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Urban Neighborhoods and Depressive Symptoms in Late Middle Age*

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ABSTRACT

This study examines associations between multiple urban neighborhood characteristics (socioeconomic disadvantage, affluence, and racial/ethnic composition) and depressive symptoms among late middle-aged persons and compares findings to those previously obtained for persons aged 70 years and above. Survey data are from the Health and Retirement Study (HRS), a U.S. national probability sample of noninstitutionalized persons aged 51 to 61 years in 1992. Neighborhoods are 1990 U.S. Census tracts. Hierarchical linear regression is used to estimate multilevel models. Depressive symptoms vary significantly across urban neighborhoods among late middle age persons. Neighborhood socioeconomic disadvantage is significantly associated with depressive symptoms, net of both individual-level sociodemographic and health variables. However, this association is contingent upon individual-level wealth in that persons with low wealth in the most disadvantaged neighborhoods report the most depressive symptoms. Unlike findings for older adults for whom neighborhood effects appear to be entirely compositional in nature, neighborhood context matters to subgroups of late middle age adults.

Urban Neighborhoods and Depressive Symptoms in Late Middle Age

INTRODUCTION

Although there is a large and growing literature concerning the adverse effects of neighborhood socioeconomic disadvantage on emotional well-being, little is known about whether these effects vary across age cohorts, which may indicate life course differences. However, existing research is suggestive. For example, among young adults, neighborhood socioeconomic factors are not consistently associated with depressive symptoms once individual-level socioeconomic factors are controlled (Henderson et al. 2005). In contrast, most age-heterogeneous studies of adults do find that neighborhood disadvantage negatively contributes to emotional well-being, independent of individual-level characteristics (e.g., Galea et al. 2007; Ross 2000; Silver, Mulvey, and Swanson 2002). Then again, in studies of older adults, some researchers have found that controlling for individual-level factors attenuates the depressive effect of neighborhood socioeconomic disadvantage (e.g., Hybels et al. 2006; La Gory and Fitzpatrick 1992), whereas others have found that neighborhood disadvantage is associated with late life depressive symptoms even when controlling for individual characteristics (e.g., Kubzansky et al. 2005; Ostir et al. 2003). For the oldest old, Aneshensel and colleagues (2007) and Wight and associates (2009) found no significant association between neighborhood-level factors and depressive symptoms net of individual-level characteristics using data from the Study of Assets and Health Dynamics among the Oldest Old (AHEAD, Soldo et al. 1997).

These mixed results may be due to at least two explanations: neighborhood effects may vary at different times of life; or differing sampling strategies and study methodologies may result in inconsistent findings. To test the first possibility while controlling for the second,

within-study comparisons are needed that specifically examine whether patterns of neighborhood effects on emotional well-being are the same for different age groups.

For this paper, we focus on an interim time of life—late middle age—to examine whether neighborhood is associated with depressive symptoms among persons in their 50's to early 60's. Our analysis is based on data from the pre-retirement age cohort of the Health and Retirement Study (HRS, Juster and Suzman 1995), the parent study to AHEAD. We compare our findings to those previously obtained for the older cohort, comparisons that are enhanced because AHEAD and HRS utilized virtually the same methodology at nearly the same time, and because we use the same analytic technique, hierarchical linear modeling, and the same set of control variables. This comparison provides a test of the hypothesis that the mental health effects of neighborhood varies across stages of the life course.

Based on our theoretical model, we also examine whether the mental health effects of neighborhood matter only for subgroups of the late middle age population. This examination of cross-level interactions relates to the question of inconsistent prior findings because studies that do find mental health neighborhood effects for older persons tend to use select populations that may be especially vulnerable to the effects of neighborhoods, subgroups we can identify with this national sample.

Late Middle Age

Although not a theory, per se, a life course perspective is especially informative for this research because it acknowledges that aging is dynamic and explicitly links micro-and macro-levels of analysis (Marshall 1996). This perspective is consistent with the idea of person-environment fit as explicated in Lawton's Ecological Model of Aging (e.g., Lawton 1982). In this

formulation, personal characteristics are considered "competencies" (e.g., monetary resources, health status), whereas environmental characteristics are considered "press" (e.g., poverty, segregation), or as having “buoying” effects (e.g., social services) (Glass and Balfour 2003). If these elements are out of balance, when competence is low and press is high, for example, negative affect is likely. However, people’s competencies change as they age, shifting this balance, thereby making neighborhood “press” more relevant at varying times of life.

We contend that neighborhood may be especially consequential to persons in late middle age because it is a transitional point characterized by changing life circumstances that may intensify the impact of neighborhood. These changes are especially noteworthy for physical health because clinical indications of underlying pathology typically make their first appearance at this time (U.S. NCHS 2001; Tate, Manfreda and Cuddy 1998; Pekkanen et al. 1994). For example, the prevalence of major risk factors for chronic disease, such as high levels of serum cholesterol and obesity, peak at 55-64 years (U.S. NCHS, 2001), and the effect of many of these risk factors on health outcomes appears to be strongest before age 65 (Tate, Manfreda and Cuddy 1998; Pekkanen et al. 1994). Emergent health problems, in turn, negatively affect mental health in late middle age (Polsky et al. 2005). These health problems also depend upon neighborhood context: Robert and Li (2001) found that the association between low community socioeconomic status (SES) and poor health peaks between middle age and age 69 years and weakens at ages 70 years and older. Thus, health conditions may be the conduit through which neighborhood influences depressive symptoms in late middle age.

