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Neighborhood socioeconomic conditions are associated with psychosocial functioning in older black and white adults

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Abstract

We examined neighborhood socioeconomic status (NSES) in relation to depressive symptoms, perceived stress, and hostility in 5,770 community-dwelling older black and white adults (mean age=73 years; 62% female) from 3 contiguous neighborhoods covering 82 census block groups in Chicago, IL. NSES was an average of z-scores of four Census 2000 block-group variables: % public assistance, % households earning $\leq$ \$25,000 annually, % with $\geq$ college degree, and % owner-occupied dwellings valued $\geq$ \$200,000. NSES was inversely related to hostility (beta=−0.305), stress (beta=−0.333) and depressive symptoms (beta=−0.223) ($p<.001$) in multi-level mixed-effects regression models adjusted for age, sex, race and years in the neighborhood. With further adjustment for education, income, marital status and health conditions, NSES remained associated with depressive symptoms (beta=−0.078) and hostility (beta=−0.133) ($p<.05$); the association with hostility was strongest in non-black neighborhoods. Neighborhood social conditions contribute to the psychosocial well-being of older residents; research is needed to investigate pathways through which neighborhoods influence health outcomes in an aging population.

Keywords

psychosocial factors; socioeconomic status; aging; multi-level models

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DISCLOSURE STATEMENT

None of the authors has any conflicts of interest to declare.

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1. INTRODUCTION

It is well-known that persons of lower socioeconomic position, whether assessed by educational attainment, income, occupation, or other markers of socioeconomic status (SES), experience poorer psychosocial functioning and worse health outcomes, relative to their more advantaged peers (Harper et al., 2002; Kaplan et al., 2007). Recently, more attention has been paid to contextual and environmental factors, including neighborhood characteristics, and their influence on health and well-being. Most of this work has focused on indicators of physical health and functioning outcomes. For example, living in disadvantaged neighborhoods is related to higher rates of cardiovascular disease (Diez Roux et al., 2001; Diez Roux et al., 1997), poorer survival following myocardial infarction (Tonne et al., 2005), higher asthma prevalence (Cagney and Browning, 2004), poorer physical functioning (Feldman and Steptoe, 2004), poorer cognitive function in old age (Wight et al., 2006), and increased mortality risk in middle-aged and older adults (Martikainen et al., 2003; Wight et al., 2010; Yen and Kaplan, 1999). Most of this work suggests that living in disadvantaged neighborhoods is associated with poorer health outcomes, independent of individual-level risk factors, including individual-level SES.

The recent growth of neighborhood research has spurred an increasing interest in the causal pathways that link neighborhood-level influences with human behavior and health (Berkman et al., 2000; Geronimus, 1992; Gibbons et al., 2007; Glass and McAtee, 2006). A useful conceptual framework defines social conditions at the level of society (macro-level) and at the immediate social environment (mezzo-level, e.g., as neighborhood, school) as contextual regulators of individual-level behavior that are contingent on biological risks and reactions and lead to downstream health (Glass and McAtee, 2006). Although this “risk-regulator” model has focused on behavior as the primary embodiment of contextual influences in health and disease, it appears likely that similar “ecosocial” pathways affect human emotional responses as well. In fact, others have postulated that reduced mental health and psychosocial function may be a primary way through which living in adverse neighborhood conditions may increase risk for poor physical health outcomes (Browning and Cagney, 2003; Wen et al., 2006). Although such a pathway is both theoretically and biologically plausible, compelling evidence for this pathway is still scarce, despite the rapidly growing literature on neighborhoods and health.

Three recent reviews suggest that poorer neighborhoods contribute negatively to depression and mental health in the general adult population (Kim, 2008; Mair et al., 2008; Truong and Ma, 2006). However, firm conclusions are difficult to draw because there is substantial variability in the measures used, including covariates assessed, and the populations studied (Mair et al., 2008). Furthermore, the majority of published studies have focused only on depression and related mental health problems. We know little about the role of neighborhood conditions in other aspects of psychosocial function that are equally important for health. In addition, findings tend to be considerably weakened when properly adjusted for individual-level risk factors (Kim, 2008; Truong and Ma, 2006).

