Published in final edited form as:

Asian Am J Psychol. 2011 June ; 2(2): 91–100. doi:10.1037/a0023656.

Neighborhood Effects on Physical and Mental Health: A Study of Korean American Older Adults

Kyung Hwa Kwag,

Department of Aging and Mental Health Disparities, University of South Florida

Yuri Jang,

Department of Aging and Mental Health Disparities, University of South Florida

Sung Han Rhew, and

School of Aging Studies, University of South Florida

David A. Chiriboga

Department of Aging and Mental Health Disparities, University of South Florida

Abstract

This study explored how the physical and mental health of Korean American older adults were influenced by neighborhood characteristics (i.e., proportion of individuals living below the poverty level, proportion of individuals 65 years of age and older, and proportion of racial/ethnic minorities in the census block groups where each respondent lived). Health perceptions (i.e., the subjective appraisal of one's own health) and depressive symptoms were used as indicators of physical and mental health. Multilevel analyses were performed with 567 individuals (at Level 1) nested within 233 census block groups (at Level 2). After controlling for individual demographic and health characteristics, we found that neighborhood poverty predicted health perceptions. The results add to the growing literature on the influence of the social environment and suggest that neighborhood characteristics should be taken into consideration in developing community-based policies for racially/ethnically diverse populations.

Keywords

depression; health perception; Korean American; multilevel analysis; neighborhood

It has long been recognized that the neighborhood contexts in which people live may influence their health and well-being (Barker & Barker, 1961; Beard et al., 2009; Krieger, 2008). The impact of the residential environment on health is likely to be greater for older adults because they often have decreased mobility and may therefore rely more on neighborhood resources (Basta, Matthews, Chatfield, & Brayne, 2008; Cagney, Browning, & Wen, 2005; Schieman, Pearlin, & Meersman, 2006). Emerging methodologies such as geographic information systems and multilevel analyses have stimulated the investigation of neighborhood contexts, but little attention has been paid to vulnerable groups of racial/ethnic

minorities, particularly Asian immigrants (Zhang & Ta, 2009). Given the heterogeneity of Asian populations, the present assessment focused on one group, Korean American older adults.

Theoretical Background

The idea that neighborhood may influence health has a long history. Arising from the overlapping environmental and ecological psychology movements, what can be called the *ecological perspective* proposes that human behaviors are strongly influenced by the physical as well as social characteristics of their environments (e.g., Barker, 1968; Heft, 2001; Lawrence, 2002). Many of the researchers who incorporate this perspective have focused on the relationship of health to “built” environmental factors such as the availability of public transportation or hospitals and clinics (e.g., Lawrence, 2002; Krieger, 2008; Subramanian, Kubzansky, Berkman, Fay, & Kawachi, 2006). Such studies often use census data at the block or tract level to evaluate how more or less advantaged environments may promote or harm health at the aggregate level. For instance, Subramanian and colleagues (2006) found that persons 65 years of age and older living within disadvantaged census tracts had poorer self-rated health than those in relatively advantaged tracts; they concluded that the reason was that those within impoverished neighborhoods may be deprived of opportunities to access appropriate infrastructures such as health services.

Effects of Neighborhood on Physical and Mental Health

Less studied than the built environment, most of the past research on social characteristics of the neighborhood has focused on population makeup (e.g., socioeconomic status, age, proportion of racial/ethnic group residents) when predicting health status (Cagney et al., 2005). Neighborhood poverty has received particular attention, with results demonstrating the adverse effects of neighborhood poverty levels on several aspects of personal health, including mortality, chronic illness, and disability (e.g., Basta et al., 2008; Eschbach, Ostir, Patel, Markides, & Goodwin, 2004; Shouls, Congdon, & Curtis, 1996). Aggregated neighborhood characteristics such as age or racial/ethnic minority distributions also have been suggested to influence the health and well-being of minority older adults, but results are somewhat mixed. For example, Usui and Keil (1987) found that persons living in neighborhoods with high concentrations of older adults reported lower levels of well-being and satisfaction, whereas Subramanian and colleagues (2006) found the reverse. Some researchers have suggested that racial/ethnic heterogeneity within neighborhoods has a negative influence on residents' health because it is indicative of economic disadvantage (e.g., Coffé, 2009). However, it is possible that racial/ethnic minority residents may derive psychological benefit from their diverse environments (Wickrama & Bryant, 2003).