As people develop health problems, especially when these health problems impose limitations on activities of daily living (ADL), they may become increasingly aware of their environment with regard to the extent to which it facilitates or hinders their daily life. Deficits in

the environment may, therefore, become readily apparent, especially those regarding health care, which previously may have been of less concern. The gap between needs and what is readily available may be psychologically distressing. Thus, we hypothesize that late middle age is a period of heightened vulnerability because of the emergent health problems that challenge personal competencies, and that increase the salience of health-related resources in the surrounding environs.

Conceptual Model

This vulnerability would render this group especially susceptible to the general effects of neighborhood on mental health, as described in our theoretical model (Figure 1). This model explicitly recognizes that neighborhood variation in mental health may be contextual or simply compositional by differentiating neighborhood press from individual competencies (Macintyre and Ellaway 2003; Ross and Mirowsky 2008). Context would appear to influence mental health if neighborhood differences persist when controlling for individual-level factors, whereas a compositional interpretation would otherwise prevail.

FIGURE 1 ABOUT HERE

As shown in Figure 1, two particular dimensions of neighborhoods are differentiated: neighborhood SES and racial/ethnic composition. For neighborhood SES, disadvantage is seen as eroding the quality of life of residents by making the neighborhood threatening and leading residents to live lives that are disconnected from their neighbors (Massey and Denton 1993), which may be emotionally harmful (Aneshensel and Sucoff 1996). In contrast, neighborhood

affluence may generate a cohesive and trusting environment (Cagney, Browning, and Wen 2005), which may benefit the emotional well-being of residents.

With regard to the racial/ethnic makeup of the neighborhood, we focus specifically on the relative presence of members of minority groups. Neighborhood ethnic composition may be associated uniquely with depressive symptoms because of the permeating effects of institutionalized racism on the one hand and "ethnic enclave" effects on the other hand. For example, racial segregation has created distinctive ecological environments for African Americans in that most poor African Americans are concentrated in high-poverty neighborhoods characterized by substandard housing quality, high crime rates, and limited access to high quality medical care (Williams and Collins 2001). Alternatively, in predominantly Hispanic neighborhoods, health benefits may be derived from high levels of social cohesion, social support, reciprocity, high rates of labor force participation, intact family structures and community institutions, particularly among Mexican Americans (e.g., Patel et al. 2003), although perhaps not among other Hispanic groups (Lee and Ferraro 2007).

Notice that individual-level health characteristics are conceptualized as mediators that play a central role in the progression of the individual- and contextual-level sociodemographic contributions to depressive symptoms. Whereas other mediators also may play an important role in this progression (e.g., life events, changing social networks), we focus on health because late middle age is a period of heightened vulnerability due to emergent health problems that challenge personal competencies, as discussed above. Health mediators are conceptualized as being influenced by individual- and neighborhood-level factors. For example, poor health may arise because of substandard living conditions in disadvantaged neighborhoods, or alternatively because of the individual's own lack of economic resources. Thus, poor health may represent the

mechanism by which neighborhood-level and individual-level sociodemographic circumstances influence mental health in late middle age.

Our conceptual model assumes an urban setting for strong theoretical reasons. For example, Galea, Freudenberg and Vlahov (2005) contend that urban social structures and living conditions serve as unique determinants of health. Cities are typified by high concentrations of the poor, ethnic minorities, and recent immigrants on the one hand, and very wealthy persons on the other hand. The juxtaposition of these disparate populations may exacerbate the observed prevalence of poverty-associated diseases. Galea and colleagues (2005) suggest that urban/non-urban health differences are not inherent and there is no "urban genotype." Rather, social processes (e.g., immigration, racial discrimination, housing markets, access to higher education) interact with social contexts to produce an "urban phenotype" (Galea, Freudenberg, and Vlahov 2005). Thus, person-environment fit models that are homogeneous in terms of basic underlying urban processes may be more meaningful than those that are heterogeneous across combined urban/non-urban areas.

As shown in Figure 1, we include the underlying impact of enduring urban structures such as economic systems, religion, and culture in our theoretical model (Galea, Freudenberg, and Vlahov 2005). These structures are unmeasured in this study but we believe it is critical to acknowledge that they set the stage for other relationships.

Hypotheses

Given that neighborhood effects may vary across different times of life (Robert and Li 2001), we expect to find that the association between urban neighborhood context and depressive symptoms among late middle age persons from the original HRS sample differs in comparison to

that previously found among older adults from the AHEAD sample, in which neighborhood-level depressive effects appeared to be attenuated by individual-level factors (Aneshensel et al. 2007). Consistent with previous research on adults in general, we expect that depressive symptoms will positively be associated with neighborhood disadvantage and racial/ethnic segregation of African Americans (i.e., proportion of neighborhood residents who are African American) and negatively associated with proportion of neighborhood residents who are Hispanic (i.e., an ethnic enclave effect) and neighborhood affluence. Further, we expect these associations to be sustained when individual-level socio-demographic characteristics are controlled. This expectation assumes that age cohort differentially matters to how individuals respond to the demands of their environment, in that neighborhood characteristics maintain personal relevance in late middle age, before they are subsumed by other priorities in late life.