The conceptual framework for this study derives from the literature in aging and health that documents the importance of neighborhood environments to the health and well-being of older adults (Glass and Balfour, 2003; Satiriano, 1997). Compared with younger adults, older adults tend to spend a greater portion of their daily activity patterns within the boundaries of their residential neighborhood, suggesting that neighborhood conditions may have particular salience to their psychosocial function, including perceptions of and vulnerability to stress (Glass and Balfour, 2003; Wen et al., 2006; Yen et al., 2009). Neighborhood conditions have been associated with depression in older age (Bierman, 2009; Kubzansky et al., 2005), but other aspects of psychosocial function have not been

considered. For example, hostility has been linked to several health outcomes (Everson-Rose and Lewis, 2005), and although some studies have found that reported hostility declines somewhat with age (Barefoot et al., 1993), it remains significantly related to health and well-being in old age (Barnes et al., 2009). Moreover, although stress and personality factors contribute to psychosocial function and well-being, prior studies of older adults largely have failed to address contextual influences on these psychosocial characteristics. This is a significant gap in the literature. A fuller understanding of contextual factors contributing to the psychosocial function and well-being of older adults is needed. This study was designed to address these gaps in the literature, particularly by expanding the range of psychosocial characteristics assessed than in previous studies of neighborhood effects on mental health in older adults. We examined neighborhood socioeconomic status (NSES) in relation to depressive symptoms, hostility, and perceived stress, characteristics that are clearly documented to affect health in the elderly, in a sample of older adults residing in Chicago, IL, USA. We hypothesized that higher NSES would be related to better psychosocial functioning in our elderly cohort, and that these relations would be independent of individual-level SES.

2. METHODS

Study Population

Participants were from the Chicago Health and Aging Project (CHAP), an ongoing longitudinal study of risk of Alzheimer's disease and age-related chronic conditions. Details of the CHAP study design have been reported (Bienias et al., 2003; Evans et al., 2003). Briefly, between 1993 and 1997, CHAP conducted a complete census of three adjacent community areas on the south side of Chicago, which encompass 20 census tracts including 82 census block groups. At that time, residents in these areas were largely African-American or non-Hispanic white, with a range of socioeconomic backgrounds within each racial group; <1% reported another race category or Hispanic ethnicity. All age-eligible (≥ 65 years old) residents identified through the census were invited to participate; 6,158 (78.9% of eligible) agreed and provided informed consent. This group is the CHAP study Original Cohort. All participants received an in-home, baseline interview, conducted simultaneously with the census. Follow-up interviews have been conducted in three-year cycles, from 1997–1999, 2000–2002, 2003–2005, and 2006–2008. Data for the current analyses come from the third interview cycle, i.e., 2000–2002, with one exception as noted below.

With the third interview cycle (i.e., beginning in 2000), CHAP has newly enrolled residents from the same community areas who have turned 65 years old since study inception and who were identified through the earlier Census and commercially available lists. These “Successive Aging” cohorts follow the same three-year interview cycles and complete the same measures as the CHAP Original Cohort. In-home interviews include assessment of depressive symptoms, hostility, perceived stress, medical history, medication usage, anthropometric measurements, health behaviors, socioeconomic factors, self-rated health status, cognitive activities in adulthood and childhood, and a battery of cognitive tests. Data on neighborhood SES are derived from the 2000 U.S. Census (see below). Analyses were limited to 5,770 participants (2,467 Original Cohort subjects; 3,303 Successive Aging cohort subjects) who had valid neighborhood SES data from a completed interview after 01/01/2000. All psychosocial data were obtained at the same interview as the neighborhood SES data with one exception: among Original Cohort participants, data on hostility and perceived stress were obtained only at the second interview cycle (conducted between 1997–99); therefore, data for these two outcomes predate the 2000 Census for Original Cohort participants by just 1–3 years. The study was approved by the Institutional Review Board of Rush University Medical Center. All participants provided written, informed consent at each assessment.

Measurement of Neighborhood SES

Addresses of all CHAP participants have been geo-coded, providing information on census tract and census block group. The high density of participants from a relatively small geographic area made it feasible to use Census block group as our definition of neighborhood. Census block groups in US urban areas tend to represent relatively small residential areas with a population of approximately 1,000 people, and therefore provide a more homogeneous definition of neighborhood areas than larger geographic units such as census tracts or zip codes (Krieger et al., 2002). The NSES measure was created using Census information on four indicators of the block group population: percent on public assistance, percent of households earning \$25,000 per year or less, percent with a college degree or higher, and percent of owner-occupied dwellings valued at \$200,000 or higher. We previously selected these indicators because they provide information on the entire spectrum of SES and because they represent four aspects of social position – i.e., social service use, income, education and wealth (Cagney et al., 2009). A z-score transformation was computed for each indicator across block groups; the resulting four z-scores were averaged for each block group to create the measure of NSES, with higher scores indicative of better neighborhood socioeconomic conditions. All 82 census block groups within the CHAP neighborhoods were included in analyses.