Although a number of studies have focused on the effects of neighborhoods on health status, it is not always clear whether the reported effect is a function of the composition of individuals in the areas or to characteristics of the neighborhoods themselves (Subramanian et al., 2006; Yen, Michael, & Perdue, 2009). For example, there may be poorer health in disadvantaged neighborhoods simply because such neighborhoods are composed disproportionately of poor individuals who cannot afford their health care regardless of

where they live. If so, the association between residential characteristics and health has been called a *compositional* effect. Alternatively, there might be something about disadvantaged neighborhoods that affects residents' health regardless of individuals' personal characteristics. For example, built environmental factors such as availability of medical services, public sanitation, and transportation may influence residents' health, in which case the effect is called *contextual*. Only recently have studies begun to investigate the possibility of a contextual relationship between neighborhood characteristics and health (Kirby & Kaneda, 2006). Living in a disadvantaged neighborhood may damage health above and beyond the impact of personal characteristics that limit residential options (Ross & Mirowsky, 2001).

Physical and Mental Health Among Korean American Older Adults

As previously mentioned, Korean American older adults were the focus of the analyses presented here. The reason for this focus is evidence that Korean American older adults is at greater risk of physical and mental health problems than other immigrant groups (Jang, Kim, & Chiriboga, 2006). Although currently ranked as only the fourth largest Asian American subgroup, their numbers are not only substantial but Korean Americans are one of the fastest growing segments of immigrants in the United States (U.S. Census Bureau, 2007). Florida, the source of participants in the study, is one of 10 states with the largest overall population of Asian Americans and is ranked 11th in the nation with respect to Korean Americans (U.S. Census Bureau, 2007). The vast majority of Korean Americans are concentrated in a few geographical areas; in fact, three quarters of all Korean Americans are concentrated in just 10 states (Yu & Choe, 2003).

One risk factor for greater vulnerability to adverse environmental conditions is being foreign-born. Although the significance of neighborhood context for immigrants in the United States is generally recognized (Portes & Rumbaut, 1990), relatively little is known about context effects on the physical and mental health of older Korean American immigrants. Therefore, the purpose of this study was to explore the impact of neighborhood contextual factors on the physical and mental health of Korean American older adults.

The present study employed health perceptions (i.e., the subjective appraisal of one's own health) and depressive symptoms as outcome criteria. Neighborhood characteristics considered in the present study were proportions of individuals living below the poverty level, proportion of individuals 65 years of age and older, and proportions of racial/ethnic minorities in the census block groups where each respondent lived. We hypothesized that higher proportions of neighborhood residents living below the poverty level, lower proportions of individuals 65 years of age and older, and lower proportions of racial/ethnic minorities would predict poorer health perceptions and increased depressive symptoms even after individual-level characteristics were controlled. Individual-level characteristics were represented by a set of demographic variables (i.e., age, gender, marital status, education, and length of stay in the United States) and health-related variables (i.e., chronic health conditions and functional disability) that are strong predictors of health perceptions and depressive symptoms.

Method

Participants and Procedure

The sample was drawn from a 2008 survey of community-dwelling Korean American adults 60 years of age and older conducted in Tampa and Orlando, Florida. Data from 675 Korean American older adults were collected through visits and mail surveys. The survey questionnaire was in the Korean language. It was developed using back-translation/reconciliation procedures and subsequently pilot tested with 20 Korean American older adults who were representative of the anticipated sample. All survey respondents were paid \$20 for their participation. Detailed information on the sampling procedures and recruitment strategy is available elsewhere (e.g., Jang, Chiriboga, Allen, Kwak, & Haley, 2010).

Of the 675 participants, 567 (84%) provided their residential address and therefore could be included in multilevel analyses. Those for whom addresses were not available were more likely to be women ($\chi^2 = 4.03, p < .05$), to have less education ($\chi^2 = 10.9, p < .01$), and to have had a shorter stay in the United States, $t(673) = -3.48, p < .01$. No difference in age, marital status, or measures of physical and mental health (i.e., chronic conditions, functional disability, health perceptions, and depressive symptoms) was observed. The data set of the 567 participants with addresses was then linked with U.S. Census Bureau data to yield neighborhood information on the census block groups in which participants lived.

