Population Review
Volume 55, Number 2, 2016
Type: Article pp. 45-74

Residential Segregation and Health Outcomes in the United States: Moving Beyond Black and White

Author: Kathryn Freeman Anderson
Affiliation: Department of Sociology, University of Houston
Corresponding author: Department of Sociology, University of Houston, 3551 Cullen Blvd, PGH Building, Room 450, Houston, TX 77204-3012 (email: kateanderson@uh.edu)

Abstract

Recent research in the United States has found a strong negative association between segregation and minority health outcomes. However, few studies have been conducted which examine this relationship in light of the theoretical processes which could produce such an association. Further, the bulk of this literature is focused on the Black case with little attention as to how this may affect other racial/ethnic minority groups. Using the 2011-2012 Behavioral Risk Factor Surveillance System (BRFSS) combined with metropolitan-level data, I examine the relationship between residential segregation and poor self-rated health for the three largest racial/ethnic minority groups in the US (Blacks, Latinos and Asians), with Whites serving as a comparison group. Moreover, I analyze a variety of factors which could account for this association based on theories of segregation, including economic considerations and immigration. Overall, I find a strong association between racial residential segregation and poor self-rated health across all of the three largest racial/ethnic minority groups in the US. However, this association is partially accounted for by economic factors in the case of Black Americans and fully accounted for by immigration in the case of Asian Americans. These results suggest that segregation should be an important consideration in our understanding of minority health disparities.

Keywords

Health disparities; residential segregation; race/ethnicity

Acknowledgment

The author would like to thank Joseph Galaskiewicz, Terrence Hill, Erin Leahey and Corey Abramson for their helpful comments on earlier drafts of this paper.

Introduction

A number of studies have shown substantial disparities in health for racial and ethnic minority groups in the United States when compared with their White counterparts (Hummer et al. 1999; Hummer and Chinn 2011; Williams and Jackson 2005). Researchers in this field have considered several approaches for understanding why such health disparities exist, including differences in socioeconomic status, culture, immigration, and racism/discrimination. More recently, this research has emphasized the role of place as it relates to health and health care outcomes. Several previous studies have considered racial/ethnic residential segregation to view its impact on a variety of health indicators (Williams and Collins 2001). These researchers argue that segregation serves as a system of stratification and racial subordination which can lead to a variety of social problems, including negative health outcomes (Massey and Denton 1993; Williams and Collins 2001). However, few have undertaken to study the mechanisms at play which could produce such an association (White and Borrell 2011). Moreover, the bulk of this literature is currently focused on the case of Black Americans, with little attention to how these processes play out for other racial/ethnic urban minority groups and the urban theories of residential segregation which relate to these other groups. These limitations have prompted this analysis.

In this study, I examine the association between racial/ethnic segregation and self-rated health across several racial/ethnic minority groups. I also examine, based on theories of segregation, several factors that might account for this association. With these considerations in mind, an overarching research question that this study addresses surfaces: What is the relationship between racial/ethnic residential segregation and health? Further, what factors related to minority health can account for the relationship between residential segregation and health outcomes? To answer these questions, first, I review the empirical literature on the findings on segregation and health across the different racial/ethnic minority groups in the US. Second, I consider current theories of racial/ethnic segregation and theories of how segregation may be related to health outcomes. Finally, I describe the present study and its central findings.

Empirical findings on segregation and health

The social and health consequences of segregation

Much research has been conducted which demonstrates a strong, negative association of segregation, especially for Black Americans, for a variety of health and health-related outcomes. First, analysts have documented Black-White differences in mortality for a number of causes of death, with Blacks experiencing substantially higher mortality rates associated with segregation for both adult and infant mortality (Collins 1999; Collins and Williams 1999; Ellen, Cutler and Dickens 2000; Grady 2006; Hart et al. 1998; Hearst, Oakes and Johnson 2008; LeClere, Rogers and Peters 1997; Polednak 1997). Furthermore, other studies have examined health outcomes more directly, and they found that minority residents of racially segregated neighborhoods are more likely to report being in poorer health than minority residents of more integrated areas (Acevedo-Garcia 2000; Do et al. 2008; Subramanian, Acevedo-Garcia and Osypuk 2005; Williams and Collins 2001). Finally, a few studies demonstrate an association between racial/ethnic segregation and diminished access to health care (Anderson and Fullerton 2012; Anderson and Fullerton 2014; Gaskin et al. 2009; Hayanga et al. 2009; Rodriguez et al. 2007) and poor health behaviors, emphasizing the structural

sources of poor nutrition in minority segregated neighborhoods (Chang 2006; Chang, Hillier and Mehta 2009; Kwate 2008; Larson, Story and Nelson 2009).

Beyond Black and White

Compared to the Black case, relatively little research has been conducted on this association in the case of other racial/ethnic minority groups in the US. However, a few studies have been conducted which examine this link for Latinos. Some such studies have found a negative association between racial/ethnic residential segregation and a variety of health and health-related outcomes for Latinos, similar to the Black case. For example, these studies include an examination of tuberculosis transmission (Acevedo-Garcia 2000), rates of exercise (Mellerson et al. 2010), physical disability for Puerto Ricans (Burgos and Rivera 2012), rates of obesity (Wen and Maloney 2011), and mental health symptoms and anxiety, especially for Mexican Americans (Lee 2009).

However, other studies have found no association, positive, mixed, or qualified effects of segregation. For example, Walton (2009) found no relationship between Latino segregation and infant birth weight. Conversely, McFarland and Smith (2011) demonstrated that Latino segregation is positively associated with low birth weight, but negatively associated with infant mortality for Latino residents. In another study, Lee and Ferraro (2007) found that Latino segregation was related to more physical health problems for Puerto Ricans, but not for Mexican Americans. Similarly, Nelson (2013) found a negative association between segregation and good self-rated health across the board for Latinos, but found a positive association for Cubans in the US. Kershaw, Albrecht and Carnethon (2013) found a positive effect of segregation, associating it with lower rates of obesity for Mexican American women, but no such association was discovered for men. Relatedly, Yang et al. (2014) found that residential segregation was protective for rates of maternal smoking for Latinos. Moreover, a related set of literature demonstrates a distinct "barrio health advantage" for residents of highly dense Latino communities, especially Mexican Americans (Eschbach et al. 2004; Inagami et al. 2006; LeClere, Rogers and Peters 1997; Patel et al. 2003). However, these studies have examined this relationship using ethnic density scores (or the proportion of the group in question in a given area) rather than segregation scores, which account for both the proportion and the distribution of a group across a given area. These studies provide mixed evidence for the association between racial/ethnic segregation and health for Latinos. Although these studies represent some of the work that has been conducted on the association between racial/ethnic segregation and health, many of them are qualified in some way. Thus, they are limited for definitively establishing an association between segregation and health for Latinos in the same consistent way that the empirical findings are for Blacks.

In the case of Asian segregation, few studies have been conducted which test this association (Acevedo-Garcia et al. 2003), and the extant work finds a positive or a null association with Asian segregation for Asian residents of such areas. For example, some research has found a negative association between Asian segregation and low birth weight (Walton 2009), a null association between Asian ethnic density and preterm birth in New York (Mason et al. 2011), a negative relationship between segregation and maternal smoking habits (Yang et al. 2014), a positive relationship between Asian ethnic density and access to specialty health facilities (Hayanga et al. 2009), and a positive effect of education on health in Asian ethnic neighborhoods (Walton 2012). Much of the theory behind the association between residential segregation and health is focused on the intersection between racial segregation and poverty (discussed in detail below),

which in the case of Asian segregation may be less relevant as the group in the aggregate does not experience generally lower SES or health inequities. Thus, this lack of current studies warrants further investigation into the issue for Asian Americans, the factors which are related to the Asian segregation and health link, and how this group fits in with the theoretical perspectives on segregation and health. In general, though, this literature across all groups has little to say about the social processes which could produce such an association or explain the effects of segregation.

Theoretical framework

Racial residential segregation as a fundamental cause of health

The literature reviewed above demonstrates an empirical relationship between racial residential segregation and health, at least for certain groups and outcomes. However, much of this research is descriptive in nature, providing a statistical link between residential segregation and health with little attention as to how or why segregation may be linked to health (White and Borrell 2011). A notable exception to this is Williams and Collins' (2001) research on segregation and health in which they describe residential segregation as a "fundamental cause" of racial health disparities. Drawing on the fundamental cause argument that is prominent in the sociological thinking on health disparities (Link and Phelan 1995), they view segregation as a fundamental cause in that it is related to multiple disease outcomes through multiple mechanisms (Williams and Collins 2001). As such, residential segregation will persistently be related to health outcomes for communities that are subject to it, even as intervening mechanisms change through public health interventions or policies aimed at targeting the effects of segregation (Williams and Collins 2001). In this article, they cite a number of phenomena associated with segregation which may have an effect on health outcomes, such as higher rates of poverty, limited educational and employment opportunities, neighborhood quality, environmental concerns, housing quality, municipal services, lack of commercial enterprises, organizational flight, lack of adequate provision of health care, and higher crime rates (Williams and Collins 2001). Massey (2004) expands this line of reasoning, and suggests that these conditions may lead to poor health outcomes due to the high allostatic load from the stress of such conditions for Black residents of such areas. Thus, this theory can provide an accounting for how segregation may be linked to a variety of health outcomes.

