Building a Polysocial Risk Score to Characterize Diversity in ADRC Participants

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ORE Core Lead, UCSF ADRC

NIH National Institute on Aging
Alzheimer's Disease Research Center
UCSF

Neighborhood
Green areas
Transportation
Violence
Polution

Service
Healthcare
Social services
Mistreatment
Education

Social
Discrimination
Isolation
Safety

Economic
Employment
Income
Work safety

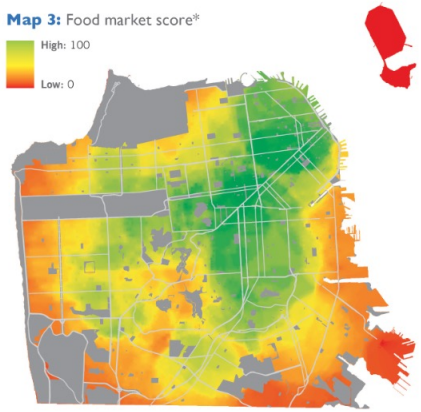
Behavioral risk factors:

Physical activity
Social isolation
Alcoholism
Smoking
Cognitive
Education

Medical risk factors

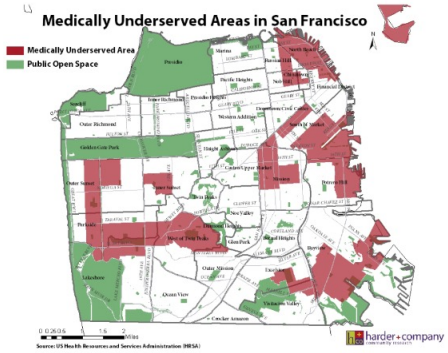
Hypertension
Hyperlipidemia
Hearing loss
TBI
Obesity
Depression
Diabetes

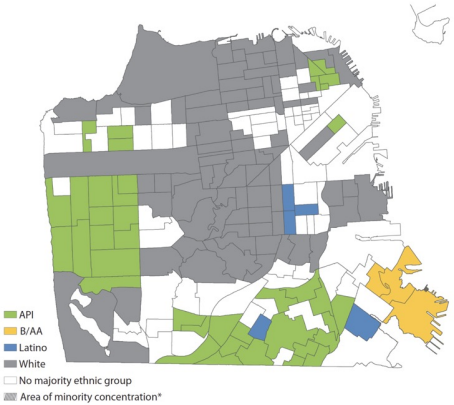
Map 3: Food market score*



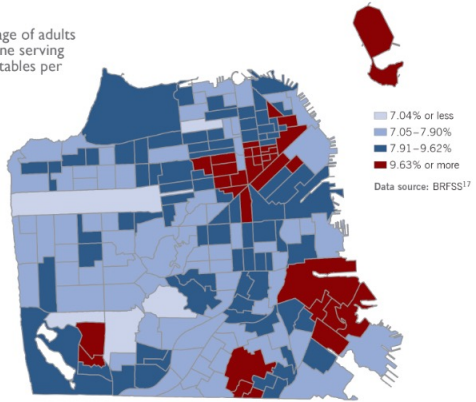
*A relative measure of the number and variety of retail resources within one mile, weighed by food offerings and distance. **Data source:** Dun and Bradstreet, SFIP, 2011.