Measures

Individual-level outcome variables

Health perceptions: Three items from the Older American Resources and Services Questionnaire (Fillenbaum, 1988) were used to assess subjective perceptions of health: “How would you rate your overall health at the present time?” “How is your present health compared to 5 years ago?” and “How much do your health troubles stand in the way of your doing the things you want to do?” The summed scores could range from 0 to 7, with higher scores indicating more negative health perceptions. Cronbach’s alpha was .71; a value of .70 or higher is considered an acceptable level of internal consistency (George & Mallery, 2003).

Depressive symptoms: A 15-item short form of the Geriatric Depression Scale (GDS–SF; Sheikh & Yesavage, 1986) provided an index of depressive symptoms. The scale, which has a yes/no response format, has five positive items (e.g., “Are you satisfied with your life?” and “Do you feel happy?”) and 10 negative items (e.g., “Do you feel that your life is empty?” and “Do you feel helpless?”). A total score was calculated by counting responses scored to suggest symptoms of depression, which could range from 0 (*no depressive symptoms*) to 15 (*severe depressive symptoms*). The GDS–SF has been translated into Korean, and its psychometric properties have been validated (e.g., Jang, Haley, & Small, 2001; Mui, Kang, Chen, & Domanski, 2003). Internal consistency for the GDS–SF in the present sample was satisfactory ($\alpha = .83$).

Individual-level predictors: Demographic variables included age (in years), gender (1 = male, 2 = female), marital status (1 = unmarried, 2 = married), education (1 = less than high school, 2 = high school or more), and length of stay in the United States (in years).

Summary measures of chronic conditions and functional disability were included as predictors. For chronic conditions, participants were asked to indicate the presence or absence of nine chronic diseases and conditions commonly found among older adults (e.g., arthritis, cancer, diabetes, heart problems, hypertension, and stroke). A summed score was used for the analysis.

Functional disability was assessed with a composite measure included in a number of epidemiologic studies (e.g., Cornoni-Huntley et al., 1990). The composite measure was based on the Physical Activities of Daily Living (Fillenbaum, 1988), the Instrumental Activities of Daily Living (Fillenbaum, 1988), the Physical Performance Scale (Nagi, 1976), and the Functional Health Scale (Rosow & Breslau, 1966). Items covered a wide range of activities, including eating, dressing, traveling, managing money, carrying a bag of groceries, and extending one's arms above the head. Participants were asked whether they could perform each activity. Responses were coded as 0 (*without help*), 1 (*with some help*), or 2 (*unable to do*). Responses for individual items were summed to obtain a total score. The possible range for disability was 0 (*no disability*) to 40 (*severe disability*). Internal consistency for the measure was satisfactory in the present sample ($\alpha = .93$).

Neighborhood-level predictors: The following neighborhood-level predictors were extracted from 2000 census block groups data.

Proportion of individuals living below the poverty level: To assess neighborhood socioeconomic status, we calculated the proportion of residents who lived below the poverty level within each 2000 census block group. Scores could range from 0 to 1, with higher values representing a greater proportion of individuals living below the poverty level in the census block groups in which each individual resided.

Proportion of individuals 65 years of age and older: To assess the concentration of older adults within neighborhoods, we calculated the proportion of residents 65 years of age and older within each 2000 census block group. Scores could range from 0 to 1, with higher values representing a greater proportion of individuals 65 years of age and older in the census block groups in which each individual resided.

Proportion of racial/ethnic minorities: As an indicator of how “diverse” the census block groups was, a diversity index was calculated using a formula developed by Lopez (2001).¹ The index represented the distribution of residents from five broad racial/ethnic group

¹For the present study, the formula used was

$$\text{Diversity Index} = 1 - \sum_{i=1}^n \left[\frac{x_i}{y} \right]^2,$$

categories: (a) Hispanic; (b) non-Hispanic White; (c) non-Hispanic Black; (d) Asian, Native Hawaiian, and other Pacific Islander; and (e) American Indian, Alaska Native, and non-Hispanic multirace. Ranging from 0 to 1, higher index values indicated greater levels of diversity in the census block groups.