In addition, we expect to find that mental health effects of neighborhood context are not the same for all late middle-aged individuals, in that person-environment fit contingencies between personal characteristics and neighborhood characteristics will be detected. Thus, consistent with work by Jencks and Mayer (1990), we contrast two hypotheses. The "disadvantages of disadvantaged neighbors" contends that the health of all persons residing in neighborhoods predominantly comprised of disadvantaged persons is similarly affected by the resultant poor conditions (i.e., statistical main effects). Alternatively, the effects of neighborhood disadvantage may be conditional, varying across subgroups of the population (i.e. a statistical cross-level interaction). We hypothesize that the effect of neighborhood SES will vary inversely with the person's own SES.

We hypothesize, however, that individual-level health factors will mediate much of these associations, based on the assumption that it is the emergence of health problems that places late

middle age persons from the HRS sample at special risk for neighborhood-related emotional distress, whereas extant individual-level aging processes have subsumed neighborhood effects among the oldest old (Wight et al. 2009). That is, we expect that late middle-age represents a time of life when neighborhood context still matters to mental health, but aging-related health issues are beginning to supercede this effect.

METHODS

Sample

The Health and Retirement Study (HRS) is a longitudinal survey of community-based samples of four specific age cohorts initiated at different baseline dates and re-interviewed for different follow-up durations. As discussed above, previous analysis (Aneshensel et al. 2007; Wight et al. 2009) has addressed the research questions investigated here for the oldest-old cohort (AHEAD). For this analysis we examine the original HRS cohort, which was aged 51 to 61 years at the 1992 baseline interview. The HRS sample was selected under a multi-stage area probability sample design (Juster and Suzman 1995). Our analysis is limited to the Time 2 data collection in 1994 because this is the first time the HRS used the same measure of depressive symptoms, our dependent variable, as all other cohorts, including AHEAD. This comparability is critical because this paper makes comparisons to findings with the baseline AHEAD cohort (Aneshensel et al. 2007) and the measure of depressive symptoms must be equivalent between the two samples. In addition, although these data are not recent, we focus on the 1994 assessment to: (a) maximize the sample size and statistical power; (b) minimize bias associated with sample attrition at more recent follow-up assessments, thus maintaining the excellent external validity of the sample; and (c) coincide in time to the date of the AHEAD data used for comparison.

Analytic Sample Derivation

At Time 2, the sample size was 11,420 individuals, with 478 not surveyed due to reassignment to other HRS cohorts, 229 deceased, 1,178 non-responders known to be alive, and 62 unknown status. For these analyses, the following were sequentially removed from the Time 2 sample: 2,584 age-ineligible spouses to limit the analysis to those aged 53 to 63 in 1994; 538 proxy interviews, which are inappropriate for measuring the dependent variable; and, 249 with missing or invalid data, principally Census tract identifier. An additional 3,244 persons were removed because they did not reside in Census tracts in which at least 75% of the population resided in an urbanized areas. Dropping these persons was necessary to maintain construct consistency with the concept of "urban neighborhood" (Massey and Denton 1993; Wilson 1987, 1991). The final analytic sample size is 4,805.

Weights adjust for variation in the probabilities of selection, including the over-sampling of African Americans, Hispanics, and residents of Florida, and attrition between baseline and Time 2. Thus, the analytic sample is nationally representative of persons aged 51 to 61 living in the community in urban areas in 1992 who survived to 1994 without cognitive or physical decline sufficient enough to require a proxy interview.

Measures

Measures for these analyses were selected to be as comparable as possible to those used by Aneshensel et al. (2007), facilitating the interpretation of cross-study findings between HRS and AHEAD.

Depressive symptoms are measured with the following eight items from the CES-D (Radloff 1977): 1) I felt depressed, 2) I felt that everything I did was an effort, 3) my sleep was

restless, 4) I was happy, 5) I felt lonely, 6) I enjoyed life, 7) I felt sad, and 8) I could not "get going." Response codes were yes (1) or no (0) for experiencing the symptom during "much of the time in the past week" (Soldo et al. 1997). Positively worded items were reverse coded; items were summed. Reliability is very good for our analytic sample (α= 0.82) and construct validity for the 8-item version of the CES-D has been previously documented (Steffick 2000; Turvey, Wallace and Herzog 1999).

Individual-level independent variables in the sociodemographic domain include: educational attainment (coded as the highest grade of school completed), household wealth (in tens of thousands of dollars, logged), household income (in thousands of dollars, logged), religion, sex, age, ethnicity, and marital status. Individual-level comorbid health variables, conceptualized as mediators, fall into four categories: 1) Activities of daily living (ADL, a count [0 – 6] of self-reported functional limitations with personal care tasks [e.g., walking]); 2) A count of physician-identified major medical conditions (high blood pressure, diabetes, cancer, lung disease, and arthritis); 3) Two other conditions, heart problems and stroke, included individually because they are particularly influential to depressive symptomatology; and 4) Cognitive function, assessed with immediate and delayed recall of a list of 20 nouns (range of scores = 1 – 40).