Segregation theories and moving beyond Black and White

Though Williams and Collins (2001) provide a compelling account of how and why we would observe a relationship between segregation and health outcomes, alternative theories and ways of understanding segregation may lead us to different conclusions about the nature of this association. The literature on the specific processes or theoretical accounts which could link segregation and health is quite limited as noted above (for a recent exception see Yang, Zhao and Song Forthcoming), but we can look to broader theories of segregation in order to better understand this relationship and the theoretical implications of segregation. Generally, the literature more broadly is dominated by two major camps in the theorizing about residential segregation and its consequences (Charles 2003). These two opposing theoretical interpretations of segregation emphasize different qualities of segregation and how it may impact the community in question.

First, the place stratification perspective emphasizes residential discrimination and minority social marginalization as the main drivers of residential segregation (Logan 1978; Charles 2003; Massey and Denton 1993). This can come in the form of more formal barriers to residential integration, such as de jure segregation (now illegal) and restrictive housing covenants, or to more informal processes of residential discrimination, racial steering and white flight (Logan 1978; Galster 1990, 1992; Yinger 1998; Charles 2003; Iceland and Wilkes 2006; Pais, Crowder, and South 2012). In general, though, this perspective emphasizes the external forces of discrimination in creating and sustaining neighborhood inequality in such communities (Logan 1978; Pais, Crowder, and South 2012). In this way, segregation, according to Massey and Denton (1993:8), serves as an "institutional apparatus that supports other racially discriminatory processes and binds them together into a coherent and uniquely effective system of racial subordination." Thus, segregation acts as a unique form of social stratification that compounds poverty, social inequality and its consequences in one place and among one group (Massey and Denton 1993). This perspective on segregation has particular implications for how we understand the segregation-health relationship. This is the theoretical conceptualization of segregation that is most often used in studies of Black segregation and its effects on the community, and this approach is most fitting with Williams and Collins' (2001) argument on fundamental cause and health. On the whole, from this perspective then, we would expect to find that segregation's impact is largely negative for health outcomes.

The second is the spatial assimilation model, which some have argued may be more relevant to the case of Latinos or Asians in the US (Iceland and Wilkes 2006). This understanding of residential segregation sees segregation largely as the result of differences in socioeconomic status and education between groups (Charles 2003). Relatedly, in an examination of immigrant ethnic enclaves, some scholars argue that these communities, although they consist of poor minority groups, do not experience the same neighborhood problems (Logan, Alba and Zhang 2002). Immigrant enclave theory argues that immigrant entrepreneurship provides flourishing communities. Though these neighborhoods would seemingly present with similar circumstances and consequences as those discussed above due to the generally low socioeconomic status of immigrants, the immigrant experience, the different motivations for migration, and the distinct role of the immigrant in US society leads to these more vibrant immigrant communities (Logan, Alba and Zhang 2002; Portes and Bach 1985). Indeed, some research from this perspective has shown that ethnic density (measured as a proportion rather than segregation scores) may have a protective effect on health-related outcomes for such communities, especially mental health and subjective health outcomes (Eschbach et al. 2004; Patel et al. 2005; Stafford, Becares, and Nazroo 2010). Or, relatedly, Gibbons and Yang (2014) in a study of Philadelphia found that the adverse effects of segregation on health are principally for minorities living in predominantly White neighborhoods. From this perspective then, we would expect the association between residential segregation and health outcomes to be either null or positive.

Thus far, the bulk of the literature on residential segregation and health is focused on the case of Black-White segregation, and has employed the place stratification perspective. However, the immense growth of groups such as Latinos and Asians in the US calls into question whether or not the place stratification perspective can be applied across the board and how this might relate to the health of these groups. These two groups are rapidly growing, and Latinos in particular now constitute the largest minority group in the US (Logan, Stults and Farley 2004). Further, although these two groups currently experience lower rates of segregation compared to Blacks, their rates are increasing over time with the overall growth in the

population (Alba et al. 1995; Fischer et al. 2004; Iceland 2004; Lichter, Parisi and Taquino 2015; Logan, Stults and Farley 2004). This suggests that such groups may be subject to external racially discriminatory processes in the housing market as in the case of Blacks from the place stratification perspective. We may observe this process perhaps to a lesser extent than Blacks, who have historically been subject to harsh and legally sanctioned barriers to integration (Iceland and Wilkes 2006; Pais, Crowder, and South 2012). Despite these trends, little is known about the consequences of residential segregation for these groups in the US and whether or not the current theorizing about segregation and health would apply to their case (Acevedo-Garcia et al. 2003; Charles 2003).

The present study will attempt to move this literature forward by considering the case of Latino and Asian segregation. Further, it includes several variables from these alternative urban theoretical perspectives on segregation which may be plausibly more related to the case of groups such as Latinos and Asians. These two different perspectives lead to different hypotheses about the relationship between segregation and health outcomes. From the place stratification perspective, I derive the following first hypothesis:

H_1: The association between segregation and minority health will be negative, after controlling for socioeconomic status, material resources and immigration.

If this theoretical perspective holds for non-Black minorities, we would observe this pattern across all racial/ethnic minority groups, including Latinos and Asians in the US. Conversely, from the spatial assimilation perspective, which sees segregation as a stepping stone to mobility and an adaptive choice, I hypothesize that:

H_2: The association between segregation and Latino and Asian health will be either null or positive, after controlling for socioeconomic status and material resources.

Or, if segregation, because of the association with poverty, is related to a negative association, it would be accounted for by socioeconomic variables and class segregation, as opposed to racial segregation. Thus, if we control for such resources, the relationship should be null. Similarly, immigrant enclave theory posits that the immigrant enclave, though impoverished, can provide a thriving environment for recent immigrant groups. Thus, from this related perspective, I derive the following related hypothesis:

H_3: The association between segregation and Latino and Asian health will be either null or positive, after controlling for immigration.

In sum, taking into account these different theoretical perspectives, I derive three different hypotheses, depending on how we understand the role and trajectories of these groups in urban space.

Data and methods

Data

In this study, I examine the relationship between a contextual variable (segregation) and an individual-level outcome (health), which calls for a multi-level approach. Thus, I combine two sources of data at two

different units of analysis – the individual level and the metropolitan statistical area (MSA) level. First, for the individual-level data, I use the 2011-2012 versions of the Behavioral Risk Factor Surveillance System (BRFSS), which is an annual random telephone survey of the non-institutionalized US adult population conducted by the United States Centers for Disease Control (CDC). The purpose of the survey is to monitor health behaviors and risk trends in the US population. The BRFSS survey had a median response rate of 49.72% across all states in 2011 and 45.2% in 2012. The CDC provides a version of the data called the Selected Metropolitan/Micropolitan Area Risk Trends (SMART), which includes a geographic identifier for the Metropolitan Statistical Area (MSA) of the respondent according to the official definitions provided by the Office of Management and Budget (OMB). According to the OMB definition, MSAs are urban areas with at least 50,000 inhabitants. However, only those MSAs which had at least 500 respondents in the BRFSS survey are provided (N=161).

Data at the MSA-level, including segregation and socio-demographic variables, come from two sources: 2010 United States Census and the American Communities Project. The 2010 US Census provides a variety of population and socioeconomic variables that were used in this study. The American Communities Project (out of Brown University) uses Census data to calculate segregation scores for all MSAs in the US. The segregation scores used in this study come from this effort.

Further, in order to examine the impact of segregation on a particular group, I divided the full BRFSS sample into four subsamples: non-Latino Black respondents, Latino respondents, non-Latino Asian respondents, and non-Latino White respondents. Of note, I group all Latinos of any racial identification into one group, which is limiting in that some research has shown racial distinctions in health by race across Latino subgroups (Borrell and Crawford 2009; Borrell, Menendez and Joseph 2011; Landale and Oropesa 2005). However, given the clustered nature of the data across MSAs, it was not possible to divide the Latino group by race as it would limit the number of included MSAs as many MSAs only have few or no respondents of certain Latino racial subgroups. I divided the data set in the manner described above using a calculated race and ethnicity variable from the BRFSS data set. Similar to the US Census, the BRFSS includes a survey item on race and a separate item on Latino ethnic identification. However, the BRFSS provides a calculated variable in the data set which combines these two items into one measure. Using these subsamples, I estimated a series of models for each of the groups respectively, and excluded all others as being outside the scope of this study. After dropping cases due to missing data, the individual-level N is 57,072 for the Black sample (0.26% of cases were dropped), 37,398 for the Latino sample (10.45% of cases were dropped), 12,651 for the Asian sample (9.72% of cases were dropped), and 388,987 for the White sample (6.7% of cases were dropped).