Analytic Strategy

Given that individual-level data were nested within the census-defined neighborhoods, multilevel analysis was an appropriate method to explore the effects of neighborhood characteristics (Muthén & Muthén, 2010). Multilevel models not only distinguish contextual effects (i.e., characteristics of census block groups) from compositional effects (i.e., characteristics of the individuals in census block groups) but also correct for bias in standard errors (Raudenbush & Bryk, 2002; Shouls et al., 1996). The multilevel models in this study were specified with a random intercept to account for the heterogeneity in physical and mental health status within neighborhoods. The multilevel data structure considered in this study had on average 2.4 respondents within neighborhoods (567 individuals nested within 233 census block groups). Following the suggestion of Raudenbush and Bryk (2002), for a small number of average respondents within neighborhoods, we ran random intercept models.

The Level 1 model was

$$Y_{ij} = \beta_{0j} + \beta_{1j}X_{ij} + \varepsilon_{ij},$$

where Y_{ij} is an individual-level health outcome for individual respondent i in census block group j , β_{0j} is the intercept, and β_{1j} represents the coefficients of individual-level covariates.

The Level 2 model was

$$\beta_{0j} = \gamma_{00} + \gamma_{01}W_{ij} + \mu_{0j},$$

where γ_{00} is the intercept of each cluster, and γ_{01} represents the coefficients of neighborhood-level covariates.

Separate models were estimated for the two outcome measures, health perceptions and depressive symptoms. Health perceptions were also considered as individual-level health-related predictors in the predictive model of depressive symptoms. Multilevel models for this analysis were estimated using Mplus statistical software (Muthén & Muthén, 2010).

where x_j = the population of racial/ethnic group j of the area, y = the total population of the area, and n = the number of racial/ethnic groups considered in the area.

Results

Characteristics of the Sample and Study Variables

Descriptive statistics for all variables are presented in Table 1. The mean age of participants was 70.2 years, and more than half (57.2%) were women. More than three quarters of the sample (77%) were married, and 73% had a high school education or more. All of the participants were foreign-born, and their average length of stay in the United States was about 29 years.

Scores on health measures suggested that in general the participants were healthy. Participants had an average of 1.37 ($SD = 1.20$) chronic conditions, and functional status averaged 1.80 ($SD = 4.41$). The mean scores for health perceptions and depressive symptoms were 3.28 ($SD = 1.70$) and 3.69 ($SD = 3.36$), respectively. Census information at the block group level indicated that participants lived in relatively typical neighborhoods. The average proportion of individuals living below the poverty level in this study was 0.09 ($SD = 0.07$; range = 0.00 – 0.48) compared with 0.12 and 0.13 in the United States and Florida, respectively (U.S. Census Bureau, 2000). The average proportion of individuals 65 years of age and older in this study was 0.15 ($SD = 0.93$; range = 0.00 – 0.83) compared with 0.12 and 0.18 in the United States and Florida, respectively (U.S. Census Bureau, 2000). The average diversity index was 0.23 ($SD = 0.15$; range = 0.00 – 0.62) compared with 0.49 and 0.52 in the United States and Florida, respectively (U.S. Census Bureau, 2000).

Correlational Analyses

As shown in Table 2, all variables were correlated in the expected directions. Poorer health perceptions were correlated with older age, female sex, unmarried status, lower educational attainment, a shorter stay in the United States, more chronic conditions, and greater disability. Greater levels of depressive symptoms were observed among individuals who were not married, were less educated, had a shorter stay in the United States, and had more adverse health profiles (more chronic conditions, greater functional disability, and more negative health perceptions). With regard to neighborhood-level variables, those block groups with higher proportions of individuals living below the poverty level were more likely to have higher proportions of older residents and greater racial/ethnic diversity. An interesting finding was that greater diversity was associated with lower proportions of individuals younger than 65 years of age. This may result in part from the fact that immigrants tend to be younger and that the past few decades have seen a marked increase in the number of immigrants. Perhaps more importantly, the proportion of individuals living below the poverty level and greater diversity were both associated with poorer health perceptions and greater depressive symptoms.

Multilevel Analyses

The results of the multilevel analyses are presented in Table 3. Because of the strong correlation between the proportion of individuals living below the poverty level and greater diversity ($r = .67$, $p < .001$), we tested each neighborhood-level variable independently. In the predictive model dealing with health perceptions, we found at the individual-level that

participants who had a shorter stay in the United States and those who had more chronic conditions and greater functional disability reported more negative health perceptions. Among the neighborhood-level variables, those living in census areas with a higher proportion of individuals living below the poverty line were more likely to perceive their health as poor. When we included all individual-level variables, this last association remained: Those who lived in poor neighborhoods perceived their health in more negative terms.

