Perceived Neighborhood Environment and Changes in Health among Older Adults

Ye Luo

Clemson University

Department of Sociology and Anthropology

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Abstract

Using data from a subsample of the 2006 Health and Retirement Study and the follow-up survey in 2008, this study examined the direct and indirect effects of perceived neighborhood characteristics on changes in depressive symptoms, self-rated health, and functional limitations among U.S. older adults. The large representative sample makes the results more generalizable, and the longitudinal data allow us to better establish causal direction of these effects. The results show some interesting patterns. Perceived neighborhood disorder has an effect on changes in depressive symptoms and self-rated health. These effects are largely explained by economic resources, such as education, income, and wealth. Perceived neighborhood cohesion affects changes in all three health outcomes, but these effects are less affected by economic resources. Rather they are explained mainly by psychological resources and followed by social resources and health behaviors.

Introduction

The proportion and number of older people is expected to continue rising well into the 21st century in the U.S. and other developed countries, with developing countries quickly catching up (Administration on Aging, 2005; Kinsella & Phillips, 2005). Ensuring a healthy life for older adults has become an important public health goal (U.S. Public Health Service, 1991). Recent public health discussion emphasizes the role of social environment in addition to individual characteristics and suggests that the development of health problems with age is critically dependent upon interactions between the individual and his or her social surroundings (Macintyre, Ellaway, & Cummins, 2002; O'Campo, 2003; Seeman & Crimmins, 2001). Although there is a growing interest in the relationship between neighborhood environment and health, research on older adults is limited. Several studies showed a positive relationship

2

between neighborhood socioeconomic conditions and health among older adults, but little is known about why, and under what circumstances, neighborhood context contributes to health and well-being in later life. Moreover, most studies on older adults are based on cross-sectional survey data, and thus the causal direction cannot be established. The primary goal of this study is to examine the relationship between perceived neighborhood environment and changes in health among older adults. It also examines the potential mechanisms of this relationship and explores the role of economic, social, and psychological resources and health behaviors. More specifically, it addresses the following questions (1) whether perceived neighborhood environment is associated with changes in health in old age; (2) whether the effect of perceived neighborhood environment on changes in health is mediated by economic, social, and psychological resources and by health behaviors; and (3) whether perceived neighborhood environment have the same effects on both physical and emotional health.

Background and Literature Review

Recently evidence has supported the hypothesis that living in neighborhoods of low socioeconomic status (SES) has negative effects on health-related outcomes including but not limited to self-rated health, low birth weight, depression, disease incidence, physical functioning, number of chronic conditions, psychological distress and life satisfaction, health-behaviors (e.g., substance use), and mortality (Anderson, Sorlie, Backlund, Johnson, & Kaplan, 1997; Aneshensel & Sucoff, 1996; Boardman, Finch, Ellison, Williams, & Jackson, 2001; Ennett, Flewelling, Lindrooth, & Norton, 1997; Kawachi, Kennedy, Lochner, & ProthrowStith, 1997; LeClere, Rogers, & Peters, 1997; Ross & Mirowsky, 2001; Yen & Kaplan, 1999). Although relatively sparse, studies of social environment have shown that the social resources of a residential area are also important factors (Browning & Cagney, 2002; Lochner, Kawachi, Brennan, & Buka, 2003; Veenstra, 2002; Wen, Cagney, & Christakis, 2005; Wen, Hawkley, & Cacioppo, 2006).

Few studies have been done to test whether the local environment might influence the well-being of older people. Social scientists have studied the neighborhood conditions in which

older adults live and the relation of neighborhood characteristics to residential and life satisfaction; however, these studies did not link characteristics of neighborhood environment with health (Carp & Carp, 1982; Chapman & Beaudet, 1983). Recent research suggests that the capacity of communities to bolster and sustain the well-being of individual residents is particularly salient for older adults; their daily activities are likely dependent on the infrastructure and social resources of their communities, particularly if health is already compromised (Balfour & Kaplan, 2002; Wen, Cagney, & Christakis, 2005; Wen, Hawkley, & Cacioppo, 2006). Previous research is also limited in examining the mechanisms by which neighborhood characteristics affect health and well-being (O'Campo, 2003; Seeman & Crimmins, 2001). This is a void that needs to be filled in order to gain a better understanding of the interrelations between social environment and health, and to help design and implement effective interventions targeting at reducing social disparities in health and improving the well-being of older adults.