Dependent variable

The dependent variable for all models in this analysis is an individual-level variable from the BRFSS data – general self-rated health. Self-rated health is a broad measure of overall health which has been shown to vary substantially across race/ethnicity, with whites reporting overall greater self-evaluations of their health (Beck et al. 2014; Su, Wen and Markides 2013). Further, although the item represents a global subjective measure of health, self-rated physical health has been shown in previous studies to be a reliable indicator of health and is associated with objective measures of health, such as mortality, morbidity and functional disability (Ferraro and Yu 1995; Idler and Kasl 1995; Jylhä 2009). The questionnaire item asks the

respondent to assess their general physical health and gives the following five response options: excellent, very good, good, fair, and poor. I dichotomize this item into a variable for *poor health* (1=poor/fair health, 0=else), by including the poor and fair responses in the poor health category, as they both indicate an unfavorable opinion of one's general health status. I combine them in this fashion as it is conventional practice in the literature on self-rated health (Browning and Cagney 2002; Jylhä 2009; Yang et al. 2014), including the work on segregation and self-rated health specifically (Gibbons and Yang 2014; Subramanian, Acevedo-Garcia, and Osypuk 2005; Yang et al. 2014; Yang, Zhao, and Song Forthcoming). This is important for being able to relate the findings of this study to those in this body of literature. Further, these fine-grained distinctions between each of these various categories may be less salient than understanding who provides a negative evaluation of their health. I also combine these two categories as few respondents report being in the poor health category (5.06%), and thus using this category alone could lead to biased estimates when using a maximum likelihood estimation procedure for a binary logistic regression model (see the methods description below).

Independent variables

Segregation is the main substantive metropolitan area independent variable. There are many different dimensions and measurements for the concept of segregation, and some research indicates that the different measurements can lead to different conclusions about the nature of this relationship (Yang and Matthews 2015). However, for this analysis, I use the isolation index (Massey and Denton 1988). Though the index of dissimilarity is also commonly used, some studies indicate that isolation indices are better measures of segregation for understanding the social isolation that segregation can produce and any negative associations that may result (Collins and Williams 1999; Subramanian, Acevedo-Garcia and Osypuk 2005). As a check on this choice, I also ran all of these same analyses using the index of dissimilarity, and the results do not differ or change in any notable ways. The isolation index measures the extent to which a resident of an MSA is likely to be in contact with another same-race resident based on census tract residence. As racial/ethnic minorities are numerically fewer than their white counterparts, we should not expect high levels of same-race contact in a race-neutral society. If we lived in a fully integrated society, any given minority resident of an MSA should have relatively low levels of contact with other same-race minority residents based on the statistical chance of coming into contact. The measure is also beneficial as it takes into account the relative size of the minority population, which is useful given that some metropolitan areas have small Black, Latino, and Asian populations, especially in certain regions of the US. Here, I use isolation scores for each group respectively as published by the American Communities Project at Brown University using population data from the 2010 US Census. The formula for the isolation index is as follows:

$$Group\ Isolation_j = 100 \quad \sum \left(\frac{G_{ij}}{G_j}\right)\left(\frac{G_{ij}}{T_{ij}}\right) \tag{1}$$

where G_j is the group population in metropolitan area j, G_{ij} is the group population of tract i in metropolitan area j, and T_{ij} is the total population of tract i in metropolitan area j. The isolation index ranges from 0 to 100, with a higher score indicating higher amounts or a higher level of residential segregation.

Of note, I also used the isolation index for the model for White respondents in order to have a comparable measure, but the measure of White isolation is not particularly robust. The power of the isolation index is

that it indicates how isolated a group is when they should not be based on their relative proportion within the population as a whole. Given that Whites make up the majority of the population in most American MSAs, this measure is not particularly interesting. As such, there is not much variation in the White isolation index, and the mean is quite high. These models, though, are meant to serve as a comparison for the results for minority respondents.

The BRFSS includes a variety of social demographic variables which were used as level-1 control variables across all of the multilevel models in the analysis. I include two demographic control variables for *age* and *gender* in order to account for how these factors may influence health outcomes, as older individuals may be more likely to report being in poor health, and women experience certain health advantages and disadvantages when compared to their male counterparts. I also account for a number of social and economic resources, including *education*, *marital status*, *employment status, income,* and whether or not the respondent has *health insurance,* all of which have been shown to be protective of health across the life course. I also include several health-related behaviors, including *exercise, smoking*, and *drinking,* in order to control for the effect that individual-level health choices and behaviors may have on self-evaluations of overall health. Age (in years) and education (highest level of schooling completed) were treated as continuous variables. Gender (1=female, 0=male), marital status (1=married, 0=else), health insurance (1=insured by any public or private provider, 0=else), exercise (1=engaged in physical exercise within the last month, 0=else), smoking (1=currently smokes at least some, 0=else), and drinking (1=consumed at least one alcoholic drink within the last 30 days, 0=else) were coded as binary variables. The measures for health-related behaviors are not the ideal ways to measure the full scope of how these behaviors may impact health outcomes. For example, exercise is measured as any exercise at all, no matter how little within the last month. However, these were the only health behaviors measures available in the full sample of BRFSS across all fifty US states. A variable for employment status was recoded into a set of four binary variables: *employed for wages* (1=employed, 0=else [reference]), *self-employed* (1=self-employed, 0=else), *unemployed* (1=unemployed, 0=else), and *outside workforce* (1=other employed, 0=else). For income, I used a calculated variable from the data set which groups household income into five categories: less than $15,000 (reference), $15,000 to less than $25,000, $25,000 to less than $35,000, $35,000 to less than $50,000, and $50,000 or more. As a large number of respondents (12.95%) have a missing value for this variable, I recoded income into a group of binary variables including all five of the response options and a sixth option of "don't know/refused." For interpretation purposes, I group-mean centered all level-1 independent variables (with the metropolitan area as the group).

To address my second research question on how other factors may account for the relationship between segregation and health outcomes, I include two MSA-level variables to try to understand the relationship between residential segregation and health. I introduce these variables as conceptual groups one-by-one into the analysis. All of these variables come from the 2010 US Census and all are treated as continuous. First, I include in all models several MSA-level control variables, which could influence the outcome. These variables include *median household income* at the MSA-level and *population* of the MSA. These variables are treated as continuous and logged to account for skew. Next, I include a group of economic factors, which could account for the association if the relationship is driven by socioeconomic inequality. These variables include *income segregation*, *percent bachelor's degree*, and *percent unemployed.* The measure for income segregation reflects the rank-order information theory index (H), which has a theoretical range from 0 to 1, where 0 represents no income segregation (the local tract reflects the income

distribution of the metropolitan area) and where 1 represents complete income segregation (no variation in incomes in the local tract). Finally, I include a variable for *percent recent immigration* (immigration within the last ten years) in the MSA to capture the potential association between immigration and segregation, especially for the Latino and Asian group of models. Descriptive statistics for all variables included can be found in Table 1 (Tables 1-4 are in the Appendix to the present document).

Methods

As the dependent variable as coded above is binary, I estimate a series of multi-level binary logistic regression models. The models proceed in several stages corresponding to the two research questions as stated above. First, in Model 1, I estimate a model with all of the level-1 variables included, but with only the measure for the isolation index in order to get at the gross effect of segregation and to address my first research question. In Model 2, I add the MSA-level control variables (median income and population). Next, in Models 3 and 4, I add the two groups of explanatory MSA-level variables in accordance with the three hypotheses. Model 3 includes the economic factors, and Model 4 includes the immigration variable. Finally, in Model 5, I include all of the MSA-level variables discussed above. The full results for all of these models can be found in Table 2 for Black respondents, Table 3 for Latino respondents, and Table 4 for Asian respondents. I do not include the full results for the models for White respondents as the segregation variables were not significant (full discussion below and results available upon request).

Also, of note here is that the series of models for Asian respondents are somewhat different as compared to the other two groups due to the much smaller overall sample size and smaller sample size across metropolitan area units as some metropolitan areas did not include a sufficient number of Asian respondents. Due to these limitations, the Asian models contain two fewer metropolitan areas as some metropolitan areas did not have any Asian respondents (159 compared to 161), and the number of metropolitan-level variables are more limited. The series of models for Asian respondents contains fewer metropolitan-level variables, and I do not present a full model with all level 2 variables included. However, this set of models still follows the same general pattern and includes the same set of theoretical considerations: economic factors and immigration.

Results

Before discussing the regression results on residential segregation and health, the descriptive statistics in Table 1 for each racial/ethnic group reveal some important patterns. First, there are notable differences in the reporting of being in poor/fair health across racial/ethnic categories. Most strikingly, Asian respondents are far less likely than other racial/ethnic minorities to report being in poor health, with only 11% in poor/fair health, compared to 26% and 27% of Black and Latino respondents respectively. They even report slightly lower rates of poor/fair health compared to Whites (15%). This indicates that Asian respondents have a distinct perceived health advantage over their Black and Latino counterparts. Looking to the metropolitan-level statistics also demonstrates disparities across the three groups in terms of which group is more likely to be subject to residential segregation and any potential negative consequences. In terms of mean segregation rates across all metropolitan areas, it is clear that Black isolation is much higher on average across metropolitan areas, with mean Black isolation at 27.13 (compared to 20.57 for Latinos and 7.44 for Asians). Again, this difference is particularly notable for Asians. However, the ranges of these

variables are quite different, with Blacks experiencing a much lower upper bound at 69.96 (compared to 91.42 for Latinos and 74.69 for Asians). Thus, although Latino and Asian isolation scores are on average much lower compared to Blacks, the variable has a much wider range across metropolitan areas.