In the model for depressive symptoms, we found that unmarried status, greater functional disability, and more negative health perceptions increased the risk of depressive symptoms. No significant role was observed for any of the neighborhood-level variables.

Discussion

Given that the social context present in the environment has the potential to enhance or damage individuals' health, the present study examined the impact of several neighborhood characteristics on the physical and mental health status of an understudied group: Korean American older adults.

At the individual-level, participants who had a shorter stay in the United States and those who had greater numbers of chronic conditions and greater functional disability had more negative perceptions of health. Higher levels of depressive symptoms were observed among those who were not married, who had greater disability, and who had more negative perceptions of health. Such findings are consistent with the literature identifying risk factors to physical and mental health among older populations in general (e.g., Hays, Schoenfeld, & Blazer, 1996) and older Korean Americans in particular (e.g., Jang et al., 2006).

The uniqueness of the present study is its inclusion of characteristics of the neighborhood context that provided an opportunity to assess predictive factors beyond those at the level of the individual. The contribution of the neighborhood characteristics varied. The proportion of elders within the neighborhood, for example, was not associated with either health perceptions or depressive symptoms at the bivariate level. On the other hand, the proportion of racial/ethnic minorities within the subject's neighborhood was associated with greater levels of depressive symptoms as well as more negative self-perceptions of health at the bivariate level. These findings go against the assumption that neighborhood diversity is inherently a good thing for racial/ethnic minority groups. For example, in a study of Mexican American older adults, Eschbach and colleagues (2004) found that having more Mexican Americans in the census tract reduced the relative risk of several health problems. The latter study of course was considering the proportion of those individuals in the census tract who represented not only the same general racial/ethnic group but the same subgroup. In the present study, a similarity index was not possible because the proportion of Korean Americans at the block group level was too low to capture.

It is also noteworthy that the significance of the proportion of racial/ethnic minorities for physical and mental health disappeared in the multilevel analyses. This was also the case for the variable tapping the proportion of older adults in the block groups. One reason for the

lack of an effect may be that individual-level characteristics reduce the influence of neighborhood characteristics (Subramanian et al., 2006; Yen et al., 2009).

However, like several other studies of neighborhood context (e.g., Basta et al., 2008; Eschbach et al., 2004; Macintyre, Ellaway, & Cummins, 2002; Mair, Diez-Roux, & Galea, 2008; Shouls et al., 1996), our findings highlight the significance of neighborhood poverty in predicting health perceptions. Results from the multilevel analyses showed a small but significant role on health perception of the latter characteristic—proportion of residents living below the poverty level—after individual-level variables were controlled. One explanation for this finding may be that Korean American older adults who reside in socioeconomically disadvantaged neighborhoods are likely to be deprived of socioenvironmental resources such as health care services and formal and informal social supports (e.g., Macintyre et al., 2002; Mair et al., 2008). It is important to recognize that neighborhood poverty was itself associated with a cluster of both individual and neighborhood characteristics. Moreover, higher proportions of individuals living in poverty were associated with greater diversity among neighborhood residents. Living in such circumstances may create pessimism about personal health. Korean American older adults who live in disadvantaged neighborhoods are likely to be less acculturated, which leads to poorer health. Further research should explore racial/ethnic-specific mechanisms, including cultural beliefs and values, that may help explain how neighborhood poverty is associated with health.

Some limitations to the present study should be noted. The most important limitation has to do with the representativeness of the sample. The present analyses included only individuals whose residential address was available. It is possible that one consequence of the exclusion of those without a reported address was that disadvantaged persons (e.g., those with low education and low acculturation) might have been excluded. Furthermore, the present sample was drawn from only two cities in Florida; the effects of neighborhood characteristics may vary in other cities and states with different concentrations of Korean Americans. Another limitation draws from the fact that information on income was not obtained in the original study. Because education is a strong indicator of socioeconomic status even in late adulthood (e.g., Mirowsky & Ross, 2008), we used education as a proxy for socioeconomic status. However, to thoroughly distinguish between composition and context, it would better to include several important individual characteristics, especially income and wealth, missed in this study. Further research may more fully explore contextual effects by including these individual-level characteristics comprehensively. A final limitation draws from the cross-sectional nature of the study, a design that precludes causal inferences to be drawn between neighborhood characteristics and health status. Future studies may benefit from using a more representative sample and a longitudinal design.