One potential mediating factor is economic resources. A long history of residential segregation in the United States has resulted in sharp contrasts between rich neighborhoods and poor neighborhoods. It is also well-documented that people with higher socioeconomic status tend to have better health (Alwin & Wray, 2005; Marmot, Friel, Bell, Houweling, & Taylor, 2008).

The second potential mediating factor is social resources. The benefits of social support and social integration to health have long been recognized (House, Landis, & Umberson, 1988; House, Umberson, & Landis, 1988) and social engagement have received renewed interests in recent years in light of the growing consensus that although absence of disease and the maintenance of functional capacities are important, it is their combination with active engagement with life that most fully represents the concept of successful aging (Rowe & Kahn, 1997). Research on social engagement suggests that it reinforces role supports necessary for the maintenance of positive self-concept, often associated with greater life satisfaction, and elderly people who remain productive and maintain or create new social networks do better than those

4

who disengage from societal and social commitments (Everard, Lach, Fisher, & Baum, 2000; Lemon, Bengtson, & Peterson, 1972; Rowe & Kahn, 1997).

Previous research suggests that social environment can have an impact on social relationships and social engagement. Ross & Jang (2000) argued that individuals living in neighborhoods characterized by disorder, such as crime, vandalism, graffiti, loitering, rundown and abandoned buildings, litter, noise, alcohol, and drugs, may have high levels of fear and mistrust; they may fear being victimized, be afraid to leave the house, or worry that their home will be broken into; they may further believe that other people cannot be trusted, be suspicious, and think that others are out to harm them. Fear and mistrust of others represent profound forms of alienation that have progressed from a sense of disconnection to one of persecution (Ross & Jang 2000). Individuals living in this environment would be less likely to engage in social and leisure activities, which may in turn, lead to poorer health and well-being (Krause, 1996).

Psychological resources can also play a mediating role in the relationship between social environment and health. Potential health damaging psychological traits, such as fear, mistrust, isolation, lower self-esteem, lower optimism, greater fatalism, lower self-efficacy beliefs, a weaker sense of control, hostility and anger, may be more readily present in impoverished and disordered neighborhoods where people have fewer social and financial resources to call on for support (Ross & Jang, 2000; Seeman & Crimmins, 2001; Wen & Christakis, 2006).

The relationship between social environment and health can also be mediated by health behaviors. Previous research has reported that people living in poor-quality social environments are more likely to smoke and to have less physical activity and higher-fat diets, which can lead to poorer physical health (Ross, 2000; Yen & Kaplan, 1998). One explanation of the social environment and health behavior linkages is that in poor-quality neighborhoods there are few amenities like bike paths or tennis courts, or that the streets may be too dangerous for a walk or run. The second explanation is that with limited opportunities in poor-quality neighborhood, individuals see little chance for a long and successful life, and thus they are not likely to be

concerned with exercising or quitting smoking, and these attitudes may prevail and spread in the neighborhood (Ross, 2000).

Methods

Data for this study come from the 2006 and 2008 waves of the Health and Retirement Study (HRS). HRS is a nationally representative, longitudinal study of older Americans with its sample composed of five birth cohorts who entered the study in different calendar years. HRS began in 1992-1993 as two separate samples: the original HRS focusing on 1931-41 birth cohorts and the AHEAD focusing on 1890-1923 birth cohorts. In 1998 the two samples were merged and two new samples--CODA (1924-30 cohorts) and War Babies (1942-47 cohorts), were added, and in 2004, another new sample--EBB (1948-53 cohorts) was added, making the total sample representative of those born in 1953 or before, approximately age 51 and older in 2004. Once they have entered the study, respondents were re-interviewed every two years. The spouses were also interviewed irrespective of their age. The sample for each cohort was derived from the same stratified, multistage area probability design in which blacks, Hispanics, and Floridians were over sampled. The HRS now includes over 30,000 respondents. The initial cohort response rates ranged from 70 percent to slightly over 80 percent; re-interview rates for all cohorts at each wave have been between 92 and 95 percent (Health and Retirement Study, 2007).