Appendix D: Medically Underserved Areas in San Francisco



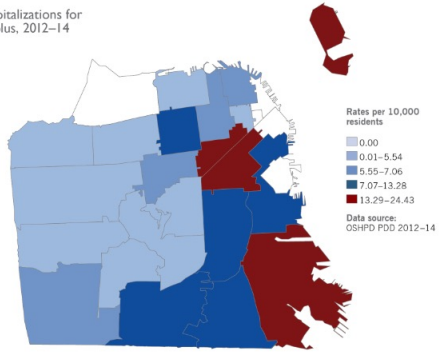


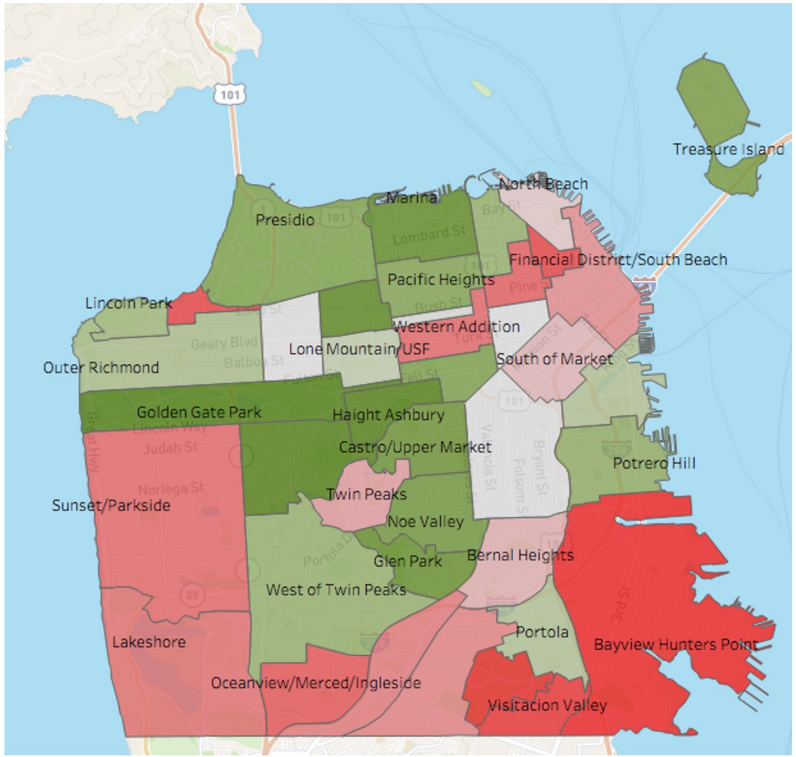
Map 4: Percentage of adults eating less than one serving of fruits and vegetables per day, 2013



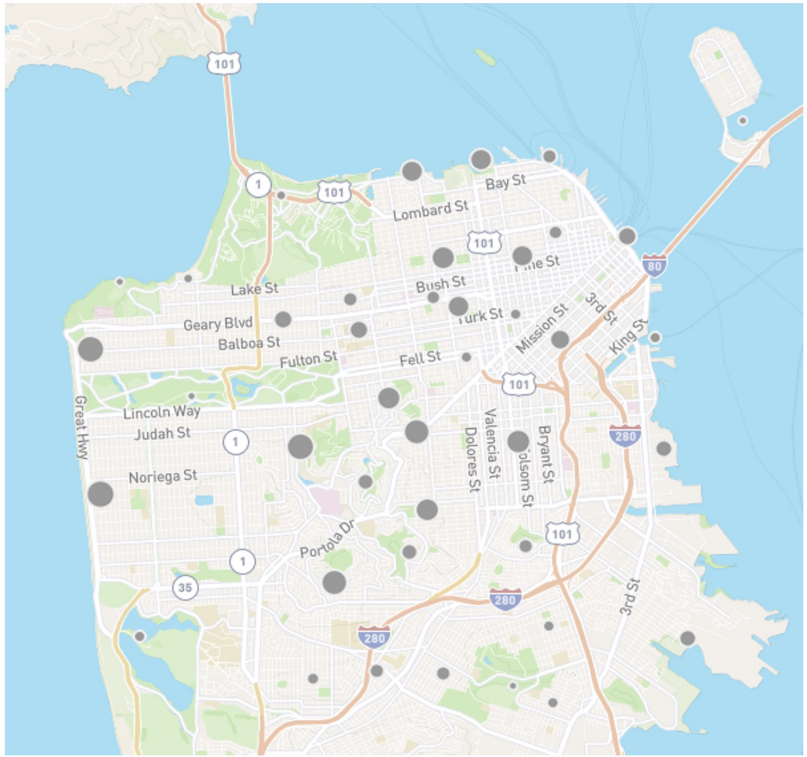
Map 1: Age-adjusted hospitalizations for diabetes among adults 18-plus, 2012–14

Hospitalization rates for diabetes among Black/African Americans increased from 2005 to 2014 while decreasing or remaining stable for all other ethnic groups in San Francisco.