Two domains are assessed at the neighborhood level, for which data are derived from 1990 U.S. Census tracts. The first domain—socioeconomic context—is operationalized in two ways. First, we utilize a socioeconomic disadvantage principal component comprised of the proportion of: residents aged 25 or older without a high school degree; households receiving public assistance income; residents living below the poverty level; and residents aged 16 or older who are unemployed. This approach is consistent with other studies that seek to globally capture

the concept of neighborhood disadvantage (e.g., Beard et al. 2008; Patel et al. 2003). Second, neighborhood affluence is assessed as the proportion of households with incomes of $50,000 or more (Cagney, Browning and Wen 2005). The second domain we assess—racial/ethnic composition—is a proxy for residential segregation and/or ethnic enclaves, and is operationalized as the percent of residents who are African American and the percent of residents who are Hispanic.

Analysis

As with the selection of measures to include in the analysis, the analysis plan itself was designed to be as similar as possible to that used by Aneshensel et al. (2007), facilitating comparisons between the HRS and AHEAD. Normalized grand sample weights are applied so that findings can be generalized to the urban population of U.S. late middle age adults. Descriptive statistics are calculated with the Stata SVY procedure. Hierarchical linear regression models are estimated with robust standard errors using HLM 6.02. The contextual-level variables are grand mean-centered. Mode imputation was used for data with negligible missing values (e.g., < 1%). In the case of cognition, where 11% of values were missing, multiple regression imputation with other independent variables via the ICE (Imputation by Chained Equations) procedure in Stata was used.

Power calculations take into consideration the design effect, which reduces the effective sample size to 3,056. There is excellent power (99%) to detect partial correlations as small as 0.10 at alpha of .05 (Hsieh et al. 2003). Assuming a test efficiency of 25%, there is 93% power at an alpha of 0.05 to detect partial correlations of 0.10 (Aiken & West 1991).

RESULTS

Sample Characteristics

Individual-level characteristics of the analytic sample are shown in Table 1. In terms of sociodemographic variables, the ratio of females to males is slightly more than one, the average participant is in their late 50's, three-quarters are non-Hispanic White, and the majority of participants are married. On average, participants are high school graduates, with above average household incomes for 1994 (U.S. Bureau of the Census Bureau, 1995) and moderate household wealth. Well over one-half are Protestant, with nearly one-third being Catholic. In the health domain, ADL assistance needs are minimal, the respondents report having one chronic condition on average, one in fifteen report having heart problems, and few have experienced a stroke. Word recall is adequate, with the average score being nearly identical to that of the total HRS sample (Ofstedal, Fishser, and Herzog 2005). Finally, the mean number of reported depressive symptoms in the past week was slightly more than one.

TABLE 1 ABOUT HERE

Table 2 shows neighborhood-level Census characteristics, some of which demonstrate considerable variation as indicated by large standard deviations. Note that the mean values in this table are unweighted and they therefore reflect the over-sampling of African American and Hispanic residents. Affluence does not predominate across neighborhoods. The average Census tract is about 20% African American and 12% Hispanic. All of the Census characteristics are significantly associated with one another: The strongest association is that between socioeconomic disadvantage and affluence, as would be expected.

TABLE 2 ABOUT HERE

Multilevel Analysis

The null model demonstrates significant variation in depressive symptoms across Census tracts ($\tau = 0.523$; $p < .0001$). The intra-class correlation (ICC), or the ratio of between tract variation to total variation, however, is somewhat small ($\rho = 0.136$), indicating that most of the variation in symptoms is at the individual level. Table 2 adds the neighborhood-level variables to the null model one at a time (shown under "Regressions"). At the neighborhood level, socioeconomic disadvantage, proportion African American, and proportion Hispanic are statistically significant and positively associated with depressive symptoms, whereas the association between depressive symptoms and neighborhood affluence is statistically significant and negative.

Table 3 shows the multivariate multilevel regression results. In Model 1, the individual-level variables are regressed on depressive symptoms with only a random intercept at level-2. A higher number of depressive symptoms is associated with being female, younger, African American or Hispanic (in comparison to being non-Hispanic white), widowed or separated/divorced (in comparison to being married), low education, low household income, low household wealth, and being Jewish (in comparison to being Protestant). Significant neighborhood variation in depressive symptoms remains, net of these individual-level characteristics, but it is diminished compared to the null model, indicating that some of the gross neighborhood variation reported above is compositional in nature.

TABLE 3 ABOUT HERE

The next step tests for main effects of level-2 variables, all of which are significantly associated with depressive symptoms at the zero-order level, to ascertain if they remain significant once individual-level sociodemographic characteristics are controlled. Only one neighborhood-level variable met this criterion: the socioeconomic disadvantage principal component. As shown in Model 2 of Table 3, high socioeconomic disadvantage is associated with high depressive symptomatology, independent of the level-1 variables, and its inclusion in the Model represents a significant improvement in fit compared to Model 1, although the between group variation remains virtually identical across models. The associations for the two racial/ethnic variables reported above (Table 2), thus appear to be compositional in nature.

