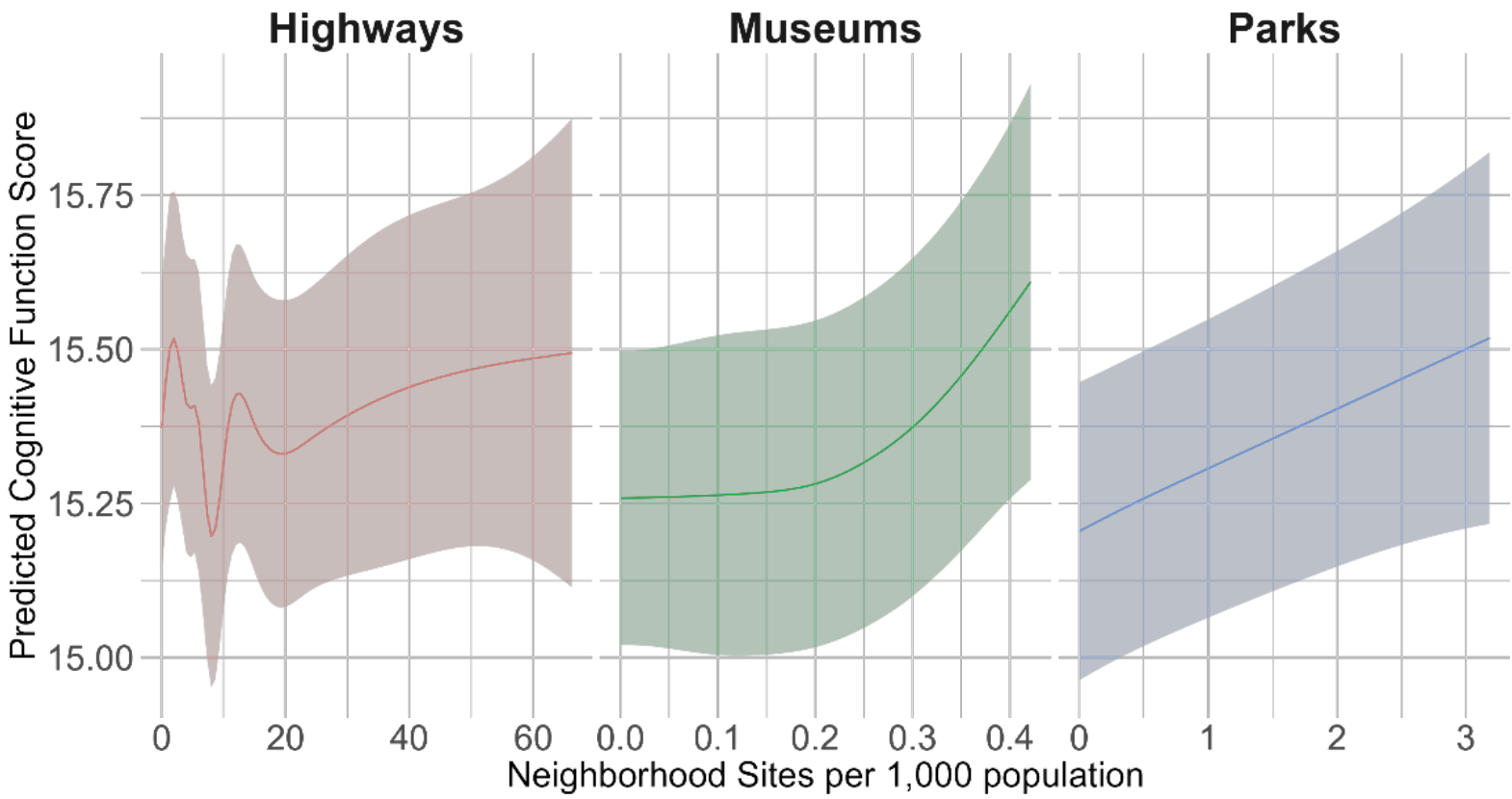
Gaussian generalized additive multilevel model (REGARDS Study)

Covariates: Individual-level (age, gender, race, education, years of follow-up since baseline) and area-level (census tract population density, proportion living below the poverty line, proportion non-Hispanic Black residents, proportion owner-occupied housing units)

Shading: 90% uncertainty intervals; 200 draws from the model plotted to further summarize uncertainty

Work in progress

- Test and extend in additional cohorts (e.g., HRS, PINE)
- Rural and international contexts (e.g., Gateway to Global Aging)
- Life Course Cognability (e.g., ACL, Add Health)