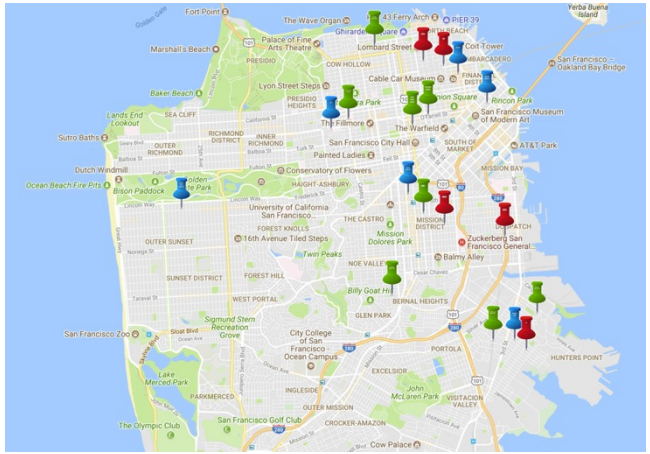


San Francisco Neighborhoods Vulnerability Map

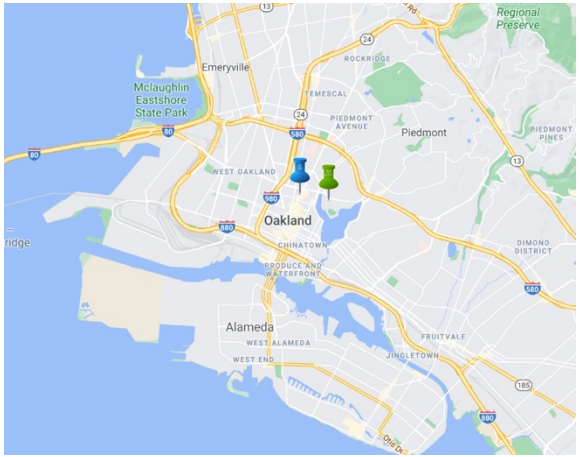


UCSF MAC Neighborhood Representation Map

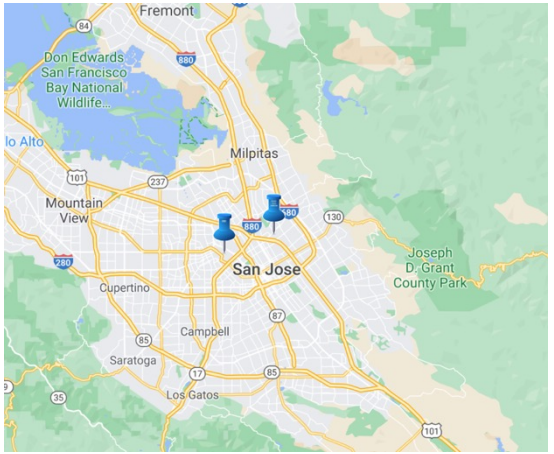
2017 data



San Francisco



East Bay



San Jose

- Community-based clinics
- Community centers
- Senior centers

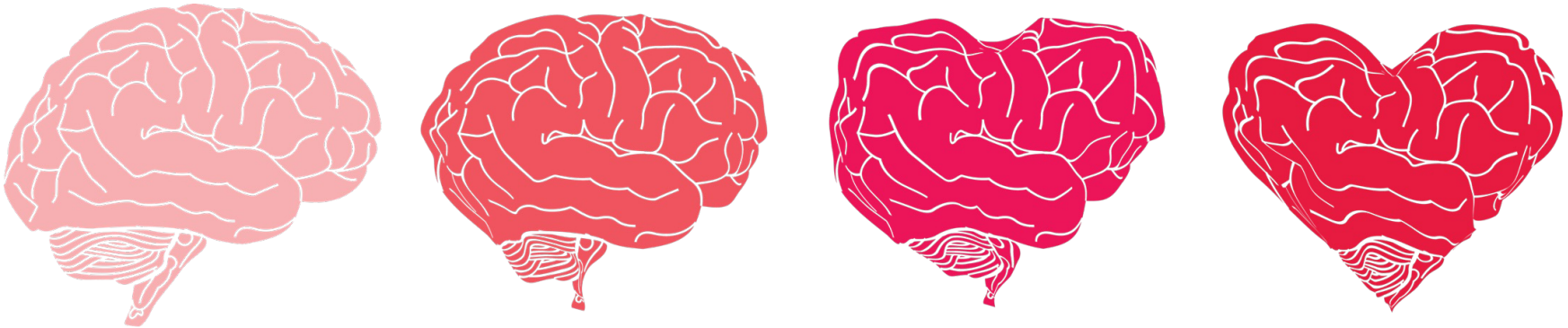
Overarching aims of our outreach program

1) Improve access to clinical care for Chinese -, English -, and Spanish - speaking older adult San Franciscans living within the most *underserved* and *vulnerable* neighborhoods of the city.