Although the descriptive statistics reveal different patterns on the extent of poor health and segregation in these respective groups, the regression results demonstrate more about the relationship between these two variables across groups. First, examining the results in Table 2 for Black respondents, it is clear that segregation has a significant and substantively strong relationship with self-evaluations of health. In Model 1, with only the Black isolation variable included at the metropolitan level, a standard deviation increase in the Black isolation index is related to a 16.3% increase in the average odds of reporting being in fair/poor health by Black respondents. This is a rather sizable increase in the odds of poor health reporting, and according to the metropolitan-level pseudo R^2 value, accounts for 16.9% of the variation in poor health reporting across metropolitan areas for Black residents. This indicates that the gross effects of segregation on poor self-rated health are strong for Black respondents.

This pattern changes somewhat, though, when accounting for the various factors which are theoretically related to segregation and could potentially account for this relationship. Most notably, with the inclusion of median family income in metropolitan areas in Model 2, the size of the coefficient for Black isolation decreases by 28%. In this model, a standard deviation increase in Black isolation is related to an increase in the average odds of poor self-rated health by 11.8%. The odds ratio for median family income here is also quite sizable, with a one-standard deviation increase in median family income being related to a decrease in the average odds of being in poor/fair health by 14.8%, meaning that more metropolitan-level family income is related to fewer respondents reporting being in poor health. This indicates that financial dynamics at the metropolitan-level accounts for some portion of the association for segregation for the Black community (although the coefficient remains significant and sizable). Similarly, when accounting for a variety of other economic variables in Model 3, we find a similar relationship. Here, the coefficient for income segregation is significant and positive (with an odds ratio of 1.101), indicating that class segregation, in addition to racial/ethnic segregation, contributes to poor self-reported health. The coefficient for Black isolation drops further in this model (the odds drop to an increase of 8.8%). This is also the preferred model according to the AIC. In Model 4, though, the immigration variable is not significant and does not diminish the size of the coefficient for Black isolation. Overall, from these results, it appears that economic factors play an important role in health outcomes for Black residents and that these variables account for some of the relationship between Black isolation and self-reported health. However, while these coefficients are strong, the variable for Black isolation remains significant and substantively notable across all models (an increase in the average odds by 8.8% in the preferred model). Thus, these variables are not able to fully account for the association.

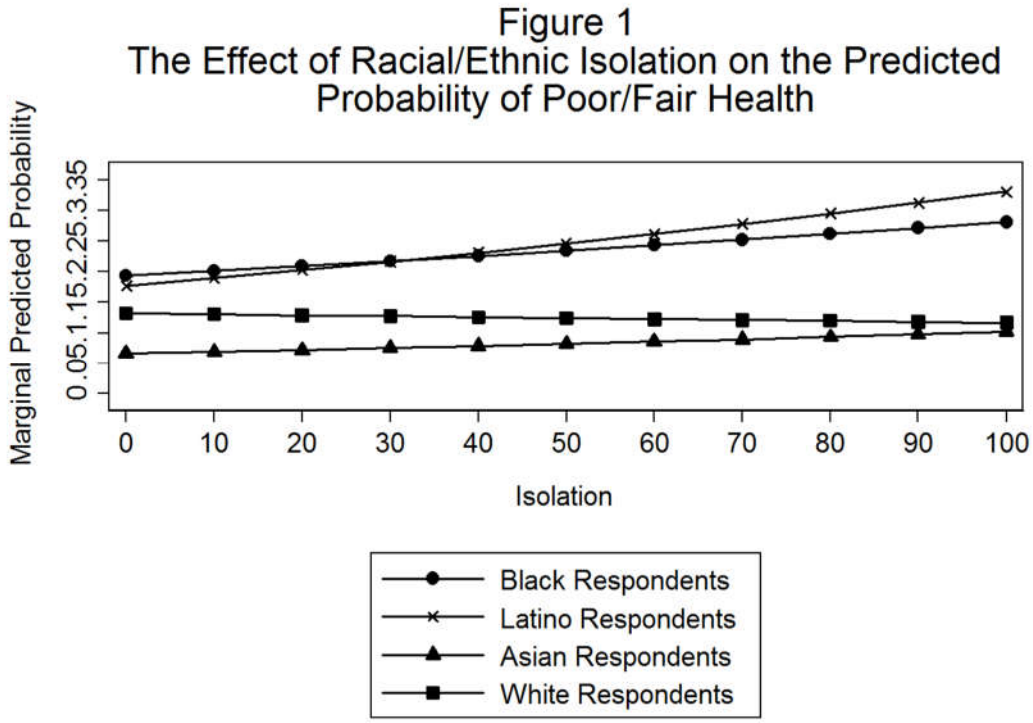
Moving to the regression results for Latino respondents in Table 3, again there is a strong and positive association between Latino isolation and Latino self-reported health. In Model 1, the gross effects of Latino isolation are significant and substantively strong, with a one standard deviation increase in Latino isolation leading to an 18% increase in the average odds of poor self-rated health. This indicates that a higher level of segregation is related to more poor/fair self-reported health among Latino residents, and this variable accounts for a sizable portion (23%) of the overall variation in self-rated health across metropolitan areas. Furthermore, this association changes little when accounting for the factors which are theoretically pertinent

to segregation. None of the other metropolitan-level variables are significant in any of the other models, including a number of economic factors and immigration. Also, none of these variables reduces the size of the Latino isolation coefficient in a notable way. For example, only the inclusion of the economic variables in Model 3 reduces the size of the coefficient at all, but this change is not substantively great (0.009 to 0.008). Thus, for Latino respondents, the coefficients for segregation are strong and consistent across all models, even when accounting for a variety of factors related to segregation.

Examining the results for Asian respondents in Table 4, again, there is a significant and positive coefficient for Asian isolation on poor/fair self-rated health at least for the gross effects. In Model 1, with only Asian isolation included at the metropolitan level, a one standard deviation increase in Asian isolation is associated with a 5.8% increase in the average odds of poor/fair self-reported health. However, when accounting for the other sets of variables, a different pattern emerges. Most notably, in Model 4, the coefficient for recent immigration is significant and negative, and accounts for the association with Asian isolation, dropping this variable down to non-significance. In particular, a one standard deviation increase in the percent of recent migration is related to a decrease in the average odds of poor/fair health reporting by a factor of 0.854 (or 14.6%). This is a rather sizable coefficient, and the inclusion of this variable reduces the size of the Asian isolation coefficient by 43%, and it is no longer significant. In sum, for Asian respondents, the percent of recent immigration accounts for the relationship between segregation and health. However, of note, these models do not include as many variables as the set of models for Black and Latino respondents, and are therefore not directly comparable.

Further, I also ran all of the same models for White respondents using a measure of White isolation to serve as a comparison case for the results for minority respondents (results available upon request). In all models, the variable for White isolation is not significant, indicating that for Whites, segregation is unrelated to their health status. This is anticipated from the theoretical perspectives in the literature as Whites are not subject to racial segregation and its effects.

In addition to the regression results, I also plotted a graph of the predicted probability of reporting poor self-rated health for each racial/ethnic group across the theoretical range of the isolation index to serve as a visual representation of the results. For Black, Latino, and White respondents, this is based on the full model presented in each of the tables, and for Asian respondents, the graph is based on Model 4, which includes the variable for immigration, as this variable accounted for the association for residential segregation. This graph can be found in Figure 1 (next page). From this graph, a few patterns are evident. First, as expected from the descriptive statistics, Blacks and Latinos are far more likely to report being in poor/fair health, even in metropolitan areas with no residential segregation (0.19 for Blacks and 0.18 for Latinos compared to 0.07 for Asians and 0.13 for Whites). Second, when accounting for residential segregation, this probability increases steadily as residential segregation in a metropolitan area increases, with the slope for Latino respondents being somewhat more dramatic than for Black respondents. Yet, for Asian and White respondents, the slope is relatively flat. In sum, the predicted probabilities show a notable increase in the probability of poor/fair self-rated health across the spectrum of residential segregation, but only for Black and Latino respondents.



Discussion and conclusions

The goal of this paper is to further delve into the association between racial residential segregation and health outcomes for minority communities in the US. While a large and growing body of literature on Black Americans has established that residential segregation has a consistent and negative association with Black health in the US, few studies have tested this association for other racial/ethnic minorities. This is especially the case for Latinos and Asians whose rates of segregation have increased over the last several decades. Furthermore, while these studies have established an empirical association between segregation and health, few, if any, studies have attempted to provide a plausible theory or process which could account for this relationship. Based on theories of segregation from urban sociology, here I test a variety of factors which may help us understand this association. Overall, I aim to expand this literature by including other racial/ethnic minority groups often neglected in the literature and to provide some account for why this association might exist.

From the regression results presented above, I draw several main conclusions. First, for Black residents, segregation consistently leads to more poor health reporting. However, this association is at least partially accounted for by two significant economic factors: median family income and income segregation. The fact that segregation is associated with poor self-rated across all models is consistent with the expectations of place stratification theory, which asserts that segregation will produce negative effect for the community as it is rooted in discriminatory practices and racial isolation (Charles 2003; Massey and Denton 1993). Although discrimination is not directly tested in these models, the place stratification perspective sees segregation as system of stratification which can operate through structural (both formal and informal) discrimination even if no overt discrimination is measured or observed. As some of this relationship is

accounted for by class-based factors, this set of models also provides partial support for the spatial assimilation perspective, which posits that differences by segregation are largely the result of socio-economic differences between groups (Charles 2003; Logan, Alba and Zhang 2002).