Since its inception in 1992, the HRS survey has focused on the health, economics, and demographics of aging and the retirement process. In 2004, HRS added a new feature for data collection in the form of self-administered questionnaires that were left with a random subsample of respondents upon the completion of an in-person core interview. In 2006, the Leave-Behind Questionnaire was expanded to include a rich set of questions on psychosocial issues (Clarke, Fisher, House, Smith, & Weir, 2007). Most psychosocial measures used in this study were taken from this self-administered questionnaire. Excluding the respondents who were not included in this subsample, those missing on neighborhood, psychosocial, health behavior and/or demographic variables, those who died or dropped out between 2006 and 2008, and those who

moved between 2006 and 2008, the analytical sample for this study included 5,671 respondents born in 1953 or before and were interviewed in both 2006 and 2008.

Health Outcomes

This study assesses three health outcomes. Health variables were measured in both 2006 and 2008 while other variable were measured in 2006. (1) *Depressive symptoms.* HRS includes a short version of the Center for Epidemiological Studies Depression Scale (CES-D) designed for telephone interviews with older respondents (Turvey, Wallace, & Herzog, 1999). Each item asked whether the person experienced a specific symptom in the last week. I excluded he item of "feeling lonely" because loneliness is included as a measure of psychological resource. Number of depressive symptoms is a count of the affirmative responses to the remaining items, with two items tapping positive affect reverse coded; it ranges from 0 to 7. (1) *Self-rated health.* Each respondent was asked to rate his or her physical health on a five-point scale from poor to excellent, providing a subjective assessment of his or her health status. (2) *Functional limitations*. Number of functional limitations is calculated by summing responses to eleven items assessing whether the respondent has difficulty with specific forms of ambulation, such as walking a block and climbing a flight of stairs, or muscle movements, such as moving a large chair or picking up a dime.

Perceived Neighborhood Environment

The eight questions that asked how the respondents feel about their local area, defined as somewhere within a 20 minute walk or about a mile from their home, tap two dimensions of perceived neighborhood environment: (1) *Neighborhood physical disorder* is the average score of respondents' ratings of their neighborhood regarding vandalism/graffiti, rubbish, vacant/deserted houses, and crime. (2) *Neighborhood social cohesion* is the average score of respondents' ratings of their attachment to the neighborhood, and the friendliness, helpfulness, and trustworthiness of their neighbors. The scores on each index range from 1 to 7 with higher values indicating higher levels of disorder or cohesion and the Cronbach's alpha is .64 and .82 respectively. Although there is a high correlation between perceived neighborhood disorder and

social cohesion (r = -.46), previous research suggests there is significant non-overlap between these two. People who report that they live neighborhoods characterized by disorder may lack social ties with their neighbors, but one is not simply the absence of the other (Ross & Jang, 2000).

Economic Resources

These include education (in years), log of household income and log of net worth, and whether the respondent is working full-time, part-time or not working.

Social Resources

Five aspects of social network and social engagement are assessed. (1) *Marital and partnership status* is coded 1 if the respondent is married or partnered. (2) *Leisure activities participation* is the count of affirmative responses to the questions asking whether or not the respondent performs seven leisure activities: newspaper reading, hobby, vacation within and outside of the U.S., day trip/outing, the Internet use, and cell phone use. (3) *Social integration* is based on the frequencies of religious services attendance, organizational programs or meetings attendance, and volunteer work. Because the three items have different response scales, the responses on each item was first standardized and the standardized scores were averaged to create a summary index of social integration. (3) *Contact*. Respondents were asked whether they have children, and for those who answered yes, three additional questions were asked regarding how often they meet up with, speak on the phone with, or write or email their children. Similar questions were asked about other relatives and friends. To create a summary index of contact, I first assigned 0 on the variables measuring frequencies of contact for those who do not have a particular type of relationship, and then the nine items tapping frequencies of contact (three items for each type of relationship) were averaged. The summary index ranges from 0 to 6 with higher values indicating more frequent contact. (4) *Social support*. For each type of relationship (spouse/partner, children, other relatives, and friends), three positively worded (e.g., "How much can you rely on them if you have a serious problem?") and four negatively worded questions (e.g., "How often do they make too many demands on you?") were asked on a four-