2) Educate older adult San Franciscans living in *underserved*, *underrepresented,* and *vulnerable* neighborhoods on various topics related to neurocognitive disorders and brain health promotion strategies.

3) Incentivize and facilitate recruitment and retention of ADRC participants from *underrepresented* and *vulnerable* backgrounds.

4) **Study associations between social and environmental exposures and late-life brain health outcomes.**



Community Outreach Program

記憶與老化研究中心社區外展團隊

Programa de alcance comunitario

UCSF Weill Institute for Neurosciences
Memory and Aging Center

GLOBAL BRAIN HEALTH INSTITUTE

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Self-identified race/ethnicity is a poor marker of within-group biological similarity and between-group biological difference

American Society of Human Genetics (Nov. 2017):

"Humans cannot be divided into biologically distinct subcategories…human genetics challenges the traditional concept of different races of humans as biologically separate and distinct."

"There is considerable genetic overlap among members of different [socially-defined] populations. Such patterns of genome variation are explained by patterns of migration and mixing of different populations throughout human history."

"Genetics exposes the concept of ''racial purity'' as **scientifically meaningless**."

"Culture refers to the integrated patterns of human behavior that include the language, thoughts, communications, actions, customs, beliefs, values, and institutions of racial, ethnic, religious, or social groups" .

https://npin.cdc.gov/pages/cultural-competence

Racial and ethnic differences in brain health outcomes in the US are primarily driven by social and environmental factors:

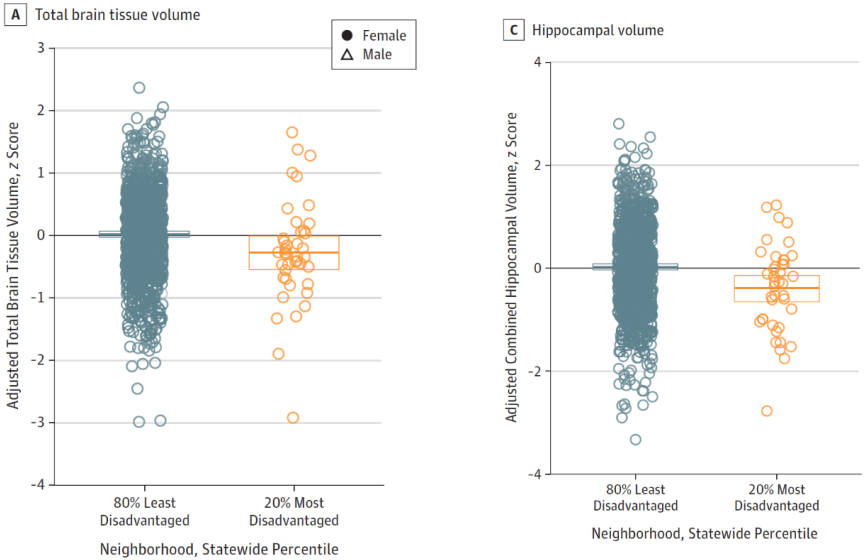
" As a low-income worker, it is hard to access primary care because of **health insurance**, so I go to [a SF hospital]. It may take **up to an hour to travel there**. It is hard to get translation and **sometimes I have to bring my own translation**. **Getting medication is difficult and not convenient**. I have to travel further in the city and often multiple times to get one medication, and **wait countless hours**. This **affects my work schedule** because I can't take that much time off. "

- Chinese speaking resident of southeast San Francisco

JAMA Neurology | Original Investigation

Association of Neighborhood-Level Disadvantage With Cerebral and Hippocampal Volume

Jack F. V. Hunt, BA; William Buckingham, PhD; Alice J. Kim, BA; Jennifer Oh, BS; Nicholas M. Vogt, BA; Erin M. Jonaitis, MS, PhD; Tenah K. Hunt, MPH, PhD; Megan Zuelsdorff, PhD; Ryan Powell, PhD; Derek Norton, MS; Robert A. Rissman, PhD; Sanjay Asthana, MD; Ozioma C. Okonkwo, PhD; Sterling C. Johnson, PhD; Amy J. H. Kind, MD, PhD; Barbara B. Bendlin, PhD