Moreover, for Latino residents, I also find a uniform and positive association between segregation and poor/fair self-rated health, indicating that segregation is associated with more poor health reporting. In this case, though, none of the theorized factors appear account for the association between residential segregation and health outcomes for this group. Thus, these results appear to find support for the place stratification perspective, surprisingly in contrast to the spatial assimilation and immigration enclaving perspectives which are theorized to pertain more to the case of Latino and Asian urban communities. For Asian residents, in the gross effects, the results demonstrate a significant and positive association between segregation and poor self-rated health. However, this relationship is reduced to non-significance when including recent immigration at the MSA-level, indicating that immigration may help us understand the association between segregation and self-rated health for Asian residents. This finding is in accordance with the immigrant enclaving side of this debate, which argues that immigration produces these effects due to the large influx and clustering of immigrant groups, but that these associations will diminish with various forms of assimilation, both in terms of the spatial and socioeconomic attainment (Logan, Alba and Zhang 2002).

On the whole, from these results, I conclude that the positive association of segregation on poor health outcomes can be extended to include other, non-Black racial and ethnic minority groups. But, the positive relationship between segregation and poor health outcomes seems to go hand-in-hand with having a marginalized social status in the US. For example, here we observe a positive association for Latino segregation and poor health, but not for Asian segregation once we account for immigration. Asians in the US are less likely to be marginalized, both socially and economically, although I acknowledge that there are important subgroup differences with regard to this experience. This is evidenced here by their much lower rate of group isolation across the US, as well as their clear economic and educational advantages, even when compared to Whites, as demonstrated in the descriptive statistics. In contrast, the descriptive statistics for Latino respondents resemble those of Black respondents, and the negative relationship of Latino isolation is similar to that of Blacks as well. From the place stratification perspective, which argues that it is the formal and informal forms of structural discrimination which produces these negative effects, it would thus follow that groups who are more likely to be subject to such processes would be more likely to experience these negative consequences. In this case then, we would expect Blacks and Latinos to be more likely to experience such problems compared to their White and Asian counterparts. Thus, from these figures, I posit that it is the segregation in space of a socially and economically marginalized minority group that produces this association.

This study builds on the previous research on the subject in several key ways. First, it is consistent with previous research, especially related to the case of Blacks, which demonstrates an association between residential segregation and a variety of health and health-related outcomes. The results presented here show this same pattern for self-rated health, indicating that residential segregation is related to a higher reporting of poor self-rated health. This is in line with much of the research on Black health and some of the findings for Latino health (Anderson and Fullerton 2012; Anderson and Fullerton 2014; Lee 2009; Subramanian, Acevedo-Garcia and Osypuk 2005; Williams and Collins 2001). However, these results extend the

literature beyond Black and White, and present some contradictory findings to the literature for Latinos and Asians. For example, the literature on segregation and health for Latinos is quite mixed, with studies presenting null, positive, negative and conditional results for this association (Kershaw, Albrecht and Carnethon 2013; Lee and Ferraro 2007; McFarland and Smith 2011). Here, though, the results are unequivocally negative, with segregation being consistently related to poorer health outcomes for Latinos, even after accounting for a number of related factors. Similarly, while the current state of the albeit limited literature on segregation and health outcomes for Asian residents presents either null or positive results, this study shows that at least in the gross effects, segregation has a negative association with health outcomes, though it is accounted for by recent immigration at the MSA-level (Mason et al. 2011; Walton 2009; Walton 2012). For these two groups, though, the literature is far less developed (especially in the case of Asian segregation) and the current state of the literature has not produced any definitive conclusions about this association. This study attempts to extend this literature further and provide some theoretical insight into this association.

In general, the results presented here provide some advances over the current state of the literature. First, the data come from a national data source, it includes the three major racial/ethnic minority groups in the US, and it examines a dependent variable with broad implications for adult health. Many of the previous studies on the relationship between segregation and health are limited in geographic scope and only consider one group (in most cases, Blacks), or they consider a fairly narrow health outcome. In this sense, the study provides a more comprehensive overview of the issues. Furthermore, this analysis provides a theoretical rationale for the question of why we might find such as association by drawing from the current theorizing on residential segregation from urban sociological theory. Much of this literature is presently only descriptive and has not accounted for why we observe this association.

Despite these advances, there are some limitations to the present study. First, these findings only provide an indication of the simple cross-sectional association between these two variables, segregation and self-rated health. This is particularly problematic given that one of the main criticisms of the literature on neighborhood effects is the problem of self-selection, in that people of a certain type chose to cluster together in certain areas which may not be conducive to healthy environments. Although in this case it is unlikely that sicker people would be more likely to live together or to live in segregated areas, to build this argument longitudinal data on segregation and residential mobility are needed. Second, from the structure of the data, we cannot assess whether or not the respondent actually lives in a segregated community even if they live in a highly segregated city, as the level of analysis only permits one to situate the individual respondent within a metropolitan area and not a specific neighborhood within that metropolitan area. The analysis only assumes that if a person lives in a highly segregated city, that minority resident of that city would be more likely to live in a segregated community. Relatedly, I do not directly test the mechanisms underlying the place stratification perspective in terms of the processes of housing discrimination which may be at work here. However, such data is difficult to measure quantitatively, and further difficult to pair with cross-sectional data with limited geographic information. Moreover, while the BRFSS data set is useful for its breadth, large sample size, and thorough health indicators, it is limiting in terms of the social indicators that it provides. This is especially true when trying to account for immigration and generational status, which have been shown to have important links to health, especially for groups where this may be theoretically more pertinent, such as with Latinos and Asians. In this case, the BRFSS data provide no indication of generational status, national origin or subgroup, or documented legal status in the US. Or,

relatedly, the BRFSS does record in which language the interview was conducted which might provide some indication of acculturation status, but this variable is not available in the SMART version of the data which provides the geographic indicator for the MSA used in this study. The literature has shown important differences in health outcomes for all three groups by each of these factors (Aguirre-Molina, Molina and Zambrana 2001; Lee and Ferraro 2007). While I account for immigration at the metropolitan level, there are no indicators for these at the individual-level in the BRFSS data. All of these are important limitations of the BRFSS data, and are important considerations for future research in order to expand this research.

While the study has these limitations, it presents an advance over the current state of the literature on residential segregation and health outcomes. The analysis moves the literature beyond Black and White to consider other groups which are growing in size in the US population and groups for which segregation is increasing over time. Further, the results point to some factors related to segregation that could provide a better understanding of how segregation might impact health, such as economic considerations and immigration. The results demonstrate that segregation indeed has a negative impact on health outcomes, in this case self-reported physical health, across all groups. In the case of Blacks, this relationship is partially accounted for by income dynamics and class segregation, and for Asians, this is wholly accounted for by recent immigration. On the whole, though, this suggests that, at least for Blacks and Latinos, segregation itself and racial/ethnic dynamics are an important consideration when considering policy or public health interventions which could improve the health of such communities.

References

Anderson, Kathryn Freeman, and Andrew S. Fullerton. 2012. "Racial Residential Segregation and Access to Health-Care Coverage: A Multilevel Analysis." *Research in the Sociology of Health Care* 30:133-58.

—. 2014. "Residential Segregation, Health, and Health Care: Answering the Latino Question." *Race and Social Problems* 6(3):262-79.

Acevedo-Garcia, Dolores. 2000. "Residential segregation and the epidemiology of infectious diseases." *Social Science & Medicine* 51(8):1143-61.

Acevedo-Garcia, Dolores., Kimberly A. Lochner, Theresa L. Osypuk, and S. V. Subramanian. 2003. "Future directions in residential segregation and health research: A multilevel approach." *American Journal of Public Health* 93(2):215-21.

Aguirre-Molina, Marilyn , Carlos Molina, and Ruth E. W. Zambrana. 2001. *Health issues in the Latino community*. San Francisco: Jossey Bass Publishers.

Alba, Richard D., Nancy A. Denton, Shi-yin J. Leung, and John R. Logan. 1995. "Neighborhood Change Under Conditions of Mass Immigration - The New-York-City Region, 1970-1990." *International Migration Review* 29(3):625-56.

Beck, Audrey. N., Brian. K. Finch, Shih-Fan. F. Lin, Robert. A. Hummer, and Ryan. K. Masters. 2014. "Racial disparities in self-rated health: Trends, explanatory factors, and the changing role of socio-demographics." *Social Science and Medicine* 104:163-77.

Borrell, Luisa N., and Natalie D. Crawford. 2009. "All-Cause Mortality Among Hispanics in the United States: Exploring Heterogeneity by Nativity Status, Country of Origin, and Race in the National Health Interview Survey-Linked Mortality Files." *Annals of Epidemiology* 19(5):336-43.

Borrell, Luisa N., Barbara S. Menendez, and Sharon P. Joseph. 2011. "Racial/Ethnic Disparities on Self-Reported Hypertension in New York City: Examining Disparities among Hispanic Subgroups." *Ethnicity & Disease* 21(4):429-36.

Browning, C. R., and K. A. Cagney. 2002. "Neighborhood structural disadvantage, collective efficacy, and self-rated physical health in an urban setting." *Journal of Health and Social Behavior* 43(4):383-99.