We next tested random slopes for the individual level sociodemographic variables of theoretical interest (education, household income, and household wealth) to investigate whether their effects varied randomly across Census tracts: none were statistically significant. We then proceeded to examine whether there were statistically significant fixed effects for the individual-by neighborhood-level contingencies by adding fixed cross-level interactions to Model 2. As shown in Model 3, one statistically significant cross-level effect is found for individual-level wealth. The addition of this fixed cross-level interaction represents a significant improvement in fit between Models 2 and 3.

Figure 2 illustrates the nature of the cross-level effect. For neighborhood socioeconomic disadvantage, two values—the minimum and maximum—were substituted into the regression equation. For individual-level household wealth, three values (the mean +/- one standard

deviation) were substituted. Mean values were used for significant continuous variables, and 0 for the reference category was the value for other variables. Neighborhood disadvantage is least consequential to those of average household wealth. Persons with high household wealth are the least adversely affected by neighborhood disadvantage as their average symptom level decreases as neighborhood disadvantage increases. Those with the lowest level of household wealth increase in depressive symptoms as neighborhood disadvantage increases and do so at the steepest slope.

FIGURE 2 ABOUT HERE

In Model 4, we tested the hypothesis that individual-level health variables mediate observed associations between level-1 sociodemographics and level-2 neighborhood characteristics. As shown, the effects of the lower order and interactive terms decrease in magnitude when the individual-level health variables are controlled, meaning that health does mediate some of the neighborhood disadvantage effect. However, the main effect of neighborhood socioeconomic disadvantage and its cross-level interaction with individual-level wealth remain statistically significant. Thus, individual-level health contributes to depressive symptomatology, but it does not substantially attenuate the neighborhood effect, nor does it significantly diminish the between-group variation in symptoms, meaning that the persistence of this variation is due to other unmeasured factors.

DISCUSSION

Our main goals for this paper were twofold. First, we examined differentials in how neighborhood context may be associated with depressive symptoms among late middle age adults (original HRS sample) in comparison to findings previously reported (Aneshensel et al. 2007) for older adults (AHEAD sample). Second, we investigated whether neighborhood-level effects on depressive symptoms were contingent on individual-level SES characteristics among late middle age adults by examining a series of cross-level interactions. This second goal addressed questions related to differential vulnerability among persons of the same general age.

With regard to the first goal, we note again that among late middle age persons, the intra-class correlation (ICC), or the ratio of between tract variation in depressive symptoms to total variation, is somewhat small ($\rho = 0.136$), indicating that most of the variation in symptoms is at the individual level. However it is more than twice as large as the ICC found for the oldest old in the AHEAD sample ($\rho = 0.064$; Aneshensel et al. 2007). Thus, in the younger group, more between tract variation in depressive symptoms exists, suggestive of differential life course contextual effects.

In addition, we found that neighborhood socioeconomic disadvantage is significantly and positively associated with depressive symptomatology among late middle age adults, controlling for individual-level socio-demographic characteristics—a "main effect" finding. This finding is in contrast to previous non-significant results for older adults from the AHEAD study (Aneshensel et al. 2007), which utilized virtually the same methodology and sampling frame at nearly the same time, and that used the same analytic technique, hierarchical linear modeling. Contrary to our hypotheses, statistically significant effects of urban neighborhood affluence,

proportion Hispanic, and proportion African American were not sustained once individual-level socio-demographic variables were controlled.

The divergent socioeconomic disadvantage findings between AHEAD and HRS support our hypothesis that time of life differentially matters to how individuals respond to the demands of their environment, in that neighborhood characteristics maintain personal relevance in late middle age, before they are subsumed by other priorities in late life. For the older population as a whole, depressive symptoms appear to be more affected by underlying individual-level demographic and aging processes than of the characteristics of their neighborhood, whereas among late middle-aged persons neighborhood "press" maintains relevance to emotional well-being.

With regard to the second goal, we found that the depressive impact of urban neighborhood disadvantage was conditional upon individual-level wealth. Persons living in neighborhoods characterized by low socioeconomic disadvantage clearly benefit emotionally, irrespective of their own household wealth, whereas persons residing in disadvantaged neighborhoods who are disadvantaged themselves fare worse emotionally than more advantaged persons residing in the same neighborhoods, consistent with the idea of cumulative disadvantage. Thus, a main-effects only interpretation of the depressive effect of neighborhood disadvantage is inappropriate because the effect of neighborhood disadvantage matters for some persons, but not for others. In analytic terms, the effect of neighborhood disadvantage on depressive symptoms must be interpreted as a set of variables (individual-level wealth, neighborhood-level disadvantage, individual-level wealth x neighborhood-level disadvantage) or else the model is miss-specified. Miss-specification of this particular relationship may be a source of inconsistent

findings in previous studies of neighborhoods and emotional well-being to the extent that studies differentially sample persons of low SES.

In addition to the two main goals discussed above, our conceptual model posited that health conditions in late middle age would be the conduit through which neighborhood influences depressive symptoms in late middle age. We found that the presence or "emergence" of clinical manifestations of poor health reduced the neighborhood socio-economic disadvantage effect on depressive symptoms somewhat, but not entirely, as the neighborhood disadvantage effect remained statistically significant even when health indicators were included in the model. Thus, comorbid health variables did not attenuate entirely the neighborhood disadvantage effect. Future research is needed to examine other types of factors that may transmit neighborhood effects in late middle age.

