**Community Context, Cognitive Impairment, and Differences across Racial/Ethnic Minorities and Immigrant Groups**

**A. Specific Aims**

This research uses data from the Health and Retirement Survey (HRS) to explore whether community-level social context shapes cognitive impairment beyond individual-level traumatic events across the lifespan. I will achieve the following Specific Aims:

* Aim 1:Evaluate the association of community social context as defined by a) perceived discrimination; b) neighborhood context (social cohesion and physical disorder); each separately and then as a summative index on cognitive impairment (ascertained via the HRS global cognitive summary score and a measure of subjective memory impairment).
* Aim 2:Assess the added effect of community social context on cognitive impairment even when controlling for individual-level trauma exposure across the lifespan.
* Aim 3: Investigate whether race/ethnicity and immigrant status modify the link between community social context and cognitive impairment.

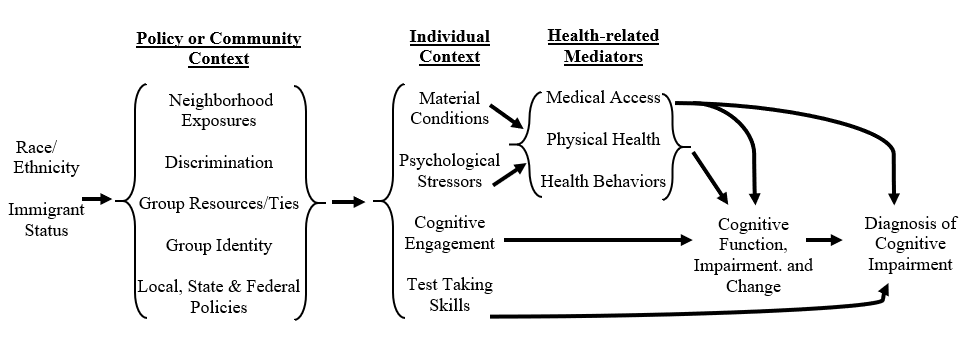
The *long-term goal* of this research is to elucidate pathways linking community social context and individual exposures to cognitive impairment outcomes. This foundational work will help develop community interventions that might reduce risk for cognitive decline.

**B. Background and Significance**

Traumatic events can induce a physiological reaction involving the hypothalamic–pituitary–adrenal axis and the stress hormone cortisol that forms the biological foundation for the association between life stressors and cognitive function1–3. **Yet studies examining the role of traumatic events on cognitive impairment have predominantly focused on the individual-level, despite increasing awareness that community social context can modify exposure to, and risk associated with, traumatic events**4,5**.**

**Community social context could play a significant role in cognitive impairment, particularly for older adults who spend more time in their neighborhoods.** Neighborhood context shapes exposure to stressors, social integration, and participation in healthcare, which influences health outcomes6. For example, neighborhood characteristics such as neighborhood walkability have been shown to be negatively associated with cognitive impairment among older adults7. Such risks might be compounded for racial/ethnic minority older adults and immigrant older adults, who are more likely to live in communities affected by structural disadvantages8,9. At the same time, they experience discrimination that can vary according to neighborhood context6 and portend cognitive impairment10. There are few population-based studies investigating the joint effects of discrimination and neighborhood characteristics on cognitive health. **This study will leverage population-based data to investigate how community social context, co-occurring with individual-level trauma, shapes cognitive impairment, particularly for racial/ethnic minority and immigrant older adults who experience health disparities.**

Figure 1. Conceptual Framework, adapted from Manly & Glymour (2008)

By 2060, nearly half of U.S. older adults are projected to be racial/ethnic minorities, and the majority of projected U.S. population growth is linked to immigration11. As the U.S. population ages, it is vital to consider how community context can improve the cognitive health of older adults as part of a comprehensive strategy to address disparities, identified as a priority area by the National Academies of Science, Engineering, and Medicine12. Manly & Glymour13 (see Figure 1) have conceptualized how race/ethnicity may contribute to cognitive decline due to different socially patterned experiences at community and individual levels. This project modifies and uses this framework, **focusing on discrimination and neighborhood exposures, with the hope of mitigating cognitive decline and promoting equity in aging across diverse communities.**

**C. Innovation**

**The proposed research will go beyond the individual-level and analyze the pivotal role of community social context on cognitive impairment.** Because racial/ethnic minorities and immigrants are disproportionately affected by negative community context9,12, this research will promote equity in healthy aging.

**This study will also demonstrate how hierarchical modelling techniques may be a better way to measure the relationship between individual and community-level variables in a way that constitutes a methodological improvement over standard linear regression modeling.**

**By investigating community-level social context, individual-level stressful life events, and cognitive impairment in a national, population-based sample, this study paves the way for evidence-based community interventions particularly for racial/ethnic minority and immigrant communities.**

**D. Approach**

**D1. Design, Data, and Study Population:** The Health and Retirement Survey (HRS) is a longitudinal and nationally representative survey of community dwellings of older adults over 5014. Starting in 2006, the HRS implemented a psychosocial questionnaire that includes assessment of lifetime traumatic events, perceived discrimination, and neighborhood context. I plan to include all participants who have completed the measures of interest from 2006 to 2016 (5 waves of data) (n=77,775; 28% Black; 21% Hispanic).