Burgos, Giovani., and Fernando I. Rivera. 2012. "Residential Segregation, Socioeconomic Status, and Disability: A Multi-Level Study of Puerto Ricans in the United States." *Centro Journal* 24(2):14-46.

Chang, Virginia W. 2006. "Racial residential segregation and weight status among US adults." *Social Science & Medicine* 63(5):1289-303.

Chang, Virginia W., Amy E. Hillier, and Neil K. Mehta. 2009. "Neighborhood Racial Isolation, Disorder and Obesity." *Social Forces* 87(4):2063-92.

Charles, Camille Z. 2003. "The dynamics of racial residential segregation." *Annual Review of Sociology* 29:167-207.

Collins, Chiquita A. 1999. "Racism and health: Segregation and causes of death amenable to medical intervention in major US cities." Pp. 396-98 in *Socioeconomic Status and Health in Industrial Nations: Social, Psychological, and Biological Pathways*, edited by N. E. Adler, M. Marmot, B. McEwen, and J. Stewart.

Collins, Chiquita A., and David R. Williams. 1999. "Segregation and mortality: The deadly effects of racism?" *Sociological Forum* 14(3):495-523.

Do, D. Phuong, Brian Karl Finch, Ricardo Basurto-Davila, Chloe Bird, Jose Escarce, and Nicole Lurie. 2008. "Does place explain racial health disparities? Quantifying the contribution of residential context to the Black/white health gap in the United States." *Social Science & Medicine* 67(8):1258-68.

Ellen, Ingrid Gould , David M. Cutler, and William Dickens. 2000. "Is Segregation Bad for Your Health?: The Case of Low Birth Weight." *Brookings-Wharton Papers on Urban Affairs*:203-38.

Eschbach, Karl, Glenn V. Ostir, Kushang V. Patel, Kyriakos S. Markides, and James S. Goodwin. 2004. "Neighborhood context and mortality among older Mexican Americans: Is there a barrio advantage?" *American Journal of Public Health* 94(10):1807-12.

Ferraro, Kenneth F., and Yan Yu. 1995. "Body-Weight and Self-Ratings of Health." *Journal of Health and Social Behavior* 36(3):274-84.

Fischer, Claude S., Gretchen Stockmayer, Jon Stiles, and Michael Hout. 2004. "Distinguishing the geographic levels and social dimensions of US metropolitan segregation, 1960-2000." *Demography* 41(1):37-59.

Galster, George. 1990. "Racial steering by real estate agents: Mechanisms and motives." *The Review of Black Political Economy* 19(1):39-63.

Galster, George C. 1992. "Research on discrimination in housing and mortgage markets: Assessment and future directions." *Housing Policy Debate* 3(2):637-83.

Gaskin, Darrell J., Adrian Price, Dwayne T. Brandon, and Thomas A. LaVeist. 2009. "Segregation and Disparities in Health Services Use." *Medical Care Research and Review* 66(5):578-89.

Gibbons, Joseph, and Tse-Chuan Yang. 2014. "Self-Rated Health and Residential Segregation: How Does Race/Ethnicity Matter?" *Journal of Urban Health* 91(4):648-60.

Grady, Sue C. 2006. "Racial disparities in low birthweight and the contribution of residential segregation: A multilevel analysis." *Social Science & Medicine* 63(12):3013-29.

Hart, Kevin D., Stephen J. Kunitz, Ralph R. Sell, and Dana B. Mukamel. 1998. "Metropolitan governance, residential segregation, and mortality among African Americans." *American Journal of Public Health* 88(3):434-38.

Hayanga, Awori J., Heather E. Kaiser, Rakhi Sinha, Sean M. Berenholtz, Marty Makary, and David Chang. 2009. "Residential Segregation and Access to Surgical Care by Minority Populations in US Counties." *Journal of the American College of Surgeons* 208(6):1017-22.

Hearst, Mary O., J. Michael Oakes, and Pamela Jo Johnson. 2008. "The Effect of Racial Residential Segregation on Black Infant Mortality." *American Journal of Epidemiology* 168(11):1247-54.

Hummer, Robert A., Monique Biegler, Peter B. De Turk, Douglas Forbes, W. Parker Frisbie, Ying Hong, and Starling G. Pullum. 1999. "Race/ethnicity, nativity, and infant mortality in the United States." *Social Forces* 77(3):1083-117.

Hummer, Robert A., and Juanita J. Chinn. 2011. "Race/Ethnicity and US Adult Mortality: Progress, Prospects, and New Analyses." *Du Bois Review-Social Science Research on Race* 8(1):5-24.

Iceland, John. 2004. "Beyond Black and White - Metropolitan residential segregation in multi-ethnic America." *Social Science Research* 33(2):248-71.

Iceland, John, and Rima Wilkes. 2006. "Does socioeconomic status matter? Race, class, and residential segregation." *Social Problems* 53(2):248-73.

Idler, Ellen L., and Stanislav V. Kasl. 1995. "Self-Ratings of Health - Do They Also Predict Change in Functional Ability." *Journals of Gerontology Series B-Psychological Sciences and Social Sciences* 50(6):S344-S53.

Inagami, Sanae, Luisa N. Borrell, Mitchell D. Wong, Jing Fang, Martin F. Shapiro, and Steven M. Asch. 2006. "Residential segregation and Latino, black and white mortality in New York City." *Journal of Urban Health-Bulletin of the New York Academy of Medicine* 83(3):406-20.

Jylhä, Marja. 2009. "What is self-rated health and why does it predict mortality? Towards a unified conceptual model." *Social Science & Medicine* 69(3):307-16.

Kershaw, Kiarri N., Sandra S. Albrecht, and Mercedes R. Carnethon. 2013. "Racial and Ethnic Residential Segregation, the Neighborhood Socioeconomic Environment, and Obesity Among Blacks and Mexican Americans." *American Journal of Epidemiology* 177(4):299-309.

Kwate, Naa Oyo A. 2008. "Fried chicken and fresh apples: Racial segregation as a fundamental cause of fast food density in black neighborhoods." *Health & Place* 14(1):32-44.

Landale, Nancy S., and R. S. Oropesa. 2005. "What does skin color have to do with infant health? An analysis of low birth weight among mainland and island Puerto Ricans." *Social Science & Medicine* 61(2):379-91.

Larson, Nicole I., Mary T. Story, and Melissa C. Nelson. 2009. "Neighborhood Environments Disparities in Access to Healthy Foods in the US." *American Journal of Preventive Medicine* 36(1):74-81.

LeClere, Felicia B., Richard G. Rogers, and Kimberley D. Peters. 1997. "Ethnicity and mortality in the United States: Individual and community correlates." *Social Forces* 76(1):169-98.

Lee, Min-Ah A. 2009. "Neighborhood residential segregation and mental health: A multilevel analysis on Hispanic Americans in Chicago." *Social Science & Medicine* 68(11):1975-84.

Lee, Min-Ah A., and Kenneth F. Ferraro. 2007. "Neighborhood residential segregation and physical health among Hispanic Americans: Good, bad, or benign?" *Journal of Health and Social Behavior* 48(2):131-48.

Lichter, Daniel T., Domenico Parisi, and Michael C. Taquino. 2015. "Spatial Assimilation in US Cities and Communities? Emerging Patterns of Hispanic Segregation from Blacks and Whites." *The ANNALS of the American Academy of Political and Social Science* 660(1):36-56.

Link, Bruce G., and Jo Phelan. 1995. "Social Conditions As Fundamental Causes of Disease." *Journal of Health and Social Behavior* 35:80-94.

Logan, John R. 1978. "Growth, Politics, and the Stratification of Places." *American Journal of Sociology* 84(2):404-16.

Logan, John R., Richard D. Alba, and Wenquan Q. Zhang. 2002. "Immigrant enclaves and ethnic communities in New York and Los Angeles." *American Sociological Review* 67(2):299-322.

Logan, John R., Brian J. Stults, and Reynolds Farley. 2004. "Segregation of minorities in the metropolis: Two decades of change." *Demography* 41(1):1-22.

Mason, Susan M., Jay S. Kaufman, Julie L. Daniels, Michael E. Emch, Viaya K. Hogan, and David A. Savitz. 2011. "Black Preterm Birth Risk in Nonblack Neighborhoods: Effects of Hispanic, Asian, and Non-Hispanic White Ethnic Densities." *Annals of Epidemiology* 21(8):631-38.

Massey, Douglas S. 2004. "Segregation and Stratification: A Biosocial Perspective." *Du Bois Review: Social Science Research on Race* 1(01):7-25.

Massey, Douglas S., and Nancy A. Denton. 1988. "The Dimensions of Residential Segregation." *Social Forces* 67(2):281-315.

—. 1993. *American apartheid : segregation and the making of the underclass*. Cambridge, Mass.: Harvard University Press.

McFarland, Michael, and Cheryl A. Smith. 2011. "Segregation, Race, and Infant Well-Being." *Population Research and Policy Review* 30(3):467-93.

Mellerson, Jenelle, Hope Landrine, Yongping P. Hao, Irma Corral, Luhua Zhao, and Dexter L. Cooper. 2010. "Residential segregation and exercise among a national sample of Hispanic adults." *Health & Place* 16(3):613-15.

Nelson, Kyle Anne. 2013. "Does residential segregation help or hurt? Exploring differences in the relationship between segregation and health among US Hispanics by nativity and ethnic subgroup." *The Social Science Journal* 50(4):646-57.