There are a number of limitations to our research to acknowledge. Most notably, using 1990 Census tracts to operationalize "neighborhoods" in some ways is problematic because tracts are official boundaries that create artificial neighborhoods. However, our approach is justified by the availability of data to link with individual-level HRS data, and by our expressed goal of making direct comparisons to the previously published work with the AHEAD sample, which utilized Census tracts. In addition, our results may be biased towards a well-functioning late middle-aged population by the unavoidable exclusion of proxy-assisted interviews and because participants resided in the community at baseline. Furthermore, social selection may be an alternative explanation for our findings because unmeasured characteristics of persons may determine who resides in certain residential areas. Causal inference is further limited because the study is cross-sectional. Finally, the use of self-reported assessments of physical health leaves open the possibility for confounding by differences in awareness of specific health conditions.

Importantly, however, our results have implications for the orientation of mental health interventions for different age cohorts. At the present time, many health promotion programs and pharmaceutical advertisements are specifically targeted to late middle age adults with a focus almost exclusively on individual behavioral change, generally ignoring more fundamental causes of poor health (Link & Phelan 1995), including effects of neighborhood context. This individualistic orientation is challenged by the present study that demonstrates how context matters to depressive symptoms over and above individual characteristics among subgroups of persons in late middle age. Our findings suggest that these individuals are not solely responsible for their emotional well-being, but that some part of their mental health status is attributable to aversive aspects of their environment. Thus, our findings support expanding policy discussions to focus on community-based interventions and call attention to the "upstream" determinants of mental health conditions, in particular neighborhood socioeconomic disadvantage. In addition, because we examined cross-level interactions, we also identify the type of late middle-aged individuals in specific types of urban neighborhoods that are most in need of mental health resources: persons with few financial assets who reside in highly disadvantaged neighborhoods.

In conclusion, our research suggests that the depressive impact of neighborhood context differs between persons in late middle age versus old age. Persons who are approaching late life may be significantly affected by living in a socio-economically disadvantaged neighborhood, particularly if they have low household wealth, whereas this effect is not evident among the oldest old (Aneshensel et al. 2007). Thus, it appears that the "emotional plateau" of neighborhood press (Wight et al. 2009) has not yet been reached at late middle age and neighborhood factors are still apt to affect depressive symptomatology at this time of life.

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TABLE 1. Characteristics of sample of U.S. urban adults aged 52-63 in 1994, *n* =4805 (weighted).

Demographic and Health Characteristics	% or Mean	SD
Gender		
Female	54.63	
Male	45.37	
Age (years)	57.40	3.25
Ethnicity		
Non-Hispanic White	77.00	
African American	13.18	
Hispanic	7.37	
Other	2..45	
Marital status		
Married	72.35	
Widowed	7.02	
Separated/Divorced	16.03	
Never married	4.59	

Education (years)	12.77	2.95
Income (thousands $)	61.16	99.68
Wealth (thousands $)	281.52	565.77
Religion		
Protestant	56.24	
Catholic	34.30	
Jewish	3.19	
No religion	5.24	
Other religion	1.03	
ADL assistance (0 – 6)	0.11	0.48
Number of medical conditions (0-5)	1.38	1.25
Heart problems (yes)	15.11	
Stroke (yes)	2.85	
Word recall (1 – 40)	14.39	6.04
Depressive symptoms (0 – 8)	1.26	1.91

TABLE 2. Correlations of Census-tract variables and simple multilevel regressions of depressive symptoms.

Tract-Level Variables	Correlations[a]				Regressions[b]	
	I	II	III	IV	Coefficient	Standard Error
I Socioeconomic Disadvantage[c]	1.00				0.473***	0.038
II Affluent[d]	-0.703***	1.00			-1.889***	0.164
III African-American[d]	0.589***	-0.389***	1.00		0.726***	0.112
IV Hispanic[d]	0.378***	-0.259***	-0.154***	1.00	1.863***	0.251
Means	0.018	0.307	0.195	0.117		
Standard Deviations	1.125	0.203	0.308	0.202		

[a] N_j = 1,314 tracts.

[b] N_j = 1,314 tracts, N_i = 4,805 individuals. Depressive symptoms are regressed separately on each level-2 variable; no individual-level characteristics are controlled.

[c] Factor score.

[d] Proportion.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

TABLE 3. Multilevel regressions of depressive symptoms among U.S. urban adults aged 52-63 in 1994.