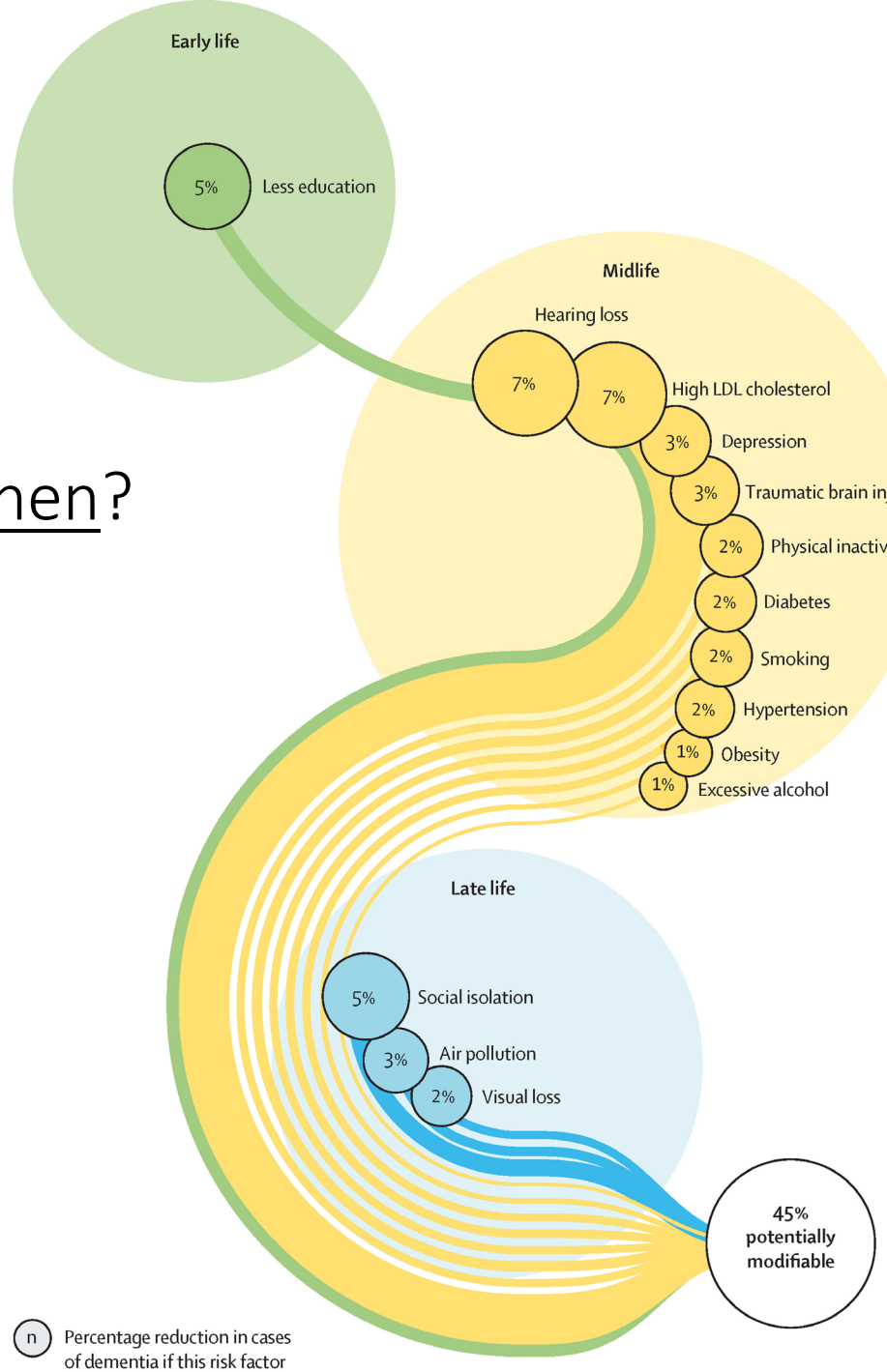


Gaussian generalized additive multilevel model (Health and Retirement Study)

Covariates: Individual-level (age, gender, race, education, years of follow-up since baseline) and area-level (census tract population density, proportion living below the poverty line, proportion non-Hispanic Black residents, proportion owner-occupied housing units)

Key questions

- Which environmental exposures matter when?
- To whom?
- At what scale?



Livingston et al. 2024. Dementia prevention, intervention, and care: 2024 report of the Lancet Commission. *The Lancet.*

Exposome

“Exposures in the environments where people live, work, pray, and play throughout their lives shape health, including a person’s risk or resilience to disease.