Individual Level Measures

Measurement of Depressive Symptoms—The 10-item version of the Center for Epidemiologic Studies Depression Scale (CES-D) was used to measure depressive symptoms (Irwin et al., 1999; Radloff, 1977). This version, developed and tested at the East Boston EPESE site for use with those aged 65 or older, has acceptable reliability and measures the same four dimensions as the original 20-item CES-D (Kohout et al., 1993). A CES-D score is determined by summing across items, representing the number of symptoms experienced by a respondent in the past week (range, 0–10). Six of 10 items had to be non-missing for the summary score to be non-missing. For the present analyses, we used the CES-D data obtained concurrently at the visit when neighborhood SES data were collected.

Measurement of Hostility—Hostility was measured by 8 items from the Cook-Medley Hostility Scale (Cook and Medley, 1954), a commonly used measure of distrustful, suspicious attitudes that has been associated with excess CVD risk (Barefoot et al., 1983; Everson et al., 1997; Smith et al., 2004). The 8-item subset used in CHAP focuses on cynical distrust and disparaging views of others' intentions. Each item has a true/false response option, with 1 point assigned for each "true" response and summed across items, with a higher score indicating greater hostility (range, 0–8). The 8-item scale has acceptable internal consistency in CHAP (Cronbach's alpha, 0.73).

Measurement of Perceived Stress—Perceived stress was measured with a 6-item version of the Perceived Stress Scale (PSS), a well-validated measure widely used in large scale epidemiologic studies (Cohen et al., 1983; Cohen and Williamson, 1988). Each item has a response of 0 to 3 and scores are calculated by summing across items (range=0 to 18), with higher scores indicating greater stress. Cronbach's alpha for this 6-item scale was 0.77. The PSS assesses the extent to which a person appraises situations in his/her life to be stressful and is considered a global measure of the level of stress experienced. Higher PSS scores previously have been related to greater CVD risk, including physiological manifestations of stress (Cohen et al., 1999; Kramer et al., 2000).

Assessment of Covariates

Covariates included age, sex, race, years residing in the neighborhood, education and income. Age, self-reported by date of birth, was modeled continuously, centered at age 75. Sex was modeled as a binary variable (referent = females). Race was self-reported using 1990 U.S. census questions on race/ethnicity and modeled as a binary variable (referent = non-black). Education, self-reported highest grade or year of regular school completed, was modeled continuously, centered at 12 years. Total household income, self-reported in 10 categories ranging from < \$5,000 per year to > \$75,000 per year, was modeled continuously. Years of neighborhood residence was ascertained by asking respondents to indicate the total number of years they had lived in the neighborhood, and was modeled as a continuous variable. Marital status was based on participant's report of their status at the third interview cycle and modeled as currently married (49%) versus not currently married (51%). Of those not currently married, the vast majority (70.6%) were widowed. Six chronic health conditions (heart attack, cancer, stroke, hypertension, diabetes, hip fracture) were assessed by self-report in response to the question: "Has a doctor, nurse, or other health care provider ever told you that you have had (condition)?", and modeled continuously as a count of conditions.

Data Analyses

Descriptive statistics were computed to characterize study participants on sociodemographics and covariates. The association between NSES and each psychosocial outcome was tested using multi-level, mixed-effects regression models, with NSES modeled continuously as a neighborhood-level variable, and depressive symptoms, hostility and perceived stress modeled continuously as outcome variables. All covariates were modeled as individual-level variables. A linear link function and normal error structure were used for hostility and perceived stress given their approximately normal distribution in this population. The CES-D had a non-linear distribution so a negative binomial error structure with a log link was specified. The first set of regression models tested the crude association between NSES and each outcome, unadjusted for any individual-level covariates (Model 1). In subsequent models, the following sets of variables were entered at each step: age, sex, race, years residing in the neighborhood (Model 2), and individual-level education, income, marital status, and chronic health conditions (Model 3). Subsequently, we tested for race by NSES interactions for each outcome, using individual level race. Model assumptions, tested graphically and analytically, were satisfactorily met. All models were computed in SAS V9.2[®] (SAS Institute; Cary, NC) using PROC MIXED[®] for the linear mixed-effects models for hostility and perceived stress and PROC GLIMMIX[®] for the CES-D models.