Despite these limitations, the present study shows a significant effect of neighborhood poverty on subjective health perceptions that is independent of individual-level variables. Results also suggest that the general level of diversity in a neighborhood is not inherently a positive resource for immigrants. Such findings should be taken into consideration when developing community-based prevention or intervention programs.

Acknowledgments

This project was supported by National Institute of Mental Health Research Grant 1R21MH081094; principal investigator, Yuri Jang.

References

- Barker, RG. Ecological psychology: Concepts and methods for studying the environment of human behavior. Stanford, CA: Stanford University Press; 1968.
- Barker, RG., Barker, LS. Behavioral units for the comparative study of culture. In: Kaplan, B., editor. Studying personality cross-culturally. New York: Harper & Row; 1961. p. 457-476.
- Basta NE, Matthews FE, Chatfield MD, Brayne C. Community-level socioeconomic status and cognitive and functional impairment in the older population. *European Journal of Public Health*. 2008; 18:48–54. [PubMed: 17631489]
- Beard JR, Cerdá M, Blaney S, Ahern J, Vlahov D, Galea S. Neighborhood characteristics and change in depressive symptoms among older residents of New York City. *American Journal of Public Health*. 2009; 99:1308–1314. [PubMed: 19008519]
- Cagney KA, Browning CR, Wen M. Racial disparities in self-rated health at older ages: What difference does the neighborhood make? *The Journals of Gerontology, Series B: Psychological and Social Sciences*. 2005; 60:S181–S190.
- Coffé H. Social capital and community heterogeneity. *Social Indicators Research*. 2009; 91:155–170.
- Cornoni-Huntley, J., Blazer, DG., Lafferty, ME., Everett, DF., Brock, DB., Farmer, ME. Established populations for epidemiologic studies of the elderly, Vol. II: Resource data book. Bethesda, MD: National Institute on Aging; 1990.
- Eschbach K, Ostir GV, Patel KV, Markides KS, Goodwin JS. Neighborhood context and mortality among older Mexican Americans: Is there a barrio advantage? *American Journal of Public Health*. 2004; 94:1807–1812. [PubMed: 15451754]
- Fillenbaum, G. Multidimensional functional assessment: The Duke older Americans resources and services procedure. Hillsdale, NJ: Erlbaum; 1988.
- George, D., Mallery, P. SPSS for Windows step by step: A simple guide and reference. 4. Boston: Allyn & Bacon; 2003.
- Hays JC, Schoenfeld DE, Blazer DG. Determinants of poor self-rated health in later life. *American Journal of Geriatric Psychiatry*. 1996; 4:188–196. [PubMed: 28531077]
- Heft, H. Ecological psychology in context: James Gibson, Roger Barker, and the legacy of William James's radical empiricism. Hillsdale, NJ: Erlbaum; 2001.
- Jang Y, Chiriboga DA, Allen J, Kwak J, Haley WE. Willingness of older Korean American adults to use hospice. *Journal of the American Geriatrics Society*. 2010; 58:352–356. [PubMed: 20374409]
- Jang Y, Haley WE, Small BJ. Cross-cultural comparability of the Geriatric Depression Scale: Comparison between older Koreans and older Americans. *Aging & Mental Health*. 2001; 5:31–37. [PubMed: 11513010]
- Jang Y, Kim G, Chiriboga DA. Health perception and depressive symptoms among Korean American older adults. *Journal of Cross-Cultural Gerontology*. 2006; 21:91–102. [PubMed: 17195097]
- Kirby JB, Kaneda T. Access to health care: Does neighborhood residential instability matter? *Journal of Health and Social Behavior*. 2006; 47:142–155. [PubMed: 16821508]
- Krieger N. Proximal, distal, and the politics of causation: What's level got to do with it? *American Journal of Public Health*. 2008; 98:221–230. [PubMed: 18172144]
- Lawrence, RJ. Healthy residential environments. In: Bechtel, RB., Churchman, A., editors. *Handbook of environmental psychology*. New York: Wiley; 2002. p. 394-412.
- Lopez, A. Racial/ethnic diversity and residential segregation in the San Francisco Bay Area. Stanford, CA: Stanford University, Center for Comparative Studies in Race and Ethnicity; 2001. Sep. (Demographics Report Series No. 1)