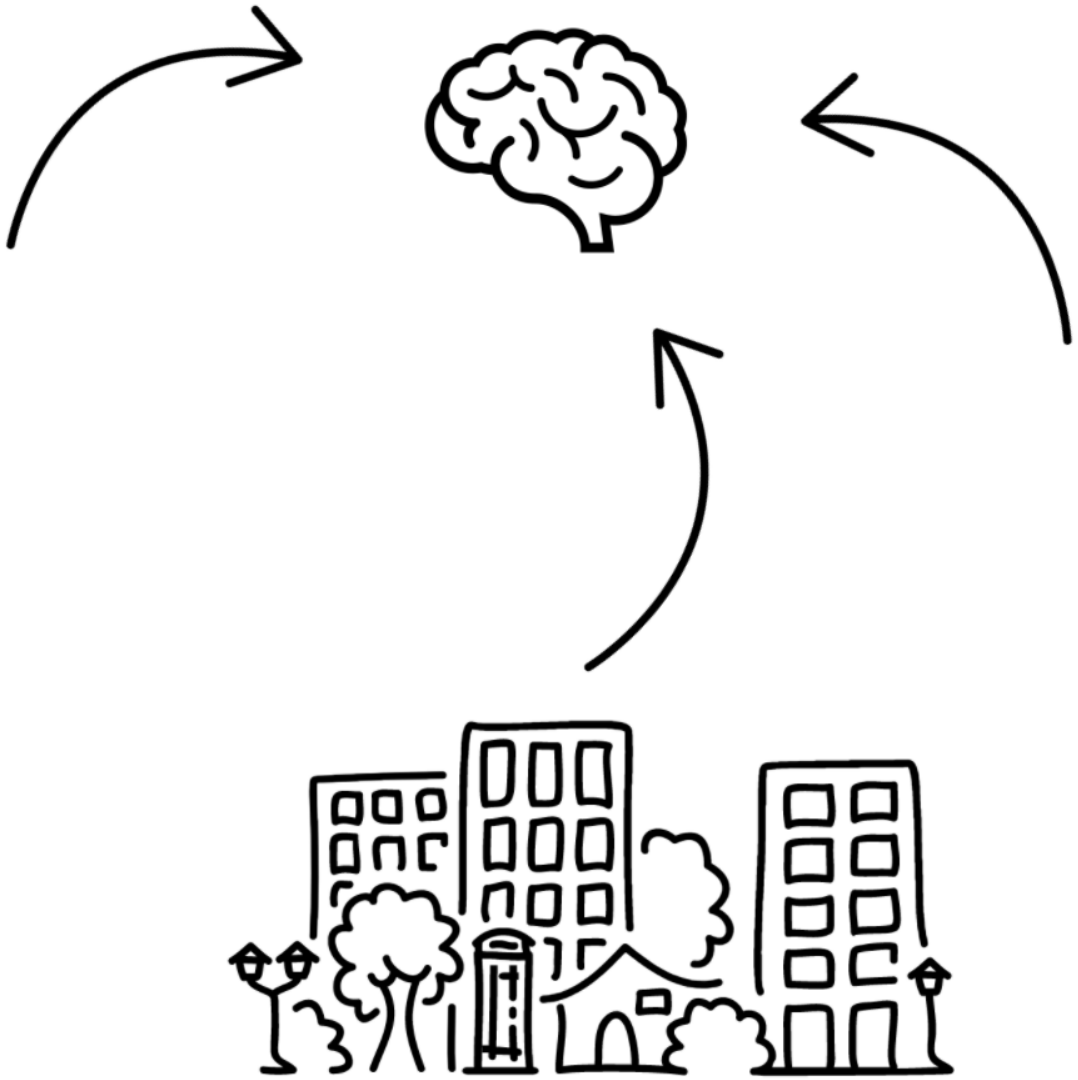
Together, this comprehensive set of exposures across domains (e.g., physical, chemical, social, psychological, economic) constitute the “exposome.”

NIA seeks to expand our understanding of how these exposures shape health and risk for disease, especially Alzheimer’s disease and Alzheimer’s disease-related dementias (AD/ADRD).”

https://www.nia.nih.gov/exposome

Clinical Geography

- Neighborhood environments and communities fundamentally shape dementia risk
- Unequally distributed neighborhood services, amenities, and hazards may produce and perpetuate health disparities
- “Treat neighborhoods” to support health across the life course



Thank you!

^ Cognability paper link

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