**D2. Measures**

**A) Outcome Variable: Cognitive Impairment**

I will use objective and subjective measures of cognitive impairment measures15,16. Objective cognition will be assessed via the HRS global cognitive summary score, comprising four items: immediate ten-word recall (0–10 points), delayed ten-word recall (0–10 points), backward counting (0–2 points), and serial sevens (0–5 points), for a total score of 0–2715. A score of ≥12 is considered normal. Subjective memory will be measured using the following question: “How would you rate your memory at the present time? Would you say it is excellent, very good, good, fair, or poor?” (1=excellent, 5=poor). Subjective memory impairment will be defined as self-rated memory of less than “good” (score of 4–5) as has been done in prior studies16.

**B) Exposure Variables: Individual and Community Context**

**Individual Level Adversity**

**Lifetime Trauma Exposure:** Traumatic experiences will be assessed using the following items: 1) losing a child; 2) experiencing a fire, flood, earthquake, or natural disaster; 3) firing a weapon or been fired upon; 4) having a partner or child addicted to drugs or alcohol; 5) being the victim of a serious assault; 6) having a life-threatening illness or accident; and 7) having a partner or child experience a life-threatening illness or accident. I will create a continuous variable as a count of the total traumatic events experienced (Range: 0–11)17,18.

**Community Social Context**

**Discrimination:** Perceived discrimination will be measured using the Everyday Discrimination Scale (EDS)19,20, which asks respondents how often they experience: treatment with less respect than others, poorer service than others at restaurants or stores, others acting as if they are not smart, others acting as if they are afraid of them, and being threatened or harassed. Ratings are made on a six-point scale (1=almost every day, 6=never). I will create a continuous variable reflecting total EDS score by summing scores across items.

**Neighborhood Context:** Eight questions will be included8 as part of a continuous variable defining neighborhood context, involving neighborhood physical disorder (4 items: vandalism/graffiti, rubbish, vacant/deserted houses, and perceived safety walking alone at night) and social cohesion (4 items: feeling part of the area, trusting people, friendliness of people, and availability of help if in trouble)21,22. Response ratings are made on a seven-point scale (1=more favorable, 7=worse) and will be summed to create the variable.

**C) Moderators:** Race/ethnicity (Non-Hispanic White, Non-Hispanic Black, Hispanic), immigrant status (U.S.-born versus foreign-born)

**D) Covariates:** Age, gender, education, medical comorbidities (self-report count of eight conditions)16

**D3. Analysis**

For Aim 1,I will use multivariate linear regression to estimate the association of community social context on cognitive impairment for a) perceived discrimination (Model 1); b) neighborhood context (Model 2); and as a summative cumulative index (Model 3).

For Aim 2,I will use multi-level linear regression23 to model risk for cognitive impairment in a two-level, hierarchical structure (i.e., individuals nested within communities) to simultaneously study the effects of individual trauma and community social context on cognitive impairment. To check the assumption of linearity, I will plot the residuals to compare the model-predicted values to the observed ones24.

For Aim 3, I will add interaction terms to separate fully adjusted models for each community social context variable (perceived discrimination, neighborhood context, and the summative index) and race/ethnicity and immigrant status to determine whether the community context and cognitive impairment association differs across racial/ethnic or immigrant status group.

For all these analyses, I will apply survey weights to ensure the national representativeness of data25.

**E. How the pilot will contribute to future funding**

The findings of this study will serve as preliminary data for an NIH R01 proposal to understand how risk of cognitive impairment changes *over time* in presence of changing trajectories in individual and neighborhood characteristics. I hope to expand this work to include measures of trauma-based injury like TBI, mediation by depressive symptomatology, and moderation by community protective factors that may buffer against the sequelae of adversity. Multilevel models can be used for longitudinal data and cross-sectional survey analyses, examination of geographic variations (e.g. neighborhoods nested within regions or larger areas), and for analyzing cross level (neighborhood-individual) interactions, allowing for answering a variety of questions on cognitive aging across diverse communities. I also hope to expand this analysis to additional datasets focusing on racial/ethnic minorities or immigrants specifically, such as the Hispanic Community Health Study/Study of Latinos (SOL)26, and to shift toward developing community interventions to reduce risk of cognitive impairment. I have received funding from the American Academy of Neurology, Russel Sage Foundation, and National Science Foundation. I have a pending K23 resubmission on adapting and evaluating a multi-component intervention to address depression and cognitive impairment among refugees with comorbid depression and TBI. I am committed to developing an independent clinical research career focusing on how sociocultural factors, community context and structural policies influence cognitive impairment, particularly among marginalized populations, and leveraging these findings to support community-level interventions.

**F. Timeline & milestones**

I have conducted descriptive and bivariate analyses to explore feasibility. In unadjusted regression models, discrimination is associated with decreased cognitive impairment (ß=0.014, p<0.01) and neighborhood context with greater cognitive impairment (ß =-0.256, p<0.01), suggesting a signal of support for exploring the role of these factors on cognitive impairment. I will adhere to the following timeline:

1) Data management and analysis in months 1-6

2) Manuscript preparation in months 6-10

3) Manuscript submission and NIH proposal preparation: months 10-12.

**G. Identified mentor whose role and commitment to mentoring is described in the research plan**

My mentor is Dr. Margarita Alegría, who serves as my primary mentor for my American Academy of Neurology Practice Research Scholarship and primary co-mentor for my K23 submission. I have a first-authored publication (with her as senior author) published in the *Journal of American Geriatrics Society* about the prevalence of cognitive impairment in a sample of Latino and Asian minority older adults. As my mentor, she will inform study modeling based on extant health disparities literature, expose me to methodologies used in health disparities research, inform my future R01 submission, and provided guidance for my overall career development. I meet with Dr. Alegría on a bimonthly basis and will continue to meet throughout the award period to ensure the successful completion of this project.

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