" In the primary analysis of 951 participants (637 women [67.0%]; mean [SD] age, 63.9 [8.1] years), living in the 20% most disadvantaged neighborhoods was associated with 4.1% lower hippocampal volume (β = −317.44; 95% CI, −543.32 to −91.56; *P* = .006) and 2.0% lower total brain tissue volume (β = −20 959.67; 95% CI, −37 611.92 to −4307.43; *P* = .01), after controlling for intracranial volume, individual-level educational attainment, age, and sex. **Robust propensity score–matched analyses determined that this association was not due to racial/ethnic or demographic characteristics."**

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Viewpoint

April 3, 2020

Addressing Social Determinants of Health
Time for a Polysocial Risk Score

Jose F. Figueroa, MD, MPH[1,2]; Austin B. Frakt, PhD[1,3,4]; Ashish K. Jha, MD, MPH[1,5]

» Author Affiliations | Article Information

JAMA. 2020;323(16):1553-1554. doi:10.1001/jama.2020.2436

- Analogous to a polygenic risk score but constructed based on social/environmental exposures.
- An important concept, given that in the US, self-reported race and ethnicity may not be a reliable proxy of within-group homogeneity everywhere in the country.
- A polysocial risk score would allow us to improve our understanding of social vulnerability in relation to specific brain health outcomes across different research projects at the MAC.

Life Course Epidemiology 101

Critical/sensitive model: social/environmental exposures have differing heightened effects on individual health outcomes only during specific life periods.

Accumulation model: Timing is less relevant, what matters most is the cumulative duration of exposures throughout life.

Green MJ, Popham F. Life course models: Improving interpretation by consideration of total effects. *Int J Epidemiol*. 2017;46(3):1057-1062. doi:10.1093/ije/dyw329

Cable N. Life course approach in social epidemiology: An overview, application and future implications. *J Epidemiol*. Published online 2014. doi:10.2188/jea.JE20140045

The creation of the MAC SEDBH-Q

- **Guiding framework:** NIH Health Disparities Framework, SF DPH documents, clinical experience.

- **Existing questionnaires:** “Capturing Social and Behavioral Domains in Electronic Health Records”(IOM Report), UCSF Clinical and Translational Science Institute, literature review.

- **Consultation with community partners and MDs of diverse backgrounds**

- **Translation to Spanish, Mandarin, Cantonese**

- **Face validity testing of questionnaire and iterative revision**

- **Pilot testing in each language**

The creation of the MAC SEDBH-Q

Roughly 80 questions that probe a wide range of life exposures:

- Maternal and paternal background
- Expanded sociodemographic characteristics (self-reported race and ethnicity, cultural background; sexual orientation and gender; linguistic abilities, etc.)
- Family dynamics and adverse childhood experiences
- Work experiences
- Exposure to potentially traumatic experiences
- Discrimination
- Resource strain
- Home and neighborhood environment
- Health care access
- Overall stress

Progress

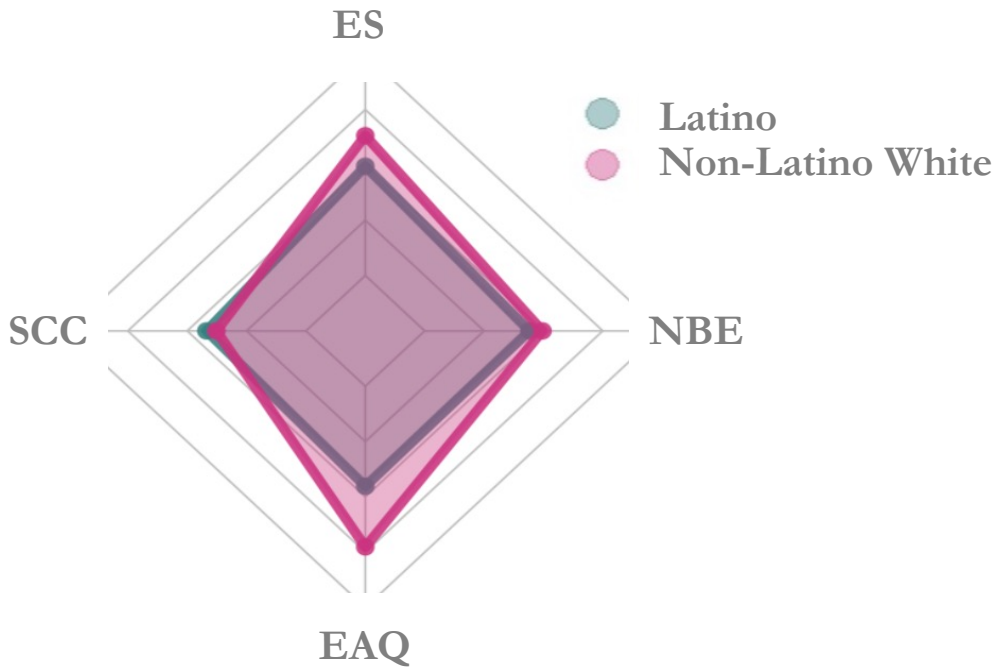
SDOBH – Q (English, Spanish, Chinese)