- Macintyre S, Ellaway A, Cummins S. Place effects on health: How can we conceptualise, operationalise and measure them? *Social Science & Medicine*. 2002; 55:125–139. [PubMed: 12137182]
- Mair C, Diez-Roux AV, Galea S. Are neighbourhood characteristics associated with depressive symptoms? A review of evidence. *Journal of Epidemiology and Community Health*. 2008; 62:940–946. [PubMed: 18775943]
- Mirowsky J, Ross CE. Education and self-rated health: Cumulative advantage and its rising importance. *Research on Aging*. 2008; 30:93–122.
- Mui AC, Kang SY, Chen LM, Domanski MD. Reliability of the Geriatric Depression Scale for use among elderly Asian immigrants in the USA. *International Psychogeriatrics*. 2003; 15:253–271. [PubMed: 14756161]
- Muthén, LK., Muthén, BO. MPlus user's guide. Los Angeles: Author; 2010.
- Nagi SZ. An epidemiology of disability among adults in the United States. *Milbank Memorial Fund Quarterly: Health and Society*. 1976; 54:439–467. [PubMed: 137366]
- Portes, A., Rumbaut, RG. *Immigrant America: A portrait*. Berkeley: University of California Press; 1990.
- Raudenbush, SW., Bryk, AS. *Hierarchical linear models: Applications and data analysis methods*. Thousand Oaks, CA: Sage; 2002.
- Rosow I, Breslau N. A Guttman Health Scale for the aged. *Journal of Gerontology*. 1966; 21:556–559. [PubMed: 5918309]
- Ross CE, Mirowsky J. Neighborhood disadvantage, disorder, and health. *Journal of Health and Social Behavior*. 2001; 42:258–276. [PubMed: 11668773]
- Schieman S, Pearlin LI, Meersman SC. Neighborhood disadvantage and anger among older adults: Social comparisons as effect modifiers. *Journal of Health and Social Behavior*. 2006; 47:156–172. [PubMed: 16821509]
- Sheikh JI, Yesavage JA. Geriatric Depression Scale (GDS): Recent evidence and development of a shorter version. *Clinical Gerontologist*. 1986; 5:165–173.
- Shouls S, Congdon P, Curtis S. Modelling inequality in reported long term illness in the U.K.: Combining individual and area characteristics. *Journal of Epidemiology and Community Health*. 1996; 50:366–376. [PubMed: 8935472]
- Subramanian SV, Kubzansky L, Berkman L, Fay M, Kawachi I. Neighborhood effects on the self-rated health of elders: Uncovering the relative importance of structural and service-related neighborhood environments. *The Journals of Gerontology, Series B: Psychological and Social Sciences*. 2006; 61:S153–S160.
- U.S. Census Bureau. Census 2000. 2000. Retrieved from <http://www.census.gov/main/www/cen2000.html>
- U.S. Census Bureau. *The American community—Asians: 2004*. Washington, DC: U.S. Department of Commerce; 2007.
- Usui WM, Keil TJ. Life satisfaction and age concentration of the local area. *Psychology and Aging*. 1987; 2:30–35. [PubMed: 3268189]
- Wickrama KAS, Bryant CM. Community context of social resources and adolescent mental health. *Journal of Marriage and Family*. 2003; 65:850–866.
- Yen IH, Michael YL, Perdue LP. Neighborhood environment in studies of health of older adults: A systematic review. *American Journal of Preventive Medicine*. 2009; 37:455–463. [PubMed: 19840702]
- Yu, E., Choe, P. Social and economic indicators by race and Asian ethnic groups and Korean population density map—Top 5 metropolitan areas, 2000. 2003. Retrieved from http://www.calstatela.edu/centers/ckaks/census_tables.html
- Zhang W, Ta VM. Social connections, immigration-related factors, and self-rated physical and mental health among Asian Americans. *Social Science & Medicine*. 2009; 68:2104–2112. [PubMed: 19427087]

Table 1
Descriptive Information of Korean American Older Adults and Their Neighborhood

Variable	<i>n</i>	%	<i>M (SD)</i>	Range	Reliability
Individual-level predictor variables					
Age (years)	563		70.2 (6.81)	60–96	
Gender (female)	566	57.2			
Marital status (married)	563	76.9			
Education (high school or more)	560	73.0			
Length of stay in the United States (years)	558		28.7 (11.5)	1–54	
Chronic conditions	564		1.37 (1.20)	0–7	
Functional disability	564		1.80 (4.41)	0–40	.93
Neighborhood-level predictor variables					
Proportion of individuals living below the poverty level	233		0.09 (0.07)	0–0.48	
Proportion of individuals older than 65	233		0.15 (0.13)	0–0.83	
Proportion of racial/ethnic minorities	233		0.23 (0.15)	0–0.62	
Individual-level outcome variables					
Health perceptions	567		3.28 (1.70)	0–7	.71
Depressive symptoms	556		3.69 (3.36)	0–15	.83