	Model (1)	Model (2)	Model (3)	Model (4)
Independent Variables	B (SE)	B (SE)	B (SE)	B (SE)
Individual-Level				
Demographic Variables				
Female (/male)	0.208 (0.056)***	0.212 (0.056)***	0.213 (0.056)***	0.220 (0.052)***
Age	-0.019 (0.009)*	-0.019 (0.009)**	-0.018 (0.009)*	-0.032 (0.008)***
African American[a]	0.180 (0.085)*	0.053 (0.098)	0.039 (0.098)	0.002 (0.090)
Hispanic[a]	0.638 (0.142)***	0.548 (0.144)***	0.534 (0.144)***	0.530 (0.133)***
Other ethnicity[a]	0.032 (0.178)	0.005 (0.176)	0.002 (0.176)	0.043 (0.170)
Widowed[b]	0.580 (0.140)***	0.581 (0.140)***	0.574 (0.140)***	0.510 (0.127)***
Separated or divorced[b]	0.359 (0.090)***	0.351 (0.090)***	0.344 (0.090)***	0.355 (0.087)***
Never married[b]	0.117 (0.168)	0.103 (0.167)	0.096 (0.166)	0.114 (0.159)
Years of education	-0.105 (0.012)***	-0.098 (0.012)***	-0.097 (0.012)***	-0.070 (0.012)***
Household income (log)	-0.319 (0.040)***	-0.318 (0.040)***	-0.316 (0.040)***	-0.174 (0.036)***
Household wealth (log)	-0.913 (0.350)**	-0.859 (0.343)**	-1.992 (0.607)**	-1.481 (0.473)**
Catholic[c]	-0.022 (0.060)	-0.008 (0.060)	-0.007 (0.060)	0.035 (0.057)

Jewish[c]	0. 765	(0.214)**	0.758	(0.213)**	0.743	(0.215)**	0. 640	(0.211)**
No religion[c]	0. 255	(0.140)	0.263	(0.140)	0.534	(0.388)	0. 484	(0.385)
Other religion[c]	0. 534	(0.391)	0.535	(0.388)	0.257	(0.140)	0. 263	(0.138)
Individual-Level								
Health Variables								
ADL assistance count							0. 849	(0.068)***
Count medical conditions							0. 355	(0.030)***
Heart problems (/no)							0. 002	(0.093)
Stroke (/no)							-0. 360	(0.200)
Word recall							-0. 016	(0.005)**
INTERCEPT	12. 364	(2.945)***	11.818	(2.900)***	21.432	(5.134)***	16. 653	(4.025)***
Census Tract-Level Variables								
Socioeconomic Disadvantage			0. 109	(0.041)*	12. 116	(4.786)*	8.251	(3.742)*

Cross-Level Interaction				
Socioeconomic Disadvantage * Household wealth (log)			-1. 407 (0.560)*	-0.962 (0.438)*
Intercept Variance Component				
Between-group (τ)	0. 115***	0. 116***	0. 114***	0. 064***
Within-group (σ^2)	3.097	3. 090	3. 088	2. 721
Model Comparison				
(to previous model)				
Chi-square		8.929**	27.056***	666.248***
Degrees of Freedom		1	1	5