Pais, Jeremy, J. South Scott, and Crowder Kyle. 2012. "Metropolitan Heterogeneity and Minority Neighborhood Attainment Spatial Assimilation or Place Stratification?" *Social Problems* 59(2):258-81.

Patel, Kushang V., Karl Eschbach, Laura L. Rudkin, M. Kristen Peek, and Kyriakos S. Markides. 2003. "Neighborhood context and self-rated health in older Mexican Americans." *Annals of Epidemiology* 13(9):620-28.

Polednak, Anthony P. 1997. *Segregation, poverty, and mortality in urban African Americans*. New York: Oxford University Press.

Portes, Alejandro, and Robert L. Bach. 1985. *Latin journey : Cuban and Mexican immigrants in the United States*. Berkeley: University of California Press.

Rodriguez, Rudolph A., Saunak Sen, Kala Mehta, Sandra Moody-Ayers, Peter Bacchetti, and Ann M. O'Hare. 2007. "Geography matters: Relationships among urban residential segregation, dialysis facilities, and patient outcomes." *Annals of Internal Medicine* 146(7):493-501.

Stafford, Mai, Laia Bécares, and James Nazroo. 2010. "Racial Discrimination and Health: Exploring the Possible Protective Effects of Ethnic Density." Pp. 225-50 in *Ethnicity and Integration: Understanding Population Trends and Processes: volume 3*, edited by John Stillwell and Maarten van Ham. Dordrecht: Springer Netherlands.

Su, Dejun, Ming Wen, and Kyriakos S. Markides. 2013. "Is Self-Rated Health Comparable Between Non-Hispanic Whites and Hispanics? Evidence From the Health and Retirement Study." *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences* 68(4):622-32.

Subramanian, S. V., Dolores Acevedo-Garcia, and Theresa L. Osypuk. 2005. "Racial residential segregation and geographic heterogeneity in black/white disparity in poor self-rated health in the US: a multilevel statistical analysis." *Social Science & Medicine* 60(8):1667-79.

Walton, Emily. 2009. "Residential Segregation and Birth Weight among Racial and Ethnic Minorities in the United States." *Journal of Health and Social Behavior* 50(4):427-42.

—. 2012. "Resurgent Ethnicity among Asian Americans: Ethnic Neighborhood Context and Health." *Journal of Health and Social Behavior* 53(3):378-94.

Wen, Ming, and Thomas N. Maloney. 2011. "Latino Residential Isolation and the Risk of Obesity in Utah: The Role of Neighborhood Socioeconomic, Built-Environmental, and Subcultural Context." *Journal of Immigrant and Minority Health* 13(6):1134-41.

White, Kellee, and Luisa N. Borrell. 2011. "Racial/ethnic residential segregation: Framing the context of health risk and health disparities." *Health & Place* 17(2):438-48.

Williams, David R., and Chiquita Collins. 2001. "Racial residential segregation: A fundamental cause of racial disparities in health." *Public Health Reports* 116(5):404-16.

Williams, David R., and Pamela B. Jackson. 2005. "Social sources of racial disparities in health - Policies in societal domains, far removed from traditional health policy, can have decisive consequences for health." *Health affairs* 24(2):325-34.

Yang, Tse-Chuan, and Stephen A. Matthews. 2015. "Death by Segregation: Does the Dimension of Racial Segregation Matter?" *PLoS ONE* 10(9):e0138489.

Yang, Tse-Chuan, Carla Shoff, Aggie J. Noah, Nyesha Black, and Corey S. Sparks. 2014. "Racial segregation and maternal smoking during pregnancy: A multilevel analysis using the racial segregation interaction index." *Social Science & Medicine* 107:26-36.

Yang, Tse-Chuan, Yunhan Zhao, and Qian Song. Forthcoming. "Residential segregation and racial disparities in self-rated health: How do dimensions of residential segregation matter?" *Social Science Research*.

Yinger, John. 1998. "Housing discrimination is still worth worrying about." *Housing Policy Debate* 9(4):893-927.

APPENDIX

TABLE 1. Descriptive Statistics for Variables Used in Multilevel Binary Logistic Regression Models of Poor Self-Rated Health

	Blacks		Latinos		Asians		Whites			
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Range	Description
Dependent Variable:										
Poor Self-Rated Health	0.26	0.44	0.27	0.45	0.11	0.31	0.15	0.36	0 to 1	1=Poor/fair self-rated health, 0=else
Independent Variables:										
Level 1:										
Age	52.03	16.95	44.91	16.47	45.72	17.31	55.80	17.10	18 to 99	Age in years
Female	0.67	0.47	0.60	0.49	0.52	0.50	0.59	0.49	0 to 1	1=female, 0=male
Education	13.82	3.06	12.38	4.12	16.10	2.70	14.95	2.92	0 to 18	0=no school, 5=elementary, 10=some high school, 12=high school, 14=some college, 18=college graduate
Married	0.30	0.46	0.47	0.50	0.61	0.49	0.55	0.50	0 to 1	1=married, 0=else
Employment Status										
Employed (reference)	0.42	0.49	0.48	0.50	0.55	0.50	0.44	0.50	0 to 1	1=employed for wages, 0=else
Self-employed	0.04	0.20	0.07	0.26	0.07	0.26	0.08	0.27	0 to 1	1=self-employed, 0=else
Unemployed	0.11	0.31	0.10	0.30	0.06	0.24	0.05	0.22	0 to 1	1=unemployed/out of work, 0=else
Outside Workforce	0.43	0.49	0.35	0.48	0.31	0.46	0.43	0.49	0 to 1	1=homemaker/student/retired/unable to work, 0=else
Income										
< $15,000 (reference)	0.18	0.39	0.19	0.39	0.06	0.24	0.07	0.25	0 to 1	1=less than $15,000, 0=else
$15,000 to $25,000	0.21	0.41	0.24	0.43	0.09	0.29	0.12	0.33	0 to 1	1=$15,000 to $25,000, 0=else
$25,000 to $35,000	0.12	0.32	0.12	0.32	0.08	0.27	0.09	0.29	0 to 1	1=$25,000 to $35,000, 0=else
$35,000 to $50,000	0.12	0.33	0.11	0.31	0.11	0.32	0.13	0.33	0 to 1	1=$35,000 to $50,000, 0=else
$50,000 or More	0.25	0.43	0.22	0.42	0.53	0.50	0.47	0.50	0 to 1	1=$50,000 or more, 0=else
Don't Know/Refused	0.12	0.32	0.13	0.33	0.12	0.32	0.12	0.33	0 to 1	1=don't know/refused, 0=else
Insured	0.83	0.38	0.70	0.46	0.89	0.31	0.92	0.27	0 to 1	1=health insurance, 0=else
Exercise	0.69	0.46	0.70	0.46	0.78	0.41	0.78	0.42	0 to 1	1=exercised at least once in past month, 0=else
Smoker	0.20	0.40	0.15	0.35	0.09	0.28	0.15	0.36	0 to 1	1=smokes at least sometimes, 0=else
Drinker	0.42	0.49	0.46	0.50	0.45	0.50	0.58	0.49	0 to 1	1=at least one drink in past 30 days, 0=else

Level 2:	Mean	SD	Range	Description
Black Isolation	27.13	20.94	0.9 to 69.96	0=no isolation, 100=complete isolation
Latino Isolation	20.57	18.09	1.13 to 91.42	0=no isolation, 100=complete isolation
Asian Isolation	7.44	8.46	0.9 to 74.69	0=no isolation, 100=complete isolation
White Isolation	4.97	14.10	4.97 to 95.69	0=no isolation, 100=complete isolation
Log Median Income	10.81	0.16	10.43 to 11.34	Median household income in dollars
Log Population	13.36	1.14	11.31 to 16.75	Log of population size in number of people
Income Segregation	0.13	0.04	0.05 to 0.22	0=no income segregation, 1=total income segregation
% Poverty	15.04	3.75	7 to 33.4	Percent of population in poverty
% Unemployment	10.03	2.25	4.1 to 17	Percent of unemployed population
% Recent Immigration	40.21	9.55	21.2 to 67.8	Percent of population who are recent immigrants

Note: Black Model: Level 1 N=52,072. Latino Model: Level 1 N=37,398. Asian Model: Level 1 N=12,651. White Model: Level 1 N= 388,987. Level 2 N=161.
Level 1 data come from the 2011-2012 Behavioral Risk Factor Surveillance System.
Level 2 data come from the 2010 United States Census and the American Communities Study.