point response scale ("a lot" to "not at all") to assess the quality of interaction of each relationship. With the positively worded items reverse coded, the seven items were averaged to create one subscale for each type of relationship. A composite measure of social support was created by averaging scores on the four subscales. It has a range of 1 to 4 with higher values indicating higher levels of support; Cronbach's alpha is .70-.82 for the subscales, and is .82 for the composite measure.

Psychological Resources

Four psychological characteristics are included as indicators of psychological resources. (1) *Sense of control.* Respondents were asked to rate their agreement on a 6-point scale from strongly disagree to strongly agree with 10 statements assessing the belief that events and outcomes in one's own life remain within one's personal control (e.g., "What happens in my life is often beyond my control" and "What happens to me in the future mostly depends on me") (Lachman & Weaver, 1998). With the negatively worded items revise coded, a summary index was created by averaging responses to the 10 items. It ranges from 1 to 6 with higher values representing greater sense of control; Cronbach's alpha is .87. (2) *Hostility.* Five items from the Cook-Medley Hostility Scale (e.g., "Most people inwardly dislike putting themselves out to help other people" with 6-point response scale from strongly disagree to strongly agree) were used to create an index of cynical hostility by averaging the scores across these items (Cook & Medley, 1954). The summary index ranges from 1 to 6 with higher values representing greater degrees of hostility; Cronbach's alpha is .79. (3) *Optimism.* Six items from the Revised Life Orientation Test (e.g., "I'm always optimistic about my future" with 6-point response scale from strongly disagree to strongly agree) were used to create an index of optimism by first reverse coding the negatively worded items and then averaging the scores across these items (Scheier, Carver, & Bridges, 1994). The summary index ranges from 1 to 6 with higher values representing greater degrees of optimism; Cronbach's alpha is .73. (4) *Loneliness.* A summary index of loneliness was created by averaging scores on the three items that asked how often the respondents feels lacking of companionship, left out, or isolated from others (Hughes, Waite, Hawkley, &

Cacioppo, 2004). It ranges from 1 to 3 with higher values indicating a greater degree of loneliness; Cronbach's alpha is .82. Because these four psychological measures are correlated (r = .27 to .51) and factor analysis showed they load on one factor, a composite measure of psychological resources was created by reverse coding hostility and loneliness, standardizing each summary measure and then averaging the standardized scores across the four measures; the Cronbach's alpha is .71 for this composite measure.

Health Behaviors

Three health behaviors are assessed. (1) *Smoking*. Respondents were asked whether they are current smokers. Models using the number of cigarettes as the outcome, with non-smokers coded to 0, showed substantively similar results to those presented here. (2) *Problem drinking*. Respondents who drink 5 or more drinks a week for women and 13 or more drinks a week for men are coded 1. Several measures of alcohol use: drinks per day (0, 1-2, 3-4 and 5 or more), drinks per week (0-topcode of 42) were also used, and results for these measures were nearly identical. (3) *Moderate exercise*. Respondents were asked how often they participate in moderate physical activities with the response ranging from 1 (hardly ever) to 4 (everyday).

Control Variables

Demographic characteristics, including age (in years), gender, race/ethnicity (white, black, Hispanic, and other race), are controlled in all multivariate models.

Statistical Procedures

All results are weighted and adjusted for complex sampling using Stata *svy* procedure so that the findings can be generalized to the U.S. older adults. A series of OLS regression models were estimated for each health outcome. Model I includes only neighborhood characteristics and demographics. Model II adds measures of economic resources. Model III to Model V add measures of social resources, psychological resources, and health behaviors as three separate groups of variables to Model II to assess the potential intervening effects of each group of variables while controlling for demographics and socioeconomic status. The last model (Model

10

VI) includes all the variables to assess how they jointly affect the relationship between perceived neighborhood environment and health.

Results

Descriptive statistics are presented in Table 1. On a scale of 1 to 7, the average perceived neighborhood disorder is 2.38 and the average perceived neighborhood cohesion is 5.53, suggesting that older adults are generally satisfied with their living environment; they tend to characterize their neighborhood environment as having low levels of disorder and high levels of cohesion. These people also seem to have good physical and emotional health. The average number of depressive symptoms is 1.39, the average self-rated physical health is 3.32, and the average number of functional limitations is 2.48. The large majority of older adults are married or cohabiting. They have high levels of leisure participation, social integration, contact, social support, psychological resources, and physical exercise. About 14% are current smokers and 12% have drinking problems.

"Table 1 about here"

Perceived neighborhood characteristics are associated with two-year change in depressive symptoms when only demographic characteristics are controlled for; higher levels of perceived neighborhood disorder in 2006 is associated with more depressive symptoms in 2008 while higher levels of perceived neighborhood cohesion is associated with fewer depressive symptoms in 2008 while keeping depressive symptoms in 2006 constant (Table 2, Model 1). The effect of neighborhood disorder becomes non-significant when measures of economic resources are added (Model 2). It is also non-significant when measures of social resources, psychological resources and health behaviors are added separately (Models 3-5), and in the full model (Model 6). The effect of perceived neighborhood cohesion does not change when economic resources are added (Model 2), but it becomes non-significant when either measures of social resources or mores of psychological resources are added (Models 3 and 4) and remains non-significant in the full model (Model 6).

"Table 2 about here"

11

Perceived neighborhood disorder in 2006 is negatively associated with self-rated health in 2008, and perceived neighborhood cohesion in 2006 is positively associated with self-rated health in 2008 while keeping self-rated health in 2006 constant and net of demographic characteristics (Table 3, Model 1). These effects remain significant after controlling for economic resources. However, the effect of perceived neighborhood disorder is substantially attenuated, while the effect of perceived neighborhood cohesion is unchanged (Model 2). The effect of perceived neighborhood cohesion becomes non-significant when any of the three groups of variables measuring social resources, psychological resources and health behaviors are added in Models 3-5, with psychological resources having the largest impact. The effect of perceived neighborhood disorder is attenuated somewhat when measures of psychological resources are added, and changes little with the addition of social resources and health behavior measures. In the full model (Model 6), neighborhood disorder remains significant while neighborhood social cohesion is no not significant.

"Table 3 about here"

Perceived neighborhood disorder in 2006 does not have any significant effect on two year change in functional limitations. Perceived neighborhood cohesion in 2006 is strongly associated with fewer functional limitations in 2008 while keeping functional limitations in 2006 constant and net of only demographics (Table 4, Model 1). This effect does not change when economic resources are added in Model 2, but it is substantially attenuated when social resources are added Model 3, psychological resources are added in Model 4, and slightly attenuated when health behaviors added in Model 5. It becomes non-significant in the full model (Model 6).

"Table 4 about here"

Discussion <mark>**(To be expanded)**</mark>

Using data from a subsample of the 2006 Health and Retirement Study and the follow-up survey in 2008, this study examined the direct and indirect effects of perceived neighborhood characteristics on changes in physical and emotional health among U.S. older adults. The large representative sample makes the results more generalizable, and the longitudinal data allow us to

better establish causal direction of these effects. The results show some interesting patterns. Perceived neighborhood disorder has an effect on changes in depressive symptoms and self-rated health. These effects are largely explained by economic resources, such as education, income, and wealth. Perceived neighborhood cohesion has effects on changes in all three health outcomes, but these effects are less affected by economic resources. Rather they are explained mainly by psychological resources and followed by social engagement and health behaviors.

This study has several limitations. One limitation is that this study only used self-reported neighborhood characteristics and self-reported physical and psychological well-being outcomes. Although previous research suggests that perceived neighborhood characteristics have effects on health and well-being, since both are likely to be affected by the respondent's mental states, the associations between them may be overestimated. Future research needs to include both objective and subjective measures of neighborhood environment.

The social environment includes the groups to which we belong, the neighborhoods in which we live, the organization of our workplaces, and the policies we create to order our lives. Despite the increasing attention to the environment, research on physical environment is well established, whereas research on the social environment has lagged, and the mechanisms linking social environment and health are not clear. This project is timely in that with an aging population and an overburdened medical care system, looking for risk factors that impact groups of older people might offer new understanding and more effective forms of intervention.

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Table 1. Descriptive statistics in 2006

	Mean	Std	Min	Max
Neighborhood Characteristics				
Perceived disorder	2.38	1.25	1	7
Perceived cohesion	5.53	1.29	1	7
Health Measures				
Depressive symptoms	1.22	1.73	0	7
Self-rated health	3.32	1.09	1	5
Functional limitations	2.48	2.81	0	11
Economic Resources				
Education	13.03	2.95	0	17
Household income (log)	10.68	1.24	0	16.42
Household assets (log)	11.64	3.23	0	18.22
Working parttime	0.10		0	1
Not working	0.53		0	1
Social Resources				
Married or partnered	0.70		0	1
Leisure participation	4.26	1.68	0	7
Social integration	-0.02	0.74	-1.16	1.56
Contact	3.43	0.97	0	6
Social support	3.23	0.40	1	4
Psychological Resources				
Psychological resources	0.02	0.73	-2.96	1.39
Health Behaviors				
Smoking	0.14		0	1
Problem drinking	0.12		0	1
Moderate exercise	3.17	1.15	1	4
Demographics				
Age	65.30	9.74	53	99
Female	0.54		0	1
Black	0.09		0	1
Hispanic	0.06		0	1
Other race	0.01		0	1

Note: Results are weighted.

Table 2. Regression coefficients of depressive symptoms in 2008 on perceived neighborhood environment, psycho-socio-economic resources, and health behaviors, and depressive symptoms in 2006

	(1)	(2)	(3)	(4)	(5)	(6)
Depressive symptoms 2006	0.51**	0.48**	0.45**	0.42**	0.47**	0.41**
	(22.87)	(21.21)	(19.16)	(18.39)	(21.41)	(17.93)
Perceived neighborhood disorder	0.05**	0.02	0.01	0.00	0.02	0.00
	(2.70)	(1.19)	(0.59)	(0.07)	(1.21)	(0.03)
Perceived neighborhood cohesion	-0.05*	-0.05*	-0.01	0.00	-0.04*	0.02
	(2.26)	(2.21)	(0.49)	(0.08)	(2.00)	(0.71)
Education		-0.03**	-0.01	-0.02	-0.02**	-0.00
		(3.27)	(1.17)	(1.93)	(2.83)	(0.50)
Household income (log)		-0.06**	-0.05*	-0.04*	-0.05*	-0.04
		(2.85)	(2.21)	(2.14)	(2.65)	(1.90)
Household assets (log)		-0.02*	-0.01	-0.01	-0.02	-0.01
		(2.26)	(1.13)	(1.40)	(1.88)	(0.72)
Working parttime		0.09	0.10	0.07	0.11	0.09
		(1.33)	(1.42)	(1.07)	(1.59)	(1.35)
Not working		0.25**	0.23**	0.24**	0.25**	0.23**
		(3.51)	(3.38)	(3.41)	(3.55)	(3.29)
Married or partnered			0.01			0.03
			(0.12)			(0.46)
Leisure activities			-0.07**			-0.05*
			(3.97)			(2.53)
Social integration			-0.09*			-0.06
			(2.38)			(1.52)
Contact			-0.04			-0.03
			(1.41)			(0.98)
Social support			-0.42**			-0.24**
			(7.76)			(3.85)
Psychological resources				-0.39**		-0.29**
				(10.71)		(7.08)
Smoking					0.10	0.07
					(1.25)	(0.84)
Problem drinking					0.03	0.04
					(0.44)	(0.52)
Moderate exercise					-0.09**	-0.06**
					(4.02)	(2.87)
Age	0.00	-0.01	-0.00	-0.00	-0.01	-0.00
	(1.74)	(1.78)	(1.08)	(1.35)	(2.00)	(1.13)
Female	0.10**	0.05	0.13**	0.10**	0.04	0.13**
	(2.70)	(1.47)	(2.93)	(2.71)	(1.22)	(3.04)
Black	0.01	-0.12	-0.12	-0.09	-0.13	-0.10
	(0.14)	(1.55)	(1.62)	(1.23)	(1.63)	(1.37)
Hispanic	0.31*	0.11	0.12	0.16	0.13	0.17
	(2.30)	(0.77)	(0.94)	(1.16)	(0.94)	(1.27)
Other race	-0.31*	-0.33*	-0.41*	-0.38*	-0.31*	-0.42*
	(2.18)	(2.23)	(2.61)	(2.48)	(2.12)	(2.59)
Constant	0.44*	2.25**	3.28**	1.59**	2.40**	2.45**
	(2.48)	(7.07)	(9.11)	(4.89)	(7.73)	(6.52)
R-squared	0.30	0.31	0.32	0.33	0.31	0.33