Language	Sent	Completed	Incomplete	In progress	Declined
Spanish	79	40	1	4	0
English	238	119	20	8	11
Mandarin/Cantonese	119	20	0	2	2

** RedCAP questionnaire (including consent)*
*** 40 to 60 minutes to complete*
*** $80 per submitted questionnaire*

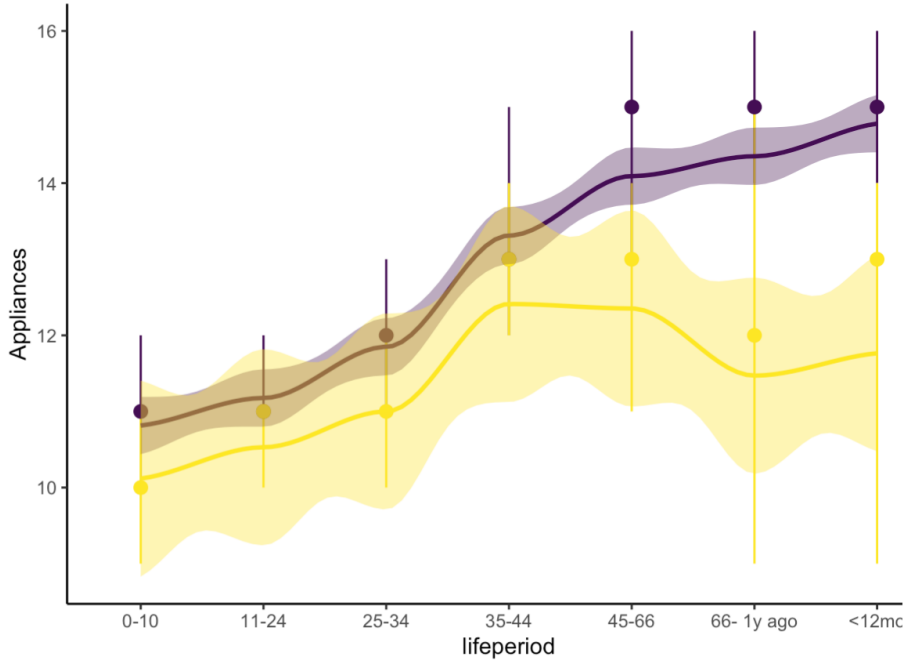
Main challenges: Lack of computer access, low computer literacy, non-responders.

Radar plot of PCA-generated social and environmental factor domain indices by cohort.



ES: Economic Stability
NBE: Neighborhood and Built Environment
EAQ: Education Access and Quality
SCC: Social and Community Context

Number of appliances in household through different life periods for cognitively normal (Purple line) and cognitively impaired (Yellow line) participants



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Early-life adversity impacts cognition in late-life