Table 2

Correlations Among All Study Variables in Korean American Older Adults

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Age	—											
2. Female	-.13**	—										
3. Married	-.19***	-.32***	—									
4. Education	-.22***	-.25***	.34***	—								
5. Length of stay in the United States	-.02	-.02	.11*	.25***	—							
6. Chronic conditions	.18***	.10*	-.11*	-.15***	-.05	—						
7. Functional disability	.35***	.12**	-.21***	-.22***	-.13**	.31***	—					
8. Proportion of individuals living below the poverty level	.26***	.08	-.18***	-.15***	-.11*	.06	.15***	—				
9. Proportion of individuals older than	.65	.21***	-.05	-.04	.04	.14***	.04	.07	.41***	—		
10. Proportion of racial/ethnic minorities	.11**	.08	-.16***	-.18***	-.15***	.07	.07	.67***	-.09*	—		
11. Health perceptions	.12**	.16***	-.19***	-.20***	-.25***	.47***	.38***	.20***	.02	.17***	—	
12. Depressive symptoms	.08	.08	-.24***	-.19***	-.19***	.22***	.34***	.17***	.03	.11**	.45***	—

*
 $p < .05$.**
 $p < .01$.***
 $p < .001$.

Table 3
Multilevel Models of Physical and Mental Health Among Korean American Older Adults

Variable	Health perception			Depressive symptoms		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Intercept	3.15*** (0.64)	3.27*** (0.64)	3.09*** (0.65)	4.69*** (1.38)	4.66*** (1.38)	4.86*** (1.39)
Individual-level demographic variables						
Age	-0.004 (0.01)	-0.003 (0.01)	-0.003 (0.01)	-0.02 (0.02)	-0.02 (0.02)	-0.02 (0.02)
Gender	0.21 (0.12)	0.21 (0.12)	0.20 (0.12)	-0.24 (0.26)	-0.23 (0.26)	-0.23 (0.26)
Marital status	-0.17 (0.15)	-0.19 (0.15)	-0.19 (0.15)	-0.77* (0.31)	-0.76* (0.31)	-0.77* (0.31)
Education	-0.02 (0.14)	-0.03 (0.14)	-0.01 (0.14)	-0.22 (0.28)	-0.23 (0.28)	-0.24 (0.28)
Length of stay in the U.S.	-0.02*** (0.01)	-0.02*** (0.01)	-0.02*** (0.01)	-0.02 (0.01)	-0.02 (0.01)	-0.02 (0.01)
Individual-level health variables						
Chronic conditions	0.51*** (0.05)	0.51*** (0.05)	0.51*** (0.05)	-0.02 (0.12)	-0.02 (0.12)	-0.02 (0.12)
Functional disability	0.09*** (0.02)	0.09*** (0.02)	0.09*** (0.02)	0.13*** (0.03)	0.13*** (0.03)	0.13*** (0.03)
Health perceptions	—	—	—	0.69*** (0.09)	0.69*** (0.09)	0.70*** (0.09)
Neighborhood-level variables						
Proportion of individuals living below the poverty level	1.39* (0.69)	—	—	0.41 (1.71)	—	—
Proportion of individuals older than 65	—	-0.14 (0.50)	—	—	0.58 (1.06)	—
Proportion of racial/ethnic minorities	—	—	0.73 (0.48)	—	—	-0.63 (1.01)
Random effects						
Intercept	1.86*** (0.15)	1.83*** (0.12)	1.86*** (0.13)	7.93*** (0.61)	7.93*** (0.60)	7.91*** (0.60)
Fit Index						
AIC	17672.67	17676.38	17674.19	20527.26	20527.02	20526.93

Note. Unstandardized coefficients are presented with standard errors in parentheses. Because of multicollinearity, each of the neighborhood variables was separately tested. AIC = Akaike's information criterion.

* $p < .05$.

** $p < .01$.

.100 > *p*

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript