



Neighborhood residential segregation and mental health: A multilevel analysis on Hispanic Americans in Chicago

Min-Ah Lee ^{a,b,*}

^aThe Institute for Social Development and Policy Research, Seoul National University, Korea

^bDuksung Women's University, Korea

ARTICLE INFO

Article history:

Available online 7 April 2009

Keywords:

Chicago
Mental health
Hispanic Americans
Neighborhood residential segregation
Social capital

ABSTRACT

Compared with the relationship between neighborhood-level residential segregation and physical health of Hispanic Americans, less is known about how neighborhood residential segregation affects mental health. This study examines if, and how, neighborhood residential segregation is associated with the mental health of Puerto Rican and Mexican Americans in Chicago. Multilevel analyses reveal that neighborhood residential segregation is positively associated with depressive symptoms and anxiety in both groups. Neighborhood segregation, however, has more salient effects on the mental health of Mexican Americans. For Puerto Rican Americans, the effects of neighborhood segregation on mental health become nonsignificant after controlling for neighborhood-level income and individual-level covariates, whereas neighborhood segregation is strongly associated with the mental health of Mexican Americans even after controlling for other covariates. These findings show that living in a Mexican American-dominated community is not beneficial to mental health, in contrast to findings for physical health shown in previous studies.

© 2009 Elsevier Ltd. All rights reserved.

Introduction

The Hispanic Paradox, referring to the relative health advantages of Hispanic Americans, has been investigated for a decade as an unusual phenomenon in the United States. It has been observed that Hispanic Americans have better health and lower mortality than other groups of comparable socioeconomic standing (Markides & Coreil, 1986). Although a recent work indicates that the Hispanic Paradox is due to the 'salmon effect,' referring to the return migration effect of unhealthy people (Palloni & Arias, 2004), several studies have shown that Hispanic Americans, especially Mexican Americans, still have health advantages in terms of morbidity as well as mortality (Cagney & Browning, 2004; Eschbach, Ostir, Patel, Markides, & Goodwin, 2004; Rogers, Hummer, & Nam, 2000).

Recently, neighborhood residential segregation has been considered an important key that may explain the health advantages. Hispanic concentration in a neighborhood protects against the deleterious effects of disadvantaged environments (Eschbach et al., 2004; LeClere, Rogers, & Peters, 1997). The research shows that Mexican Americans, especially in Hispanic/Mexican-dominated neighborhoods, have lower mortality (Huie, Hummer, &

Rogers, 2002; LeClere et al., 1997), and disease prevalence (Eschbach et al., 2004), and better physical (Lee & Ferraro, 2007), and self-rated health (Patel, Eschbach, Rudkin, Peek, & Markides, 2003) than those living in areas where their ethnic group comprises a small minority.

It is, however, elusive how neighborhood segregation affects mental health. Few studies examine variability and heterogeneity among Hispanic Americans, but the present study examines how neighborhood segregation influences mental health among Puerto Rican and Mexican Americans in Chicago. Is living in a Puerto Rican or Mexican American-dominated community good for the mental health of each group, and how? If not, why?

Puerto Rican and Mexican American health: good or bad?

Careful analysis of the Hispanic Paradox in the United States shows that treating Hispanic Americans as a homogeneous group is a major flaw (Eschbach et al., 2004; Palloni & Arias, 2004). Particularly, it is clear that Puerto Rican Americans are one of the ethnic groups with the worst health overall. The Hispanic Paradox was derived primarily from observations about Mexican Americans.

Mexican health advantages include such diverse health dimensions as lower rates of adult mortality (Eschbach et al., 2004; Rogers et al., 2000), renal disease (Rodriguez, Hernandez, O'Hare, Glidden, & Perez-Stable, 2004), hypertension (Richardson & Piepho,

* Tel.: +82 10 3380 2034.

E-mail address: minahlee@gmail.com

2000), and asthma (Homa, Mannino, & Lara, 2000). By contrast, Puerto Rican Americans manifest poorer health. Compared with Mexican Americans, Puerto Rican Americans have higher rates of infant mortality, neonatal mortality, and low birthweight (US Department of Health and Human Services, 2004). The disadvantage in early life extends into adulthood as well, with higher rates of renal disease (Rodriguez et al., 2004), hypertension (Richardson & Piepho, 2000), and asthma (Homa et al., 2000). Indeed, accumulated evidence shows that Puerto Rican Americans suffer a substantial health disadvantage, rendering most generalizations about 'Hispanic health' misleading (Weinick, Jacobs, Stone, Ortega, & Burstin, 2004).

Evidence concerning differences in mental health between Puerto Rican and Mexican Americans is, however, equivocal. Although a few studies have shown that Mexican Americans fare better than or similar to Whites and/or African Americans in terms of psychological well-being (Bratter & Eschbach, 2005; Harris, Edlund, & Larson, 2005), considerable evidence shows that Mexican, as well as Puerto Rican Americans, have significantly poorer mental health in general (Escalante, del Rincón, & Mulrow, 2000; Lopez & Stanton-Salazar, 2001).

Mexican Americans are more likely to have depression (Gonzalez, Haan, & Hinton, 2001) and cognitive impairment than Whites (Espino, Lichtenstein, Palmer, & Hazuda, 2001). Also, Puerto Rican Americans have been observed to have higher distress (Bratter & Eschbach, 2005) and depression scores than Whites (Falcon & Tucker, 2000). Bassford (1995) shows that both Puerto Rican and Mexican American elders have a higher prevalence of diabetes and depression compared with other racial/ethnic groups. Although a few studies provide inconsistent results (Bratter & Eschbach, 2005; Harris et al., 2005) and the psychological well-being of Mexican Americans can be conditioned by generational status (Gonzalez et al., 2001), it seems clear that Mexican American health advantages are not widely demonstrated in mental health dimensions and Puerto Rican Americans have worse mental and physical health than other groups, overall.

Residential segregation and Hispanic American health

Residential segregation of racial/ethnic minorities is widely observed throughout the world (Burholt, 2004; Johnston, Poulsen, & Forrest, 2007). Racial/ethnic minorities are concentrated in certain geographic places by social inequality such as racism and housing discrimination (Betancur, 1996; Emerson, Yancey, & Chai, 2001). Formation of residential segregation is, however, also affected by preference or a desire to live with the same racial/ethnic members (Clark, 1992). Immigrants are more likely to choose to live in their ethnic community to facilitate communication with ethnic members and sustain the ethnic network. Residential segregation in many Hispanic communities in the United States is caused largely by the inflow of immigrants into the same area, helping to connect other immigrants to the ethnic community (Alba & Nee, 1997).

In this sense, effects of residential segregation on health can be complicated. Evidence shows that segregation has deleterious effects on health, including mortality (e.g., Jackson, Anderson, Johnson, & Sorlie, 2000), obesity (Chang, 2006), and other health risks (e.g., Lopez, 2002). Yet, beneficial effects of segregation on Hispanic health have been recently observed in health research. The inconsistent findings imply that segregation effects differ across ethnic and geographical contexts.

The salubrious effect of neighborhood residential segregation on physical health can be explained by one of two mechanisms: the healthy migrant effect or the role of the ethnic community. Studies supporting the healthy migrant effect insist that the real cause of Hispanic health advantage is the concentration of selected healthy

migrants in the community (Huie et al., 2002), or return migration of unhealthy migrants (Palloni & Arias, 2004). It is likely that healthy immigrants successfully migrate and settle in the host country. Empirical evidence, however, is inconsistent (e.g., Abraido-Lanza, Dohrenwend, Ng-Mak, & Turner, 1999). Also, high ethnic density in neighborhoods is still beneficial after controlling for individual nativity (Patel et al., 2003) and even more beneficial for native born Mexican Americans (Lee & Ferraro, 2007).

An alternative theoretical framework is drawn by focusing on the role of the ethnic community and exchange of social capital. For some Hispanic groups, family and ethnic networks play a central role in migration processes (Kandel & Massey, 2002), thus the ethnic community becomes the center where exchange of social capital occurs. According to Portes (1998), ethnic communities with strong ties provide social capital to ethnic members. If more social capital is available in ethnically dominated neighborhoods, segregation can also benefit health because it leads to the flow of informal health care and resources. The social context into which the immigrants settle plays a critical role in their access to health knowledge and services and the availability of informal networks for providing care (LeClere, Jensen, & Biddlecom, 1994).

Compared with physical health, it is, however, less clear if neighborhood segregation has salubrious effects on the mental health of Hispanic groups. There are few studies demonstrating the protective effect of segregation on the mental health of Mexican Americans (Ostir, Eschbach, Markides, & Goodwin, 2003). Most studies on neighborhoods and the mental health of Hispanic or other groups examine how neighborhood quality is associated with mental health, showing harmful effects of neighborhood disadvantage (Hill & Angel, 2005). Neighborhood disadvantage significantly influences psychological distress of Hispanic adolescents (Bámaca, Umaña-Taylor, Shin, & Alfaro, 2005), childhood stressful events, and externalizing behaviors (Roosa et al., 2005). Espino et al. (2001) found that living in barrio neighborhoods relative to transitional and suburban areas significantly affects the prevalence of cognitive impairment of Mexican Americans, but the study measures neighborhood quality including socioeconomic status and cultural assimilation, not segregation.

Migration and Chicago contexts

There are notable differences in the migration experiences of Puerto Rican and Mexican Americans. Given that citizenship is not an issue for Puerto Rican Americans, as it is for Mexican Americans, family and social networks are more important for Mexicans' migration decision and adjustment, probably also for life after settlement (Kandel & Massey, 2002). Indeed, Mexican Americans often obtain important assistance from family and ethnic members during immigration and settlement periods, and geographic concentration fosters resource exchange in meeting immigrant needs (Alba & Nee, 1997). Given this different migration context, it is likely that Mexican Americans have strong ethnic ties and networks.

In Chicago, early settlements of Puerto Rican and Mexican Americans were affected by places of employment and housing discrimination, and they settled in different clusters (Betancur, 1996; De Genova & Ramos-Zayas, 2003). Migration of Mexican Americans began much earlier than that of Puerto Rican Americans. Puerto Rican Americans started arriving in late 1940s while Mexican American migration began early in the 20th century (De Genova & Ramos-Zayas, 2003). This might have affected current population sizes of the two groups in Chicago. According to the census, the population size of Mexican Americans in Chicago was almost 4 times and 7 times the size of Puerto Rican Americans in 1990 and 2000, respectively. Also, Puerto Rican and Mexican Americans shared social and physical spaces in the early stage of

Puerto Rican migration, but Puerto Rican Americans occupied separate social and physical places in the 1950s and 1960s (Betancur, 1996). Yet, due to the overwhelming migration of Mexican Americans and relatively low migration of Puerto Rican Americans, numbers of Mexican Americans had already overtaken Puerto Rican Americans in some Puerto Rican neighborhoods in 1990 and by 2000, Puerto Rican Americans were no longer the majority in any Puerto Rican neighborhoods (De Genova & Ramos-Zayas, 2003).

Residential isolation

It is noteworthy that most previous researchers have focused on one dimension of residential segregation, dissimilarity, measuring to what extent two groups are evenly distributed in a geographical area (see Massey & Denton, 1988 for other dimensions of segregation). Acevedo-Garcia, Lochner, Osypuk, & Subramanian, (2003) point out that health research has largely overlooked the complexity of residential segregation. Some studies include only the dissimilarity index and lack a conceptual justification for focusing on dissimilarity (Acevedo-Garcia et al., 2003). Compared with other research areas, health researchers have just recently begun to measure other dimensions such as concentration (i.e., the relative amount of physical space occupied by a group) or isolation (Acevedo-Garcia, 2001; Chang, 2006).

As the indicator of residential segregation, isolation will be measured in this study. The isolation index measures 'the extent to which a member of a racial/ethnic group is likely to be in contact with members of the same group (as opposed to members of other groups)' (Acevedo-Garcia, 2001, p. 736). The isolation index indicates how much a certain group is isolated from other groups so that a greater isolation score means higher probability that the members of the group will meet their own group members. Isolation is a useful index to capture the degree of proximity to members in the same group. Also, dissimilarity is less associated with neighborhood characteristics and socioeconomic status indicators than other dimensions (Acevedo-Garcia et al., 2003). Denton (1994) shows that dissimilarity is significantly related to only a few indicators of housing quality, neighborhood quality, and socioeconomic status, while isolation has stronger associations with the indicators. Moreover, even if a group is evenly distributed across a geographical area, leading to low dissimilarity, it may have a fair amount of contact with group members, leading to moderate/high isolation (Chang, 2006).

Methods

Data

The data for this study are drawn from two sources: (1) Midlife Development in the United States (MIDUS): A Survey of Minority Groups in Chicago and New York City, 1995–1996 and (2) the 1990 US Census Summary Tape File 3. A stratified random sampling procedure with fixed quotas for ethnicity, gender, age, and labor force status was used for the survey. Eligible respondents were identified using a two-stage sampling procedure combining identification of the 1990 census block groups within preselected strata according to ethnic composition and quota sampling of qualified respondents (Hughes, 2001). By the sampling method, the survey could collect minority residents in various neighborhoods from low to highly ethnically composed areas. Data are analyzed from the Chicago sample because the focus of this study is on Puerto Rican and Mexican Americans. Mexican Americans were not interviewed in New York. The Chicago sample is unusual in that it collected

information on the two biggest Hispanic groups in Chicago based on their communities, and is useful for a comparative study.

The census information drawn from the Summary Tape File 3 contains information for measuring neighborhood-level variables. The census data and the survey were linked by census tract and block codes recorded in the data sets. Among the 400 respondents in Chicago, 167 Puerto Rican Americans are nested in 34 neighborhoods, with a mean of 4.9 cases per neighborhood; 233 Mexican Americans are nested in 43 neighborhoods, with a mean of 5.4 cases per neighborhood.

Measurement

Definition of neighborhood

Defining neighborhood is not a simple issue. Many empirical studies examining neighborhood effects have used geographic units defined for administrative purposes. Census tracts and electoral wards are frequently used definitions in the United States and the United Kingdom, respectively (Kawachi & Berkman, 2003). Other international studies also have used units defined by governments (e.g., Sundquist et al., 2006 for Sweden).

Although census tracts, in the case of the United States, can be the best option available for empirical studies that do not focus on the definition of neighborhood itself, there might be disagreement about using census tract boundaries to define neighborhoods. As Flowerdew, Manley, & Sabel (2008) argue, there is little reason to expect neighborhoods to follow administrative boundaries. Moreover, internal homogeneity and resident identification are meaningful to draw neighborhood boundaries (Flowerdew et al., 2008).

This study uses 'neighborhood clusters' as neighborhood boundaries. Neighborhood clusters (NCs), defined by the research team of the Project on Human Development in Chicago Neighborhoods (PHDCN), were the sampling units for the PHDCN Community Survey; NCs consist of one or more geographically contiguous census tracts. Chicago's 865 inhabited census tracts were aggregated to form 343 NCs (Sampson, Raudenbush, & Earls, 1997). NCs are based on census tracts, but they are also defined by considering not only ecologically clear boundaries such as parks but also internal homogeneity by a cluster analysis of census data (Sampson et al., 1997), providing more reasonable units as neighborhoods. A few studies examining neighborhood effects in Chicago have used the NCs as neighborhood boundaries (Cagney & Browning, 2004; Lee & Ferraro, 2007). Although resident identification was not considered to define the boundaries, the NCs are a good alternative as the definition of neighborhood for Chicago.

Dependent variables, mental health

Depressive symptoms are assessed with seven items based on the Diagnostic and Statistical Manual of Mental Disorders (DSM-III-R) (American Psychiatric Association, 1987). Respondents were asked if they had the following symptoms over two weeks in the past 12 months: (a) feel more tired or low on energy; (b) lose appetite; (c) have more trouble falling asleep; (d) have more trouble concentrating; (e) lose interest in most things; (f) feel down on yourself, no good, or worthless; (g) think a lot about death.

Anxiety is measured using three questions about respondents' worry during the past 12 months. The first question asks if respondents thought that they worry more than most people in the same situation, less than, or about the same as most people. Responses range from do not worry at all (1) to worry more than most people (4). The second question asks if they worried less than a half day, about half the day, most days, just about every day, or every day. The last question asks if the worry usually lasted less than half the day, about half the day, most of the day, or all day long

on days respondents worried. Scores of the three questions are aggregated so that greater values indicate greater anxiety. Log transformation is used to fix the skewed distribution for both outcomes. The outcomes also have good reliability scores ($\alpha = 0.761$ for depressive symptoms and $\alpha = 0.844$ for anxiety).

Ecological variables

Residential isolation is measured as

$$xP_x^* = \sum_{i=1}^n \frac{[x_i]}{[X]} \left[\frac{[t_i]}{[T]} \right] \quad (1)$$

where n is the number of blocks in a neighborhood, x_i and t_i are the population size of the ethnic group of interest and the total population in block i respectively, and X represents the total population of the ethnic group in the neighborhood as a whole (Massey & Denton, 1988). Isolation indices are estimated separately for two ethnic groups: Puerto Rican and Mexican American. In addition to the segregation measure, it is important to control for neighborhood economic status. Median family income in the neighborhood was measured as the log of the weighted mean of median family income in each NC.

Individual-level covariates

Generational status is a binary variable: first generation (0); second- or later-generation (1). As individual-level demographic factors, education (no high school diploma vs. high school graduates), gender (male vs. female), and marital status (married vs. other) are also binary variables. Age is measured in years, and family income ranges from <\$10,000 (1) to >\$75,000 (5). Acculturation was measured by asking in what language respondents usually think

to themselves. Responses range from only Spanish (1), to only English (5), with higher scores indicating greater acculturation.

A physical health measure is also included: acute physical symptoms. Acute physical symptoms is measured using six items, revised and selected from the 54 items developed by Pennebaker (1982), with respondents indicating the frequency of occurrence for each symptom in the past 3 months: (a) headaches; (b) pains in heart or chest; (c) nausea or upset stomach; (d) hot or cold spells; (e) feeling weak in parts of one's body; (f) pains in the lower back. The response categories for each item are never (1) to very often (5). Scores of the six items were summed to form an index, which manifests fairly high reliability ($\alpha = 0.85$). This index is included to test if segregation has significant effects on mental health even after controlling for physical health problems.

Analytic plan

Multilevel statistical models are used to estimate parameters given the two-level hierarchical structure of the data. The level 1 model is written as

$$Y_{ij} = \beta_{0j} + \sum_q \beta_{qj} X_{qij} + \varepsilon_{ij} \quad (2)$$

where Y_{ij} is a health measure for individual respondent i in NC j ; β_{0j} is the intercept; X_{qij} is the value of covariate, q ; and β_{qj} is the coefficient of that covariate.

The level-2 model based on the hypotheses of this study is written as

$$\beta_{0j} = r_{00} + r_{01} W_{1j} + r_{02} W_{2j} + u_{0j} \quad (3)$$

Table 1

Means and standard deviations of individual and neighborhood-level variables.

	Range	Total ($N = 400$) ^a	Puerto Rican Americans ($N = 167$) ^a	Mexican Americans ($N = 233$) ^a
<i>Dependent variable</i>				
Depressive symptoms ^b (Cronbach's alpha = 0.761)	0–2.079	0.358 ^c (0.713)	0.486 (0.815)	0.265** (0.613)
Anxiety ^b (Cronbach's alpha = 0.844)	0–2.565	1.375 (0.692)	1.456 (0.729)	1.316+ (0.659)
<i>Independent variables</i>				
<i>Neighborhood-level variables</i>				
Puerto Rican isolation	0.001–0.534	0.153 (0.156)	0.201 (0.163)	
Mexican isolation	0.005–0.915	0.299 (0.229)		0.350 (0.252)
Weighted mean of median family incomes ^b	9.235–10.787	10.202 (0.274)	10.222 (0.278)	10.188 (0.271)
<i>Individual-level variables</i>				
Age	21–83	40.355 (12.188)	41.299 (12.882)	39.678 (11.647)
High school graduate	0 (No)–1 (Yes)	0.425	0.551	0.335***
Male	0 (Female)–1 (Male)	0.51	0.491	0.524
Family income ^d	1 (<\$10,000)–5 (>\$75,000)	2.246 (0.821)	2.286 (0.965)	2.217 (0.701)
Marital status	0 (Otherwise)–1 (Married)	0.663	0.551	0.745***
Generation (US born = 1)	0 (First generation)–1 (Second- or later-generation)	0.218	0.383	0.099***
Acculturation	1 (Only Spanish)–5 (Only English)	2.158 (1.203)	2.743 (1.177)	1.738*** (1.036)
Acute physical symptoms ^b (Cronbach's alpha = 0.851)	1.792–3.401	2.138 (0.373)	2.237 (0.425)	2.067*** (0.313)

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

^a The number of cases may vary due to missing data.

^b Log transformation is used.

^c Numbers in parentheses are standard deviations. Standard deviations of binary variables are excluded.

^d The missing values of family income were assigned by the regression imputation method.

where r_{01} is the neighborhood-level coefficient of residential isolation; W_{1j} is the covariate, residential isolation; r_{02} is the coefficient of neighborhood-level income; W_{2j} is the covariate, neighborhood-level income.

Results

Table 1 presents descriptive statistics for all variables, with χ^2 and t tests for individual-level variables comparing the two groups. The groups differ significantly on depressive symptoms and anxiety at 1% and 10% probabilities of a random association, respectively. Puerto Rican respondents have poorer mental health than Mexican Americans. Mexican Americans are less likely than Puerto Rican Americans to be high school graduates, born in the US (mainland), and acculturated, but they are more likely to be married. In terms of physical health, Puerto Rican Americans have significantly more acute physical symptoms than Mexican Americans.

Residential isolation and mental health of Puerto Rican Americans

Tables 2 and 3 present the results of multilevel analyses on depressive symptoms and anxiety of Puerto Rican Americans, respectively. Model 1 is the unconditional model in which the variance component for the intercept (between neighborhoods variance) is estimated without including any control variables. Model 2 includes neighborhood-level isolation only. Model 3 shows if the effect of residential isolation changes after controlling for

neighborhood-level income. Models 4 and 5 include individual-level variables.

In model 2 of Table 2, isolation is positively associated with depressive symptoms of Puerto Rican Americans. Puerto Rican Americans in highly segregated communities are more likely to have depressive symptoms than their counterparts. This isolation effect is still significant after controlling for neighborhood-level income in model 3. Isolation, however, is not significant after controlling for individual-level variables in the final model.

In the final model, family income and acute physical symptoms are significantly associated with depressive symptoms. Puerto Rican respondents with higher family income and fewer acute physical symptoms are less likely to have depressive symptoms than their counterparts. Variance components for the intercept are not significant across all models, which indicates that there is no statistically significant difference in depressive symptoms of Puerto Rican Americans across neighborhoods.

Table 3 presents results with similar patterns to Table 2. Isolation is significantly and positively associated with anxiety of Puerto Rican Americans in models 2 and 3, but it becomes nonsignificant after controlling for individual-level variables. Among individual-level variables, family income is negatively associated with anxiety in model 4. Yet, it becomes nonsignificant after controlling for acute physical symptoms. It seems that physical health, acute physical symptoms, explains most individual-level variance. The variance components for the intercept are estimated as zero in models 2–5. Zero variance estimates indicate that between-group variance (i.e., neighborhood

Table 2

Multilevel analyses of depressive symptoms for Puerto Rican Americans in Chicago ($N = 167$).^a

	Depressive symptoms				
	Model 1	Model 2	Model 3	Model 4	Model 5
<i>Fixed effects</i>					
Intercept	0.503*** ^b (0.081)	0.219+ (0.110)	3.315 (3.117)	−1.428 (3.112)	−2.021 (2.754)
<i>Neighborhood-level variables</i>					
Puerto Rican isolation		1.384** (0.429)	1.173* (0.505)	0.928+ (0.492)	0.017 (0.460)
Income			−0.298 (0.300)	0.170 (0.300)	0.038 (0.268)
<i>Individual-level variables</i>					
Age				0.141+ (0.072)	0.003 (0.005)
High school graduate				0.120 (0.128)	0.012 (0.114)
Male				−0.135 (0.126)	−0.020 (0.112)
Family income				−0.290*** (0.078)	−0.157* (0.074)
Marital status (married = 1)				−0.031 (0.141)	−0.101 (0.124)
Generation (US born = 1)				−0.092 (0.150)	−0.042 (0.132)
Acculturation				0.059 (0.074)	0.046 (0.055)
Acute physical symptoms					1.034*** (0.149)
<i>Random effects</i>					
	Variance components				
Intercept	0.057 (0.045)	0.018 (0.032)	0.030 (0.037)	0.019 (0.031)	0.018 (0.027)
Level 1 error	0.608*** (0.073)	0.603*** (0.072)	0.595*** (0.071)	0.536*** (0.065)	0.407*** (0.050)
AIC	394.3	385.1	384.8	379.2	342.8
R^2 (level 1)				0.119	0.332

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ for comparison.

^a Number of cases may vary due to missing cases.

^b Unstandardized coefficient (standard error).

Table 3Multilevel analyses of anxiety for Puerto Rican Americans in Chicago ($N = 167$).^a

	Anxiety				
	Model 1	Model 2	Model 3	Model 4	Model 5
<i>Fixed effects</i>					
Intercept	1.458 ^{b***} (0.062)	1.197 ^{***} (0.087)	3.190 (2.409)	2.240 (2.610)	1.423 (2.399)
<i>Neighborhood-level variables</i>					
Puerto Rican isolation		1.291 ^{***} (0.336)	1.125 ^{**} (0.392)	0.803 ⁺ (0.418)	0.145 (0.403)
Income			−0.192 (0.231)	−0.092 (0.251)	−0.172 (0.231)
<i>Individual-level variables</i>					
Age				0.096 (0.064)	0.016 (0.061)
High school graduate				0.171 (0.117)	0.095 (0.109)
Male				−0.092 (0.116)	−0.003 (0.108)
Family income				−0.174 [*] (0.072)	−0.074 (0.069)
Marital status (married = 1)				0.097 (0.129)	0.016 (0.119)
Generation (US born = 1)				0.174 (0.135)	0.217 ⁺ (0.125)
Acculturation				−0.055 (0.068)	−0.051 (0.063)
Acute physical symptoms					0.789 ^{***} (0.142)
<i>Random effects</i>					
	Variance components				
Intercept	0.013 (0.024)	0.000	0.000	0.000	0.000
Level 1 error	0.519 ^{***} (0.061)	0.490 ^{***} (0.055)	0.491 ^{***} (0.055)	0.466 ^{***} (0.053)	0.392 ^{***} (0.045)
AIC	366.2	350.8	351.2	356.7	329.3
R ² (level 1)				0.102	0.244

⁺ $p < 0.1$, ^{*} $p < 0.05$, ^{**} $p < 0.01$, ^{***} $p < 0.001$ for comparison.^a Number of cases may vary due to missing cases.^b Unstandardized coefficient (standard error).

variance) is not statistically different from zero. Thus, there is no statistical difference in anxiety across Puerto Rican neighborhoods.

Residential isolation and mental health of Mexican Americans

Tables 4 and 5 present the results on depressive symptoms and anxiety of Mexican Americans, respectively. The variance component for the intercept is estimated as zero across all models for depressive symptoms in Table 4, which means that prevalence of depressive symptoms does not vary across the neighborhoods at all. In models 2 and 3, isolation is positively associated with depressive symptoms of Mexican Americans. Mexican American respondents living in highly isolated neighborhoods are more likely to have depressive symptoms than others. In contrast to Puerto Rican Americans, isolation is still strongly significant after controlling for individual-level variables in models 4 and 5.

Among individual-level variables, gender, family income, and marital status are marginally significant in model 4. Male, married, and Mexican Americans with higher family income are less likely to have depressive symptoms than their counterparts. Yet, gender and marital status are not significant after controlling for acute physical symptoms in model 5. Having acute physical symptoms is significantly associated with increased depressive symptoms.

Similar to the results of Table 4, isolation is positively associated with anxiety of Mexican Americans even after controlling for neighborhood-level income and individual-level variables. Among demographic factors, only gender is significantly associated with

anxiety in model 4, but it becomes nonsignificant after controlling for acute physical symptoms in model 5. Having acute physical symptoms is marginally positively associated with anxiety for Mexican Americans.

Interestingly, effects of isolation become stronger after controlling for acute physical symptoms for mental health of Mexican Americans. The coefficient of isolation, especially for depressive symptoms, notably increases in model 5 when acute physical symptoms is controlled. This observation implies that a deleterious effect of isolation on mental health problems was partly suppressed before controlling for physical health. We can infer that isolation is associated with fewer acute physical symptoms, which may mediate the association of the ethnic isolation with mental health problems. Note that this observation is consistent with previous studies that found beneficial effects of isolation on physical health. In sum, the study revealed the positive relationship between isolation and mental health problems more clearly by controlling the indirect beneficial effect of isolation through physical health.

Acculturation and generation on mental health are not significant at all. Acculturation is considered as an important factor associated with mental health, as a potential stressor, although there is inconsistency about the associations between being more-aculturated and depression or mental health problems (Compare Gonzalez et al., 2001 and Kaplan & Marks, 1990). Acculturation, however, is neither associated with depressive symptoms nor anxiety of Mexican Americans in this study.

Table 4
Multilevel analyses of depressive symptoms for Mexican Americans in Chicago (N = 233).^a

	Depressive symptoms				
	Model 1	Model 2	Model 3	Model 4	Model 5
<i>Fixed effects</i>					
Intercept	0.265 ^{b***} (0.041)	0.088 (0.070)	−1.417 (1.650)	−1.726 (1.778)	−4.036* (1.676)
<i>Neighborhood-level variables</i>					
Mexican American isolation		0.500** (0.160)	0.553* (0.170)	0.540** (0.173)	0.639*** (0.158)
Income			0.146 (0.160)	0.177 (0.172)	0.260 (0.157)
<i>Individual-level variables</i>					
Age				0.040 (0.043)	−0.035 (0.042)
High school graduate				0.015 (0.092)	0.003 (0.084)
Male				−0.159+ (0.085)	−0.028 (0.082)
Family income				−0.071+ (0.043)	−0.075+ (0.040)
Marital status (married = 1)				−0.189+ (0.100)	−0.135 (0.092)
Generation (US born = 1)				−0.186 (0.178)	−0.188 (0.162)
Acculturation				0.020 (0.053)	0.016 (0.049)
Acute physical symptoms					0.688*** (0.140)
<i>Random effects</i>					
	Variance components				
Intercept	0.000	0.000	0.000	0.000	0.000
Level 1 error	0.376*** (0.036)	0.362*** (0.035)	0.362*** (0.035)	0.357*** (0.035)	0.295*** (0.029)
AIC	416.8	409.0	410.0	422.1	379.8
R ² (level 1)				0.052	0.216

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ for comparison.

^a Number of cases may vary due to missing cases.

^b Unstandardized coefficient (standard error).

Discussion

Although isolation is adversely associated with mental health for both groups, the salience of the associations is distinct across the groups. For Puerto Rican Americans, isolation is not significantly associated with depressive symptoms and anxiety after controlling for individual-level variables. It appears that the mental health of Puerto Rican Americans is conditioned by individual characteristics rather than neighborhood-level features. By contrast, isolation is strongly associated with depressive symptoms and anxiety for Mexican Americans even after controlling for all other covariates. Segregation is a more salient predictor than individual-level characteristics for Mexican Americans.

Why is neighborhood segregation strongly associated with Mexican Americans only? Why is the salubrious association between segregation and Mexican American physical health not demonstrated in mental health? The distinct effects of segregation across physical and mental health for Mexican Americans seem paradoxical, and suggest complex factors influencing Mexican American health, leading to inconsistent results across health dimensions.

Social capital perspective as a potential theoretical frame merits consideration. It has been shown that social capital benefits health (Lochner, Kawachi, Brennan, & Buka, 2003) as well as other life domains, such as migration process (Phillips & Massey, 2000) and economic earnings (Aguilera & Massey, 2003). In this sense, living in an ethnic community based on strong ethnic ties may benefit its

members by providing and increasing social capital, including health resources and information (Portes, 1998). Social capital, however, has its downside as well (Portes, 1998). As a negative form of social capital, overt social control in an ethnic community restricts the scope of individual expression and freedom (Portes, 1998; Portes & Sensenbrenner, 1993). Although social control is a source of social capital and thus, functional in that it facilitates mobilizing resources and maintaining discipline of an ethnic community, it also has negative features such as exclusive identity and limited access to outside resources (Portes, 1998). Double-edged aspects of social capital in the community may lead to differential physical and mental health statuses.

As a more refined conceptualization of the two sides of social capital, 'bonding' and 'bridging' ties are noteworthy. Bonding and bridging ties are comparable to strong vs. weak ties of Granovetter (1973), but not synonymous (Ferlander, 2007). As different forms of social capital, bonding tie refers to the social network that can occur more easily among homogeneous groups, while bridging tie refers to social capital that connects heterogeneous groups, leading to obtaining information and resources for a certain achievement (Wuthnow, 2002). Although an ethnic community is likely to be considered as an entity having a bonding tie in that it is a relatively homogenous group as a whole, it can have both features because bonding and bridging ties are neither mutually exclusive nor inversely correlated (Ferlander, 2007; Putnam, 2007). For instance, co-ethnic networks in the ethnic community function as a bridging tie by connecting recent migrants from the origin country to ethnic

Table 5Multilevel analyses of anxiety for Mexican Americans in Chicago (N = 233).^a

	Anxiety				
	Model 1	Model 2	Model 3	Model 4	Model 5
<i>Fixed effects</i>					
Intercept	1.312 ^{b***} (0.051)	1.121 ^{***} (0.073)	0.760 (1.735)	1.041 (1.871)	−0.338 (2.012)
<i>Neighborhood-level variables</i>					
Mexican American isolation		0.557 ^{**} (0.170)	0.570 ^{**} (0.181)	0.466 [*] (0.186)	0.500 [*] (0.205)
Income			0.035 (0.168)	0.011 (0.181)	0.070 (0.190)
<i>Individual-level variables</i>					
Age				0.019 (0.046)	−0.032 (0.048)
High school graduate				−0.086 (0.098)	−0.078 (0.096)
Male				−0.190 [*] (0.090)	−0.113 (0.094)
Family income				−0.042 (0.046)	−0.050 (0.046)
Marital status (married = 1)				0.071 (0.107)	0.114 (0.105)
Generation (US born = 1)				−0.233 (0.187)	−0.246 (0.184)
Acculturation				0.039 (0.056)	0.038 (0.056)
Acute physical symptoms					0.366 [*] (0.158)
<i>Random effects</i>					
	Variance components				
Intercept	0.020 (0.021)	0.000	0.000 (0.014)	0.000	0.014 (0.021)
Level 1 error	0.414 ^{***} (0.042)	0.416 ^{***} (0.039)	0.418 ^{***} (0.041)	0.415 ^{***} (0.040)	0.386 ^{***} (0.040)
AIC	458.5	449.2	452.9	464.1	453.2
R ² (level 1)				−0.003	0.068

+*p* < 0.1, **p* < 0.05, ***p* < 0.01, ****p* < 0.001 for comparison.^a Number of cases may vary due to missing cases.^b Unstandardized coefficient (standard error).

members who have already settled in the host country. At the same time, it also works as a bonding tie by providing and enhancing strong co-ethnic identity. In this sense, ethnic minority people living in the community can be exposed to different types of social capital, bonding and bridging ties simultaneously, which may have differential and complicated impacts on physical and mental health of co-ethnic residents.

Considering previous studies showing salubrious effects of bridging ties on health (Erickson, 2003; Stafford, De Silva, Stansfeld, & Marmot, 2008), bridging tie in an ethnic community is probably beneficial to physical health by facilitating diffusion of health information and resources. Living in neighborhoods where ethnic members have high probability to meet other ethnic members may increase likelihood of obtaining informal health resources or instrumental ethnic support. Indeed, recent immigrants will be able to more easily obtain information on formal as well as informal resources accessible to them from other ethnic members as they have a certain amount of contact with other members (i.e., increased isolation level in this study).

In contrast, relevant to overt social control argued by Portes (1998), bonding tie has a negative aspect on health. Ethnic members may experience excessive bonding tie, demanding conformity and restricting individuals, which can be deleterious to mental health. It should be noted that bonding tie is not always deleterious to ethnic members (Nannestad, Svendsen, & Svendsen, 2008; Ryan, Sales, Tilki, & Siara, 2008), in that it provides emotional and instrumental supports, leading to better psychological well-

being (Ferlander, 2007). Nevertheless, a strong bonding tie is also a source of strain, leading to conflicts, envy and disappointments, and resulting in negative effects on health (Ferlander, 2007, p. 121). Ethnic minorities depending on a strong bonding tie are socially disadvantaged (Wierzbicki, 2004) and have worse mental health (Mitchell & LaGory, 2002; Stafford et al., 2008).

In addition, Fagg, Curtis, Stansfeld, & Congdon (2006) provide insightful findings potentially relevant to the bonding tie effect and the findings of the present study. In their study, beneficial effects of ethnic density on health do not manifest in areas of very high ethnic concentration. High ethnic density is less beneficial to health compared with moderate ethnic density (Fagg et al., 2006). It is likely that people in areas of high ethnic concentration have excessive bonding ties compared with other areas, which may suppress beneficial ethnic density effect or manifest a negative effect of bonding tie on ethnic members. Concerning the present study, we need to pay attention to difference in population sizes of the two groups in Chicago. Indeed, Mexican Americans in Chicago are more likely to live in neighborhoods of very high isolation compared with Puerto Rican Americans. Negative effects of bonding tie may manifest in highly ethnically segregated areas when segregation or ethnic density is over a certain critical level. This might provide a potential answer to why the significant relationship between segregation and mental health problems is not detected for Puerto Rican Americans in Chicago.

The limitations of the study should be mentioned. First, this research was limited to an examination of Puerto Rican and

Mexican Americans in Chicago. The findings are not generalized to Puerto Rican and Mexican populations in the United States. Further study should be conducted for areas of very high Puerto Rican segregation to examine if and how the segregation is associated with the mental health of Puerto Rican Americans. Second, the small sample size limited the number of covariates in model specifications due to insufficient statistical power. Although this does not mean that the fixed effects obtained in the study are not robust, a larger sample size would better capture differential random effects across neighborhoods.

Finally, this study does not measure social capital directly. This study proposes to explore applicability of a social capital perspective on the health dynamics of ethnic minority groups and does not examine if and how social control or the bonding tie of an ethnic community affects mental health. This study, however, urges recognition of two sides of community-level effects on health, just as two sides of social capital are recognized in existing literature. Concrete mechanisms of community-level effects inevitably include social ties and, therefore, both sides of social capital will have significant implications for health research.

The present study extends previous research on association between neighborhood segregation and Hispanic health to mental health. In contrast to the existing findings on Mexican American health, segregation is adversely associated with the mental health of Mexican Americans in the findings. Moreover, segregation is a more salient predictor for Mexican than for Puerto Rican Americans. By revealing that living in an ethnic community is associated with poorer mental health, this paper expands a theoretical frame to explain Hispanic health dynamics in the United States.

Acknowledgements

I wish to thank Robert Sampson and members of the Project on Human Development in Chicago Neighborhoods for providing the frame of Neighborhood Clusters in Chicago. I also appreciate the comments on an earlier version of this paper by Kenneth F. Ferraro, Ann Howell, Sandra Barnes, Bruce Craig, Jeong-han Kang, and John Stahura. The MIDUS Data for this study were made available by the Inter-university Consortium for Political and Social Research, Ann Arbor, MI. Neither the collector of the original data nor the Consortium bears any responsibility for the analyses or interpretations presented here.

References

- Abraido-Lanza, A. F., Dohrenwend, B. P., Ng-Mak, D. S., & Turner, J. B. (1999). The Latino mortality paradox: a test of the 'salmon bias' and healthy migrant hypotheses. *American Journal of Public Health*, 89(10), 1543–1548.
- Acevedo-Garcia, D. (2001). Zip code-level risk factors for tuberculosis: neighborhood environment and residential segregation in New Jersey, 1985–1992. *American Journal of Public Health*, 91(5), 734–741.
- Acevedo-Garcia, D., Lochner, K. A., Osypuk, T. L., & Subramanian, S. V. (2003). Future directions in residential segregation and health research: a multilevel approach. *American Journal of Public Health*, 93(2), 215–221.
- Aguilera, M. B., & Massey, D. S. (2003). Social capital and the wages of Mexican migrants: new hypotheses and tests. *Social Forces*, 82(2), 671–701.
- Alba, R., & Nee, V. (1997). Rethinking assimilation theory for a new era of immigration. *International Migration Review*, 31(4), 826–874.
- American Psychiatric Association. (1987). *Diagnostic and statistical manual of mental disorder*. Washington, D.C.: American Psychiatric Association.
- Bámaca, M. Y., Umaña-Taylor, A. J., Shin, N., & Alfaro, E. C. (2005). Latino adolescents' perception of parenting behaviors and self-esteem: examining the role of neighborhood risk. *Family Relations*, 54(5), 621–632.
- Bassford, T. (1995). Health status of Hispanic elders. *Clinics in Geriatric Medicine*, 11(1), 26–38.
- Betancur, J. J. (1996). The settlement experience of Latinos in Chicago: segregation, speculation, and the ecology model. *Social Forces*, 74(4), 1299–1324.
- Bratter, J. L., & Eschbach, K. (2005). Race/ethnic differences in nonspecific psychological distress: evidence from the national health interview survey. *Social Science Quarterly*, 86(3), 620–644.
- Burholt, V. (2004). The settlement patterns and residential histories of older Gujaratis, Punjabis and Sylhetis in Birmingham, England. *Ageing and Society*, 24, 383–409.
- Cagney, K. A., & Browning, C. R. (2004). Exploring neighborhood-level variation in asthma and other respiratory diseases – the contribution of neighborhood social context. *Journal of General Internal Medicine*, 19(3), 229–236.
- Chang, V. W. (2006). Racial residential segregation and weight status among US adults. *Social Science & Medicine*, 63(5), 1289–1303.
- Clark, W. A. V. (1992). Residential preferences and residential choices in a multi-ethnic context. *Demography*, 29(3), 451–466.
- De Genova, N., & Ramos-Zayas, A. Y. (2003). *Latino crossings: Mexicans, Puerto Ricans, and the politics of race and citizenship*. New York and London: Routledge.
- Denton, N. A. (1994). Are African Americans still hypersegregated? In R. D. Bullard, J. E. Grigsby, C. Lee, & J. R. Feagin (Eds.), *Residential apartheid: the American legacy* (pp. 49–81). Los Angeles: CAAS Publications.
- Emerson, M. O., Yancey, G., & Chai, K. J. (2001). Does race matter in residential segregation? Exploring the preferences of White Americans. *American Sociological Review*, 66(6), 922–935.
- Erickson, B. (2003). Social networks: the value of variety. *Contexts*, 2, 25–31.
- Escalante, A., del Rincón, I., & Mulrow, C. D. (2000). Symptoms of depression and psychological distress among Hispanics with rheumatoid arthritis. *Arthritis Care and Research*, 13(3), 156–167.
- Eschbach, K., Ostir, G. V., Patel, K. V., Markides, K. S., & Goodwin, J. S. (2004). Neighborhood context and mortality among older Mexican Americans: is there a barrio advantage? *American Journal of Public Health*, 94(10), 1807–1812.
- Espino, D. V., Lichtenstein, M. J., Palmer, R. F., & Hazuda, H. P. (2001). Ethnic differences in Mini-Mental State Examination (MMSE) scores: where you live makes a difference. *Journal of the American Geriatrics Society*, 49(5), 538–548.
- Fagg, J., Curtis, S., Stansfeld, S. A., & Congdon, P. (2006). Psychological distress among adolescents, and its relationship to individual, family and area characteristics in east London. *Social Science & Medicine*, 63, 636–648.
- Falcon, L. M., & Tucker, K. L. (2000). Prevalence and correlates of depressive symptoms among Hispanic elders in Massachusetts. *Journal of Gerontology: Social Sciences*, 55(2), S108–S116.
- Ferlander, S. (2007). The importance of different forms of social capital for health. *Acta Sociologica*, 50(2), 115–128.
- Flowerdew, R., Manley, D. J., & Sabel, C. E. (2008). Neighbourhood effects on health: does it matter where you draw the boundaries? *Social Science & Medicine*, 66(6), 1241–1255.
- Gonzalez, H. M., Haan, M. N., & Hinton, L. (2001). Acculturation and the prevalence of depression in older Mexican Americans: baseline results of the Sacramento area Latino study on aging. *Journal of the American Geriatrics Society*, 49(7), 948–953.
- Granovetter, M. S. (1973). The strength of weak ties. *American Journal of Sociology*, 78(6), 1360–1380.
- Harris, K. M., Edlund, M. J., & Larson, S. (2005). Racial and ethnic differences in the mental health problems and use of mental health care. *Medical Care*, 43(8), 775–784.
- Hill, T. D., & Angel, R. J. (2005). Neighborhood disorder, psychological distress, and heavy drinking. *Social Science & Medicine*, 61, 965–975.
- Homa, D. M., Mannino, D. M., & Lara, M. (2000). Asthma mortality in U.S. Hispanics of Mexican, Puerto Rican, and Cuban heritage, 1990–05. *American Journal of Respiratory and Critical Care Medicine*, 161(2), 504–509.
- Hughes, D. (2001). Cultural and contextual correlates of obligation to family and community among urban black and Latino adults. In A. S. Rossi (Ed.), *Caring and doing for others* (pp. 179–224). University of Chicago.
- Huie, S. A. B., Hummer, R. A., & Rogers, R. G. (2002). Individual and contextual risks of death among race and ethnic groups in the United States. *Journal of Health and Social Behavior*, 43(3), 359–381.
- Jackson, S., Anderson, R., Johnson, N., & Sorlie, P. D. (2000). The relation of residential segregation to all-cause mortality: a study in black and white. *American Journal of Public Health*, 90(4), 615–617.
- Johnston, R., Poulsen, M., & Forrest, J. (2007). The geography of ethnic residential segregation: a comparative study of five countries. *Annals of the Association of American Geographers*, 97(4), 713–738.
- Kandel, W., & Massey, D. S. (2002). The culture of Mexican migration: a theoretical and empirical analysis. *Social Forces*, 80(3), 981–1004.
- Kaplan, M. S., & Marks, G. (1990). Adverse effects of acculturation: psychological distress among Mexican American young adults. *Social Science & Medicine*, 31(12), 1313–1319.
- Kawachi, I., & Berkman, L. F. (2003). *Neighborhoods and health*. Oxford; New York: Oxford University Press.
- LeClere, F. B., Jensen, L., & Biddlecom, A. E. (1994). Health care utilization, family context, and adaptation among immigrants to the United States. *Journal of Health and Social Behavior*, 35, 350–384.
- LeClere, F. B., Rogers, R. G., & Peters, K. D. (1997). Ethnicity and mortality in the United States: individual and community correlates. *Social Forces*, 76(1), 169–198.
- Lee, M., & Ferraro, K. F. (2007). Neighborhood residential segregation and physical health among Hispanic Americans: good, bad, or benign? *Journal of Health and Social Behavior*, 48, 131–148.
- Lochner, K. A., Kawachi, I., Brennan, R. T., & Buka, S. L. (2003). Social capital and neighborhood mortality rates in Chicago. *Social Science & Medicine*, 56(8), 1797–1805.