3. RESULTS

Participant Characteristics

Table 1 presents means (SD) or % for participant characteristics, including covariates, the four census block group indicators used to create the measure of NSES, and mean and range of participants in the block groups. Participants were, on average, 73 years old at the time of data collection, and were predominantly black, female, and had completed just over 12 years of formal education. Nearly half of the participants were currently married, over 75% had at least 1 self-reported chronic health condition, and the average number of years residing in the neighborhood was 32.5. The average number of residents per block group was 73.

Neighborhood SES and Psychosocial Functioning

Table 2 presents findings from the crude and adjusted multi-level regression models testing the association of NSES with each of the psychosocial functioning measures. Before

adjustment for individual-level covariates (Model 1), higher NSES was significantly associated with lower hostility, higher perceived stress and more depressive symptoms. After adjustment for age, sex, race and years of neighborhood residence, these associations were reduced by 35% to 55%, but they remained statistically significant for all three measures (Model 2). However, as shown in Model 3 for each outcome, adjustment for the individual-level SES variables of education and income, as well as marital status, and chronic health conditions, further reduced the magnitude of the association between NSES and hostility, stress, and depressive symptoms. The relationship between NSES and both hostility and depressive symptoms remained significant but was reduced by 75%–80% in relation to the unadjusted model (Model 1). The relationship between NSES and perceived stress was largely eliminated, and no longer statistically significant. In the fully adjusted models, sex, race, education and income were significant covariates related to all psychosocial measures. Age and chronic health conditions also were significant covariates related to perceived stress and depressive symptoms but they were not significant in the model for hostility.

Effects of Individual-Level Race

For each psychosocial outcome, we added a race by NSES term to the fully adjusted model. We observed a significant interaction for hostility (estimate (SE) = 0.387 (.122); $p=.001$). In follow-up analyses, we repeated the two covariate adjusted models stratified by % black neighborhoods (Table 3). Examination of the racial composition by block group in the CHAP neighborhoods revealed that the vast majority (>95%) of black participants in the study lived in block groups that were at least 70% black according to 2000 census data. Indeed, neighborhoods were identified as >70% black or <55% black with no neighborhoods identified between 55% and 70% black. Accordingly, we stratified block groups as either less than 70% black residents ($n=30$ block groups) or more than 70% black residents ($n=52$ block groups). These stratified analyses showed stronger associations between NSES and hostility for non-black than for black neighborhoods. Adjusting for age, sex, individual race, and number of years in the neighborhood (Model 1), NSES was significantly, inversely associated with hostility for residents in predominantly non-black ($p<.0001$) as well as black neighborhoods ($p<.01$). In the predominantly non-black neighborhoods, further adjustment for individual level education and income, marital status and chronic health conditions (Model 2) reduced this association by 31% but it remained significant ($p=.001$). In contrast, in the black neighborhoods, full covariate adjustment reduced the association by 50%, which became non-significant. There were no significant interactions between race and NSES for perceived stress or depressive symptoms (data not shown).

4. DISCUSSION

In this study of community-dwelling older adults, better socioeconomic conditions within neighborhoods were associated with fewer depressive symptoms and lower levels of hostility and perceived stress. These associations were modified to a substantial degree by individual-level sociodemographic correlates of psychosocial functioning, especially education and income. In this study, older blacks and persons with less education and lower income levels tended to report more hostility, stress and depressive symptoms, which is consistent with previous research (Barefoot et al., 1993; Baum et al., 1999; Lorant et al., 2003; Skarupski et al., 2005). However, a residual relationship was observed between neighborhood SES and depressive symptoms as well as hostility, although subsequent analyses showed the effect of neighborhood SES on hostility was stronger for predominantly non-black neighborhoods. This suggests that neighborhood social circumstances, as indexed

by markers of the average SES of the neighborhood population, play a role in the well-being and psychosocial functioning of the older residents who live in them.