[a] Reference group = Non-Hispanic white

[b] Reference group = Married

[c] Reference group= Protestant

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

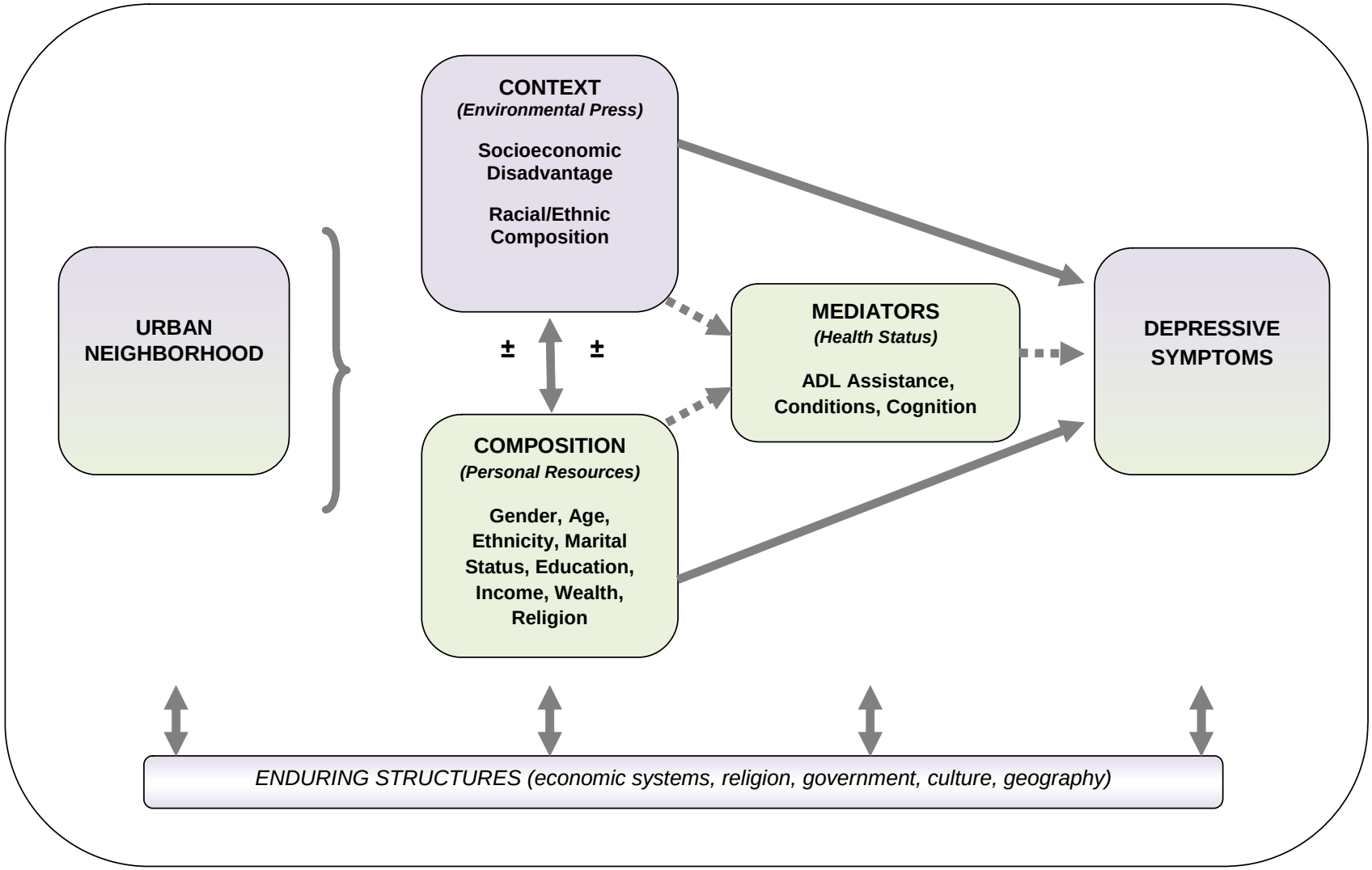

Fig. 1. Urban Neighborhood and Depressive Symptoms at Late Middle Age

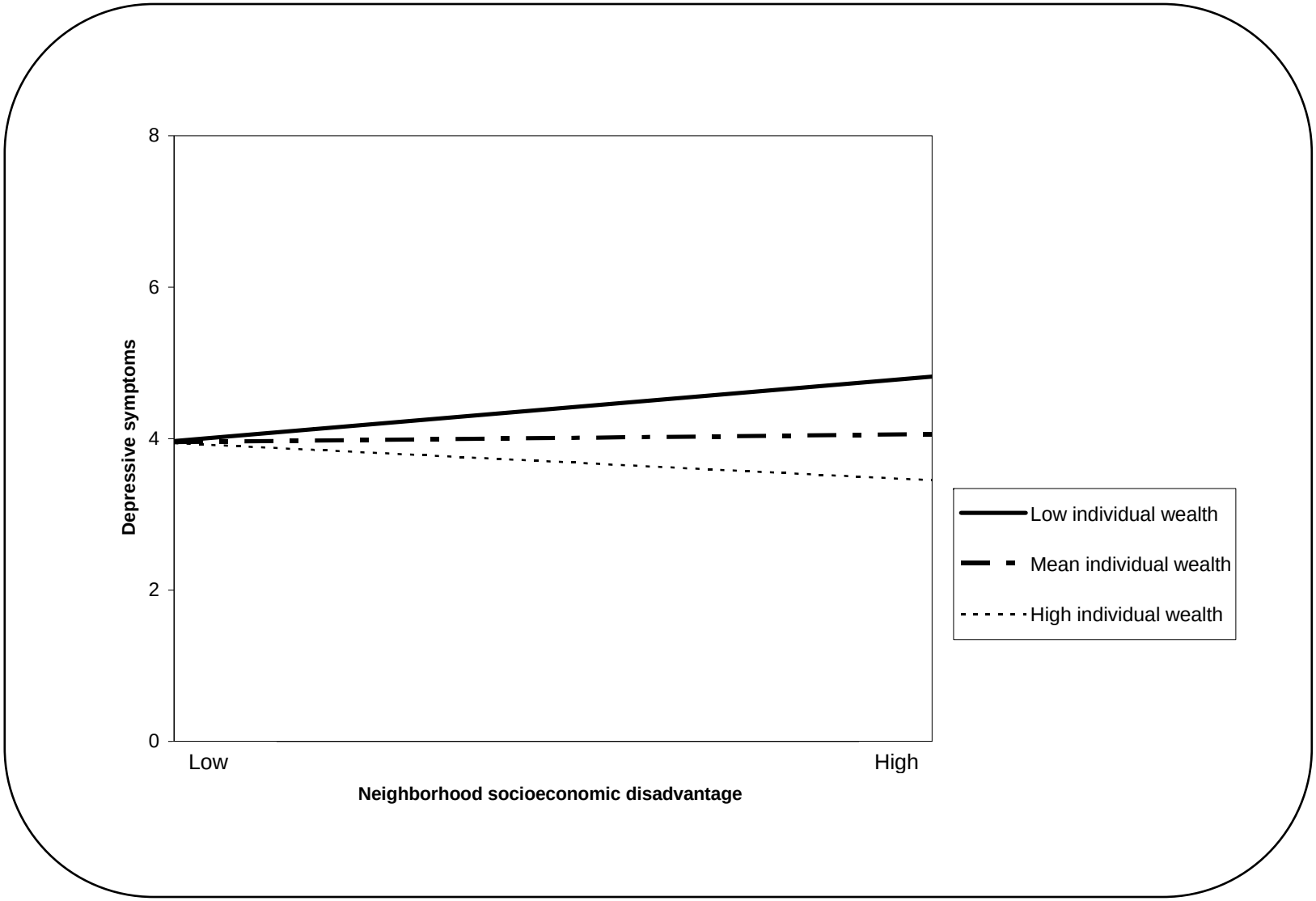

Fig. 2. The effect of individual wealth on the association between depressive symptoms and neighborhood socioeconomic disadvantage