Note: N=5,505; results are weighted and adjusted for complex sampling design; t statistics in parentheses
* significant at 5%; ** significant at 1%

Table 3. Regression coefficients of self-rated health in 2008 on perceived neighborhood environment, psycho-socio-economic resources, and health behaviors, and self-rated health in 2006

	(1)	(2)	(3)	(4)	(5)	(6)
Self-rated health 2006	0.65**	0.62**	0.60**	0.60**	0.61**	0.58**
	(47.41)	(47.65)	(44.04)	(45.58)	(47.76)	(44.37)
Perceived neighborhood disorder	-0.04**	-0.03**	-0.03**	-0.02*	-0.03**	-0.02*
	(4.16)	(2.92)	(2.80)	(2.13)	(2.95)	(2.34)
Perceived neighborhood cohesion	0.03*	0.03*	0.01	0.00	0.02	-0.00
	(2.49)	(2.24)	(0.71)	(0.23)	(1.97)	(0.39)
Education		0.01	0.01	0.01	0.01	0.00
		(1.98)	(1.04)	(1.16)	(1.60)	(0.55)
Household income (log)		0.02*	0.02	0.02	0.02	0.02
		(2.02)	(1.41)	(1.62)	(1.95)	(1.33)
Household assets (log)		0.02**	0.01*	0.01**	0.01**	0.01*
		(3.54)	(2.53)	(2.68)	(3.17)	(2.08)
Working parttime		-0.01	-0.02	-0.00	-0.02	-0.02
		(0.16)	(0.45)	(0.06)	(0.51)	(0.59)
Not working		-0.07	-0.07*	-0.07	-0.08*	-0.07*
		(1.92)	(2.05)	(1.82)	(2.15)	(2.17)
Married or partnered			0.02			0.01
			(0.67)			(0.16)
Leisure activities			0.01			0.00
			(1.35)			(0.06)
Social integration			0.06**			0.04*
			(3.36)			(2.62)
Contact			0.03*			0.02
			(2.34)			(2.00)
Social support			0.15**			0.06
			(3.98)			(1.67)
Psychological resources				0.16**		0.12**
				(7.62)		(5.84)
Smoking					-0.09	-0.07
					(1.83)	(1.41)
Problem drinking					-0.00	0.01
					(0.02)	(0.22)
Moderate exercise					0.05**	0.04**
					(5.00)	(3.66)
Age	-0.00**	-0.00	-0.00*	-0.00	-0.00	-0.00*
	(3.11)	(1.22)	(2.12)	(1.86)	(1.22)	(2.37)
Female	0.02	0.03	0.01	0.02	0.04	0.01
	(0.67)	(1.48)	(0.32)	(0.96)	(1.89)	(0.53)
Black	-0.06	0.01	-0.01	-0.01	0.01	-0.02
	(1.18)	(0.14)	(0.22)	(0.16)	(0.20)	(0.41)
Hispanic	-0.20**	-0.10	-0.12	-0.12	-0.12	-0.14*
	(3.03)	(1.56)	(1.74)	(1.83)	(1.82)	(2.09)
Other race	-0.18	-0.17	-0.14	-0.14	-0.18	-0.14
	(1.68)	(1.62)	(1.33)	(1.38)	(1.72)	(1.36)
Constant	1.30**	0.67**	0.43	1.08**	0.66**	0.91**
	(9.14)	(3.39)	(1.94)	(5.60)	(3.45)	(4.10)
R-squared	0.48	0.49	0.50	0.50	0.49	0.50