This study adds to the growing body of literature examining the influence of neighborhood characteristics on health and well-being. Although neighborhood factors have been implicated in the prevalence of depression and the need for mental health services (Kim, 2008; Mair et al., 2008; Truong and Ma, 2006); very few studies have considered a broader spectrum of psychosocial functioning. We included measures of depressive symptoms, perceived stress, and hostility to characterize our cohort on three important dimensions of psychosocial functioning. Each of these constructs has been linked to increased morbidity and mortality risk, particularly related to cardiovascular diseases (Everson-Rose and Lewis, 2005). Individual-level correlates of depressive symptoms, stress, and hostility are well-known; what has been lacking is an investigation of contextual determinants of psychosocial functioning.

Our findings suggest that the socioeconomic context of the neighborhood environment may have particular relevance for psychosocial functioning of older adults. A growing body of literature has demonstrated that several markers of psychosocial function, including distress, negative affect and hostility, are associated with adverse health outcomes in older age, e.g., mortality (Everson et al., 1996; Ohlin et al., 2004), disability (Mendes de Leon et al., 2003; Mendes de Leon et al., 2001), and cognitive impairment (Barnes et al., 2009; Wilson et al., 2003). This raises the possibility that the neighborhood environment in which older adults live and spend a large portion of their daily activity, may influence their future health trajectories. Indeed, several lines of evidence show that neighborhood conditions may have particular salience for health risks at older ages (Glass and Balfour, 2003; Satariano, 1997). Following retirement, individuals typically spend more time in smaller neighborhood areas precisely because they spend less time in other, broader social environments such as the workplace. Moreover, declines in health and mobility that commonly occur at more advanced ages likely contribute to greater time spent within one's immediate neighborhood. However, several factors make it difficult to establish specific causal inferences regarding the role of neighborhood factors in health and well-being. First, residential compositions of neighborhoods may be subject to specific selection or sorting factors that may account for the observed association between neighborhood characteristics and psychosocial function. Unfortunately, the specific nature of these selection factors is poorly understood, and therefore remains unmeasured in observational research (Oakes, 2004). Second, selection mechanisms may evolve over time, with increasing duration of residence in a neighborhood. For example, there may be a process of habituation to living in adverse neighborhoods that may attenuate perceived stress and related negative aspects of psychosocial function over time. In addition, to the extent that adverse neighborhood conditions increase risk for mortality (Diez Roux et al., 1997), a selective survival effect may occur among long-time residents, with those less vulnerable to neighborhood effects surviving in greater numbers into older age. Thus, sorting mechanisms that may induce a spurious association between adverse neighborhood conditions and poorer psychosocial function may be offset in part by other selection processes that tend to attenuate the relationship between neighborhood factors and health or well-being, especially in older adults.

We observed an interaction between individual-level race and NSES in relation to reported hostility levels. Subsequently stratifying by neighborhood racial composition revealed that NSES was more strongly related to hostility levels in the non-black than in the black neighborhoods. This study is located in Chicago, IL, a highly segregated large Midwestern city. One of the unique features of the CHAP study neighborhoods is that they range across the SES spectrum for both black and non-black neighborhoods, although, on average, black participants in CHAP have lower SES and report fewer social resources than non-blacks

(Barnes et al., 2004; Everson-Rose et al., 2003). The measure of hostility used in CHAP captures general feelings of cynicism or distrust and suspiciousness about the motives of others. Such characteristics appear to be correlated more highly with neighborhood socioeconomic circumstances for those living in predominantly non-black neighborhoods. It may be that living in neighborhoods with greater adversity and fewer resources has a greater psychosocial toll, resulting in more distrust and cynical attitudes, for the majority population because of normative expectations of upward social mobility. In addition, it is possible that other structural social conditions, such as institutional forms of racism and discrimination, are far more important in the development of distrust and cynical attitudes in African Americans than the particular socioeconomic conditions of the largely racially homogeneous neighborhood environments in which the older black adults of this study live. More work is needed to understand this finding.

Mechanisms by which neighborhood socioeconomic conditions influence psychosocial functioning or other health-related outcomes are not well understood. Neighborhood SES is a compositional measure of the residential population that often is used to characterize the structural social conditions of the neighborhood environment. Lower SES neighborhoods may offer inadequate access to important community resources, e.g., recreational facilities, walking paths, green spaces, supermarkets with healthy foods, and may experience higher crime rates. Such factors could contribute to residents experiencing stronger feelings of stress and negative affect (Ellen et al., 2001; MacIntyre et al., 1993; Pickett and Pearl, 2001). Physiologic perturbations associated with chronic stress exposure due to social disorder and stressful living conditions of more impoverished neighborhoods also could worsen psychosocial functioning (Hill et al., 2005). A recent study found that allostatic load, a biologic indicator of cumulative physiologic dysregulation (McEwen, 1998), was inversely related to neighborhood SES, as determined by income, education, poverty and unemployment, in the National Health and Nutrition Examination Survey (Merkin et al., 2009). However, as the data on the NSES components shown in Table 1 indicate, neighborhoods within CHAP would be considered predominantly middle class. Thus, additional research is needed to better understand possible mechanisms linking psychosocial functioning with neighborhood SES across the SES spectrum.

Our study has several important strengths. Data came from a well-characterized, population-based cohort with large numbers of older blacks and whites. Although substantial differences in average individual-level SES levels are evident between blacks and whites within the CHAP neighborhoods, we note that a relatively wide spectrum of SES exists within each racial group in our study. Psychosocial functioning was assessed with established measures with well-documented reliability and validity. Neighborhood SES was characterized across the SES spectrum by indicators from the 2000 U.S. census that included four aspects of social position – i.e., social service use, income, education and wealth (Cagney et al., 2009). Also, the high density of participants in the study area allowed us to define neighborhood by using census block groups, which are smaller and tend to be much more homogeneous compared with more commonly-used geographic definitions of neighborhoods, e.g., census tracts or US Postal zip codes. In addition, because CHAP began with a complete census of the entire study area, the addresses of all residents enumerated during the census were immediately geocoded, with a 100% match rate to census tract and block group. Together, the study design and measures used make it highly likely that our measure of neighborhood SES accurately reflects the socioeconomic exposures of the residents.

Limitations must also be acknowledged. This cross-sectional analysis cannot address the temporal relationship between neighborhood environment and psychosocial outcomes. In addition, the long-term selection processes that affect the population composition of

neighborhoods make proper interpretation of the relationship between neighborhood conditions and psychosocial function difficult, especially for older adults. Causal inference is challenging in neighborhood research in general, and we speculated above that the relationship between neighborhood factors and psychosocial function may be subject to countervailing selection effects over time. Data come from a geographically-defined urban area with a high population density; it is possible that structural neighborhood influences are prominent in this environment, and may be less prominent or have a different nature in other types of residential environments. Also, in this analysis we focused only on the potentially negative psychosocial consequences of neighborhood environments, and further research is needed to investigate the potentially positive psychosocial outcomes. Finally, this study was not designed to address the reciprocity or evolution of relationships between residents of neighborhoods and their social environments – the dynamics of which very likely influence psychosocial function and well-being. On average, respondents in our study had lived in their neighborhoods more than 32 years, and although CHAP neighborhoods can be characterized as relatively stable, clearly there will have been changes over time that could have impacted the social environment – for better and for worse. Recent theoretical advances point to the need for empirical work that incorporates a dynamic perspective in order to advance studies of the effects of neighborhoods on health (Cummins et al., 2007; Diez Roux, 2008).

In sum, in this population-based study of older adults, we found that neighborhood SES showed relatively robust associations with three measures of psychosocial function, including depressive symptoms, perceived stress, and hostility. Although individual-level SES accounted for a substantial portion of these associations, they remained statistically significant for depressive symptoms and for hostility, particularly among residents of predominantly non-black neighborhoods. Findings suggest that the overall neighborhood social environments in which older adults live may play a role in their psychosocial function, and perhaps through this mechanism, impact long-term survival and physical health outcomes.

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Table 1
Participant Characteristics and Neighborhood SES Components

Variable	Mean (S.D.)	%
Age years)	73.3 (6.9)	
Sex		
Male		38.4%
Female		61.6%
Race		
Black		73.6%
Non-Black		26.4%
Education	12.5 (3.5)	
Income		
< \$15,000 per year		23.9%
\$15,000 to \$30,000 per year		40.4%
> \$30,000 per year		35.7%
Marital status		
Currently married		49%
Widowed		36%
Divorced/Separated		10.8%
Never married		4.2%
Chronic health conditions		
None		24.8%
One		43.2%
Two		22.8%
Three or more		9.2%
Years in Neighborhood	32.5 (13.0)	
Participants per block group	73.0 (37.3) range: 19 to 186	
Components of NSES		
% on public assistance	5.3 (5.5) range: 0 to 26.7	
% of households earning ≤ \$25,000 per year	21.3 (10.8) range: 3.1 to 54.9	
% with ≥ college degree	30.5 (18.0) range: 0 to 74.4	
% of owner-occupied dwellings valued at ≥ \$200,000	16.0 (23.1) range: 0 to 84.7	
Measures of Psychosocial Functioning		
Hostility	3.0 (2.1)	
Perceived Stress	5.4 (3.4)	
Depressive Symptoms	1.6 (2.0)	

Note: N=5,770.