- Lopez, R. (2002). Segregation and black/white differences in exposure to air toxics in 1990. *Environmental Health Perspectives*, 110(2), 289–295.
- Lopez, D. E., & Stanton-Salazar, R. D. (2001). Mexican Americans: a second generation at risk. In R. G. Rumbaut, & A. Portes (Eds.), *Ethnicities: Children of immigrants in America* (pp. 57–90). University of California Press, Russell Sage Foundation.
- Markides, K. S., & Coreil, J. (1986). The health of Hispanics in the southwestern United States: an epidemiologic paradox. *Public Health Reports*, 101, 253–265.
- Massey, D. S., & Denton, N. A. (1988). The dimensions of residential segregation. *Social Forces*, 67(2), 281–315.
- Mitchell, C. U., & LaGory, J. (2002). Social capital and mental distress in an impoverished community. *City & Community*, 1, 195–216.
- Nannestad, P., Svendsen, G. L. H., & Svendsen, G. T. (2008). Bridge over troubled water? Migration and social capital. *Journal of Ethnic and Migration Studies*, 34(4), 607–631.
- Ostir, G. V., Eschbach, K., Markides, K., & Goodwin, J. S. (2003). Neighbourhood composition and depressive symptoms among older Mexican Americans. *Journal of Epidemiology and Community Health*, 57(12), 987–992.
- Palloni, A., & Arias, E. (2004). Paradox lost: explaining the Hispanic adult mortality advantage. *Demography*, 41(3), 385–415.
- Patel, K. V., Eschbach, K., Rudkin, L. L., Peek, M. K., & Markides, K. S. (2003). Neighborhood context and self-rated health in older Mexican Americans. *Annals of Epidemiology*, 13(9), 620–628.
- Pennebaker, J. W. (1982). *The psychology of physical symptoms*. New York: Springer-Verlag.
- Phillips, J. A., & Massey, D. S. (2000). Engines of immigration: stocks of human and social capital in Mexico. *Social Science Quarterly*, 81(1), 33–48.
- Portes, A. (1998). Social capital: its origins and applications in modern sociology. *Annual Review of Sociology*, 24, 1–24.
- Portes, A., & Sensenbrenner, J. (1993). Embeddedness and immigration: notes on the social determinants of economic action. *American Journal of Sociology*, 98(6), 1320–1350.
- Putnam, R. D. (2007). E pluribus unum: diversity and community in the twenty-first century. The 2006 Johan Skytte Prize Lecture. *Scandinavian Political Studies*, 30(2), 137–174.
- Richardson, A. D., & Piepho, R. W. (2000). Effect of race on hypertension and anti-hypertensive therapy. *International Journal of Clinical Pharmacology and Therapeutics*, 38(2), 75–79.
- Rodriguez, R. A., Hernandez, G. T., O'Hare, A. M., Glidden, D. V., & Perez-Stable, E. J. (2004). Creatinine levels among Mexican Americans, Puerto Ricans, and Cuban Americans in the Hispanic Health and Nutrition Examination Survey. *Kidney International*, 66(6), 2368–2373.
- Rogers, R. G., Hummer, R. A., & Nam, C. B. (2000). *Living and dying in the USA: Behavioral, health, and social differentials of adult mortality*. London: Academic Press.
- Roosa, M. W., Deng, S., Ryu, E., Burrell, G. L., Tein, J.-Y., Jones, S., et al. (2005). Family and child characteristics linking neighborhood context and child externalizing behavior. *Journal of Marriage and the Family*, 67(2), 515–529.
- Ryan, L., Sales, R., Tilki, M., & Siara, B. (2008). Social networks, social support and social capital: the experiences of recent Polish migrants in London. *Sociology—the Journal of the British Sociological Association*, 42(4), 672–690.
- Sampson, R. J., Raudenbush, S. W., & Earls, F. (1997). Neighborhoods and violent crime: a multilevel study of collective efficacy. *Science*, 277(5328), 918–924.
- Stafford, M., De Silva, M., Stansfeld, S., & Marmot, M. (2008). Neighbourhood social capital and common mental disorder: testing the link in a general population sample. *Health & Place*, 14(3), 394–405.
- Sundquist, K., Theobald, H., Yang, M., Li, X., Johansson, S.-E., & Sundquist, J. (2006). Neighborhood violent crime and unemployment increase the risk of coronary heart disease: a multilevel study in an urban setting. *Social Science & Medicine*, 62(8), 2061–2071.
- US Department of Health and Human Services. (2004). *Health, United States 2004 with chartbook on trends in the health of Americans*. Hyattsville, Maryland: U.S. Government Printing Office.
- Weinick, R. M., Jacobs, E. A., Stone, L. C., Ortega, A. N., & Burstin, H. (2004). Hispanic healthcare disparities – challenging the myth of a monolithic Hispanic population. *Medical Care*, 42(4), 313–320.
- Wierzbicki, S. (2004). *Beyond the immigrant enclave: Network change and assimilation*. New York: LFB Scholarly Publishing.
- Wuthnow, R. (2002). Religious involvement and status-bridging social capital. *Journal for the Scientific Study of Religion*, 41(4), 669–684.