N=5,664; results are weighted and adjusted for complex sampling design; t statistics in parentheses
* significant at 5%; ** significant at 1%

Table 4. Regression coefficients of functional limitations in 2008 on perceived neighborhood environment, psycho-socio-economic resources, and health behaviors, and functional limitations in 2006

	(1)	(2)	(3)	(4)	(5)	(6)
Functional limitations 2006	0.74**	0.72**	0.71**	0.71**	0.70**	0.69**
	(51.71)	(52.09)	(49.99)	(51.44)	(50.11)	(49.16)
Perceived neighborhood disorder	0.05	0.03	0.02	0.02	0.03	0.02
	(1.46)	(0.78)	(0.52)	(0.49)	(0.84)	(0.48)
Perceived neighborhood cohesion	-0.08**	-0.08**	-0.05	-0.05*	-0.07**	-0.04
	(3.41)	(3.23)	(2.00)	(2.09)	(2.94)	(1.56)
Education		-0.02	-0.01	-0.01	-0.01	-0.01
		(1.25)	(0.62)	(0.87)	(0.91)	(0.42)
Household income (log)		-0.07*	-0.06	-0.07	-0.07*	-0.05
		(2.16)	(1.60)	(1.94)	(2.10)	(1.57)
Household assets (log)		-0.01	-0.00	-0.01	-0.01	0.00
		(0.83)	(0.09)	(0.53)	(0.56)	(0.09)
Working parttime		0.02	0.04	0.02	0.05	0.06
		(0.25)	(0.42)	(0.23)	(0.66)	(0.71)
Not working		0.30**	0.30**	0.29**	0.32**	0.31**
		(3.92)	(3.80)	(3.81)	(4.24)	(4.03)
Married or partnered			-0.07			-0.06
			(0.85)			(0.74)
Leisure activities			-0.05			-0.03
			(1.87)			(1.38)
Social integration			-0.05			-0.01
			(1.16)			(0.31)
Contact			-0.03			-0.03
			(1.08)			(0.97)
Social support			-0.28**			-0.23*
			(3.69)			(2.43)
Psychological resources				-0.17**		-0.07
				(3.45)		(1.16)
Smoking					0.14	0.11
					(1.21)	(0.97)
Problem drinking					0.08	0.08
					(0.95)	(0.99)
Moderate exercise					-0.12**	-0.11**
					(4.07)	(3.40)
Age	0.03**	0.02**	0.02**	0.02**	0.02**	0.02**
	(7.67)	(4.08)	(4.17)	(4.24)	(3.92)	(4.00)
Female	0.18**	0.14*	0.18**	0.17**	0.14*	0.17**
	(3.12)	(2.47)	(3.20)	(2.93)	(2.38)	(3.09)
Black	-0.14	-0.24*	-0.24*	-0.23*	-0.24*	-0.25*
	(1.21)	(2.22)	(2.20)	(2.08)	(2.19)	(2.20)
Hispanic	0.22	0.05	0.05	0.06	0.06	0.06
	(1.98)	(0.37)	(0.37)	(0.46)	(0.52)	(0.51)
Other race	0.14	0.12	0.07	0.09	0.14	0.09
	(0.79)	(0.76)	(0.40)	(0.56)	(0.89)	(0.52)
Constant	-0.90**	0.85	1.52**	0.48	1.07*	1.51*
	(3.36)	(1.84)	(3.39)	(0.99)	(2.25)	(2.66)
R-squared	0.60	0.60	0.61	0.61	0.61	0.61

N=5,669; results are weighted and adjusted for complex sampling design; t statistics in parentheses
* significant at 5%; ** significant at 1%