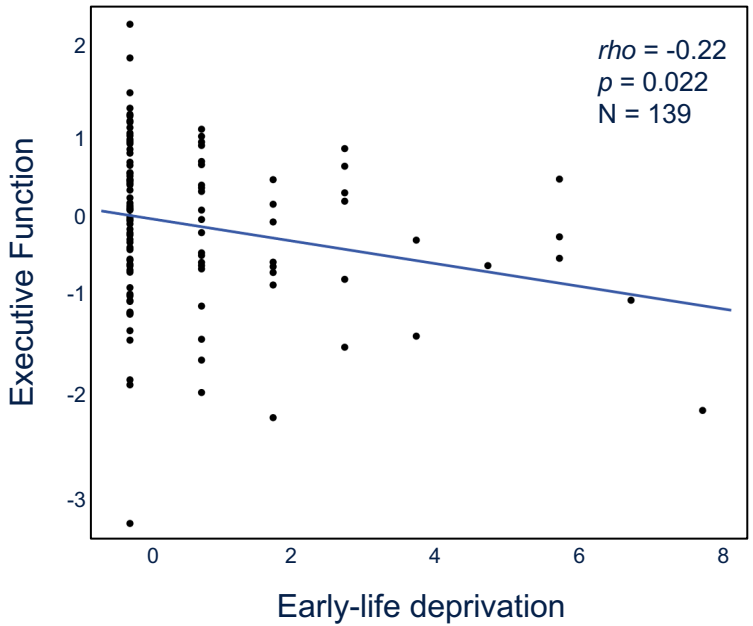
Wei-Ming Watson, PhD
Brain Health Equity Fellow

1 type of early-life adversity
(ages 0-24)

Deprivation

Lack of nutritious food
Lack of adequate healthcare
Less than 10 books in home
Caretaker neglect

Worse Executive Function



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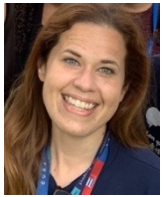
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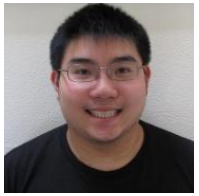
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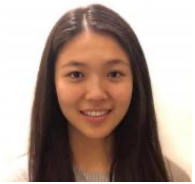
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Alinda Amuiri
(CRC, LEADS)

Eugenie Mamuyac
(CRC, Bilingualism)

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Atlantic Fellows at GBHI participating in outreach activities (2021 – 2022)

Tanisha Hill-Jarrett, PhD
Neuropsychologist, USA

Luis Martinez, MD, MPH
Neurologist, Colombia

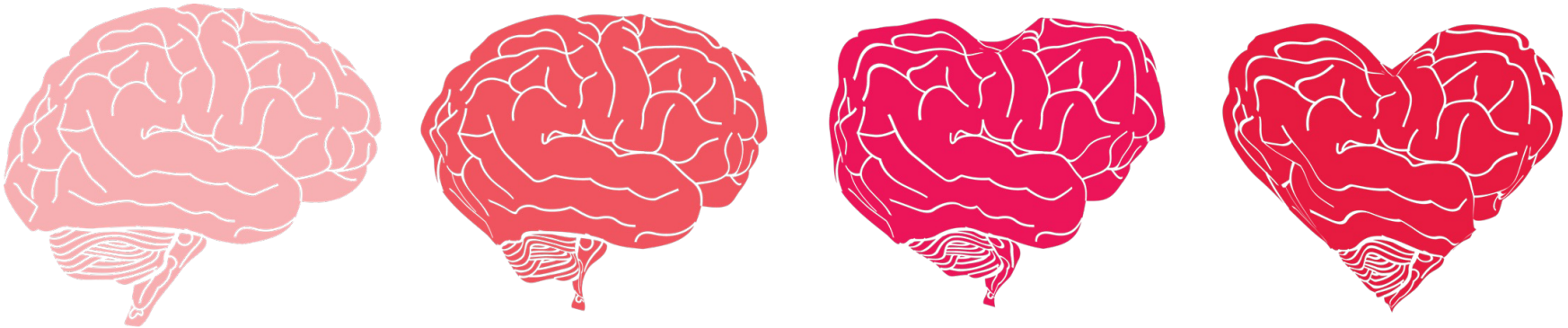
Magda Kaczmarska, BS, MFA
Dancer, Artist, USA

Alex Kornhuber, BFA
Photographer, Peru

Jet Vonk, PhD

Asst Professor in Residence
Neurology

Jet Vonk is an Assistant Professor at the UCSF Memory and Aging Center, Department of Neurology. She received her PhD degree in Speech-Language-Hearing Sciences from the City University of New York Graduate Center, with a focus on neurolinguistics and cognitive science. She also maintains an affiliation with the Department of Epidemiology at Utrecht University in the Netherlands, where she is currently obtaining a second PhD in Epidemiology.



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