Neighborhood SES and Psychosocial Functioning

Table 2

	Hostility			Perceived Stress			Depressive Symptoms		
	Model 1 (N=5,664)	Model 2 (N=5,664)	Model 3 (N=5,459)	Model 1 (N=5,670)	Model 2 (N=5,670)	Model 3 (N=5,463)	Model 1 (N=5,742)	Model 2 (N=5,742)	Model 3 (N=5,529)
Neighborhood SES	−0.686 (.055)***	−0.305 (.061)***	−0.133 (.062)*	−0.549 (.069)***	−0.333 (.087)***	0.013 (.088)	−0.349 (.032)***	−0.223 (.037)***	−0.078 (.038)*
Age		0.010 (.004)*	−0.008 (.004)		0.014 (.006)*	−0.016 (.007)*		0.021 (.002)***	0.007 (.003)*
Male sex		0.341 (.056)***	0.425 (.061)***		−0.372 (.089)***	−0.287 (.096)**		−0.205 (.035)***	−0.161 (.039)***
Black race		0.977 (.101)***	0.759 (.101)***		0.530 (.15)***	0.328 (.149)*		0.363 (.063)***	0.255 (.064)***
Years in Neighborhood		−0.008 (.002)***	−0.004 (.002)		−0.010 (.003)**	−0.004 (.003)		−0.005 (.001)***	−0.002 (.001)
Education			−0.073 (.009)***			−0.067 (.015)***			−0.040 (.006)***
Income			−0.091 (.015)***			−0.191 (.023)***			−0.076 (.009)***
Marital status			0.016 (.023)			−0.055 (.036)			0.013 (.014)
Chronic health conditions			0.021 (.029)			0.310 (.046)***			0.136 (.018)***

Note. Ns within any set of models for a psychosocial outcome varied based on missing values on some covariates in Model 3. Values shown are regression estimates (standard error) from the multi-level, mixed-effects regression models.

*
p < .05;
**
p < .01;

p < .001

Table 3

Neighborhood SES and Hostility Stratified by Neighborhood Racial Composition

	Predominantly Non-Black Neighborhoods (N=30 block groups)		Predominantly Black Neighborhoods (N=52 block groups)	
	Model 1 (N=1,526)	Model 2 (N=1,487)	Model 1 (N=4,134)	Model 2 (N=3,972)
Neighborhood	−0.528	−0.364	−0.279	−0.139
SES	(0.101)***	(.099)***	(.104)**	(.099)
Age	0.013 (.006)*	−0.006 (.007)	0.008 (.005)	−0.010 (.006)
Male sex	0.430 (.095)***	0.585 (.101)***	0.317 (.068)***	0.371 (.075)***
Black race	1.355 (.152)***	1.176 (.152)***	0.671 (.188)***	0.514 (.188)**
Years in Neighborhood	−0.008 (.003)**	−0.005 (.003)	−0.006 (.003)*	−0.002 (.003)
Education		−0.093 (.016)***		−0.069 (.011)***
Income		−0.077 (.024)***		−0.098 (.018)***
Marital status		0.048 (.039)		0.002 (.027)
Chronic health conditions		0.049 (.050)		0.010 (.035)

Note. Ns vary within non-black and black neighborhoods due to missing values on some covariates in Model 2. Values shown are regression estimates (standard error) from the multi-level, mixed-effects regression models.

*
p < .05;

**
p < .01;

p < .001 Neighborhood racial composition was determined based on 2000 census data; among CHAP neighborhoods, all were identified as either >70% black or <55% black with no neighborhoods identified between 55% and 70% black. Accordingly, we stratified block groups as either less than 70% black residents (“predominantly non-black”) or more than 70% black residents (“predominantly black”).