TABLE 2. Coefficients (Standard Errors) and Odds Ratios for Multilevel Binary Logistic Regression Models of Poor Self-Rated Health for Black Respondents

	Model 1		Model 2		Model 3		Model 4		Model 5	
Variable Name	β	OR	β	OR	β	OR	β	OR	β	OR
Fixed Effects:										
Level 1 Variables:										
Age	0.015***	1.289	0.015***	1.288	0.015***	1.288	0.015***	1.288	0.015***	1.288
	(0.001)		(0.001)		(0.001)		(0.001)		(0.001)	
Female	0.002	1.002	0.002	1.002	0.002	1.002	0.002	1.002	0.002	1.002
	(0.025)		(0.025)		(0.025)		(0.025)		(0.025)	
Education	-0.068***	0.811	-0.068***	0.812	-0.068***	0.812	-0.068***	0.811	-0.068***	0.811
	(0.004)		(0.004)		(0.004)		(0.004)		(0.004)	
Married	0.006	1.006	0.006	1.006	0.007	1.007	0.006	1.006	0.006	1.007
	(0.027)		(0.027)		(0.027)		(0.027)		(0.027)	
Employment Status[a]										
Self-Employed	0.138*	1.148	0.138*	1.148	0.138*	1.148	0.138*	1.148	0.138*	1.147
	(0.065)		(0.065)		(0.065)		(0.065)		(0.065)	
Unemployed	0.466***	1.593	0.466***	1.594	0.466***	1.594	0.466***	1.594	0.466***	1.593
	(0.041)		(0.041)		(0.041)		(0.041)		(0.041)	
Outside Workforce	0.910***	2.485	0.910***	2.485	0.910***	2.485	0.910***	2.485	0.910***	2.485
	(0.030)		(0.030)		(0.030)		(0.030)		(0.030)	
Income[b]										
$15K to <$25K	-0.295***	0.745	-0.294***	0.745	-0.294***	0.745	-0.294***	0.745	-0.294***	0.745
	(0.031)		(0.031)		(0.031)		(0.031)		(0.031)	
$25K to <$35K	-0.566***	0.568	-0.565***	0.568	-0.565***	0.568	-0.565***	0.568	-0.565***	0.568
	(0.040)		(0.040)		(0.040)		(0.040)		(0.040)	
$35K to <$50K	-0.798***	0.450	-0.797***	0.451	-0.797***	0.451	-0.797***	0.451	-0.797***	0.451
	(0.045)		(0.045)		(0.045)		(0.045)		(0.045)	
>$50K	-1.081***	0.339	-1.084***	0.338	-1.084***	0.338	-1.084***	0.338	-1.084***	0.338
	(0.045)		(0.045)		(0.045)		(0.045)		(0.045)	
Don't Know/Refused	-0.561***	0.571	-0.561***	0.571	-0.561***	0.571	-0.561***	0.571	-0.561***	0.571
	(0.038)		(0.038)		(0.038)		(0.038)		(0.038)	
Insured	-0.036	0.964	-0.036	0.965	-0.036	0.965	-0.036	0.965	-0.036	0.965
	(0.032)		(0.031)		(0.031)		(0.031)		(0.031)	
Exercise	-0.667***	0.513	-0.667***	0.513	-0.667***	0.513	-0.667***	0.513	-0.667***	0.513
	(0.023)		(0.023)		(0.023)		(0.023)		(0.023)	

Smoker	0.337***	1.401	0.337***	1.401	0.337***	1.401	0.337***	1.401	0.337***	1.401
	(0.028)		(0.028)		(0.028)		(0.028)		(0.028)	
Drinker	-0.270***	0.764	-0.270***	0.764	-0.270***	0.764	-0.270***	0.764	-0.270***	0.764
	(0.025)		(0.025)		(0.025)		(0.025)		(0.025)	
Level 2 Variables:										
Black Isolation	0.007***	1.163	0.005***	1.118	0.004**	1.088	0.006***	1.130	0.005**	1.103
	(0.002)		(0.001)		(0.001)		(0.002)		(0.002)	
Log Median Income			-0.975***	0.852	-1.421***	0.791	-0.979***	0.851	-1.427***	0.791
			(0.182)		(0.283)		(0.182)		(0.281)	
Log Population			-0.027	0.970	-0.061	0.933	-0.035	0.961	-0.069*	0.925
			(0.026)		(0.032)		(0.028)		(0.033)	
Income Segregation					2.733*	1.101			2.730**	1.101
					(1.065)				(1.057)	
% Poverty					-0.022	0.921			-0.021	0.926
					(0.014)				(0.014)	
% Unemployed					-0.004	0.991			-0.008	0.981
					(0.013)				(0.014)	
% Recent Immigration							-0.002	0.977	-0.003	0.969
							(0.003)		(0.003)	
<u>Random Effect:</u>										
Intercept Variance		0.069		0.039		0.035		0.038		0.034
Level 2 Pseudo R^2		0.169		0.530		0.578		0.542		0.590
AIC		50333.400		50295.240		50293.080		50296.610		50293.950
BIC		50501.750		50481.300		50505.730		50491.540		50515.460

Note: Level 1 N=57,072. Level 2 N=161. The models also include constants. β=Coefficient. OR=Odds ratio (factor change). [a]Reference = Employed. [b]Reference = < $15K. *p<.05, **p<.01, ***p<.001 (two-tailed). The Level 2 Pseudo R^2 is the proportion reduction in the intercept variable from a model with only level 1 variables to the current model. The intercept variance for model with only level 1 variables is: 0.083. The odds ratios for all continuous variables are x-standardized.

TABLE 3. Coefficients (Standard Errors) and Odds Ratios for Multilevel Binary Logistic Regression Models of Poor Self-Rated Health for Latino Respondents

	Model 1		Model 2		Model 3		Model 4		Model 5	
Variable Name	β	OR	β	OR	β	OR	β	OR	β	OR
Fixed Effects:										
Level 1 Variables:										
Age	0.028***	1.595	0.028***	1.595	0.028***	1.595	0.028***	1.595	0.028***	1.595
	(0.001)		(0.001)		(0.001)		(0.001)		(0.001)	
Female	-0.040	0.960	-0.041	0.960	-0.041	0.960	-0.041	0.960	-0.041	0.960
	(0.028)		(0.028)		(0.028)		(0.028)		(0.028)	
Education	-0.089***	0.694	-0.089***	0.694	-0.089***	0.694	-0.089***	0.694	-0.089***	0.694
	(0.004)		(0.004)		(0.004)		(0.004)		(0.004)	
Married	-0.033	0.968	-0.032	0.968	-0.032	0.968	-0.032	0.968	-0.032	0.968
	(0.028)		(0.028)		(0.028)		(0.028)		(0.028)	
Employment Status[a]										
Self-Employed	0.013	1.013	0.013	1.014	0.014	1.014	0.014	1.014	0.014	1.014
	(0.055)		(0.055)		(0.055)		(0.055)		(0.055)	
Unemployed	0.244***	1.277	0.244***	1.277	0.244***	1.276	0.244***	1.277	0.244***	1.277
	(0.045)		(0.045)		(0.045)		(0.045)		(0.045)	
Outside Workforce	0.416***	1.517	0.416***	1.516	0.416***	1.516	0.416***	1.516	0.416***	1.516
	(0.032)		(0.032)		(0.032)		(0.032)		(0.032)	
Income[b]										
$15K to <$25K	-0.360***	0.698	-0.360***	0.698	-0.360***	0.698	-0.360***	0.698	-0.360***	0.698
	(0.036)		(0.036)		(0.036)		(0.036)		(0.036)	
$25K to <$35K	-0.670***	0.512	-0.670***	0.512	-0.670***	0.512	-0.670***	0.512	-0.670***	0.512
	(0.048)		(0.048)		(0.048)		(0.048)		(0.048)	
$35K to <$50K	-0.852***	0.427	-0.852***	0.427	-0.852***	0.427	-0.852***	0.427	-0.852***	0.427
	(0.054)		(0.054)		(0.054)		(0.054)		(0.054)	
>$50K	-1.303***	0.272	-1.304***	0.271	-1.304***	0.271	-1.304***	0.271	-1.304***	0.271
	(0.053)		(0.053)		(0.053)		(0.053)		(0.053)	
Don't Know/Refused	-0.561***	0.570	-0.561***	0.570	-0.562***	0.570	-0.561***	0.570	-0.561***	0.570
	(0.044)		(0.044)		(0.044)		(0.044)		(0.044)	
Insured	-0.162***	0.851	-0.162***	0.851	-0.162***	0.851	-0.162***	0.851	-0.162***	0.851
	(0.031)		(0.031)		(0.031)		(0.031)		(0.031)	
Exercise	-0.547***	0.578	-0.547***	0.578	-0.547***	0.578	-0.547***	0.578	-0.547***	0.578
	(0.027)		(0.027)		(0.027)		(0.027)		(0.027)	

Smoker	0.345***	1.412	0.345***	1.412	0.345***	1.412	0.345***	1.412	0.345***	1.412
	(0.036)		(0.036)		(0.036)		(0.036)		(0.036)	
Drinker	-0.353***	0.703	-0.353***	0.703	-0.353***	0.703	-0.353***	0.703	-0.353***	0.703
	(0.029)		(0.029)		(0.029)		(0.029)		(0.029)	
Level 2 Variables:										
Latino Isolation	0.009***	1.180	0.009***	1.176	0.008***	1.159	0.009***	1.184	0.008**	1.164
	(0.002)		(0.002)		(0.002)		(0.002)		(0.003)	
Log Median Income			-0.270	0.956	-0.200	0.968	-0.258	0.958	-0.202	0.967
			(0.213)		(0.343)		(0.215)		(0.343)	
Log Population			-0.004	0.996	-0.061	0.933	-0.004	0.995	-0.061	0.933
			(0.032)		(0.042)		(0.032)		(0.042)	
Income Segregation					2.406	1.089			2.357	1.087
					(1.348)				(1.371)	
% Poverty					0.004	1.014			0.003	1.011
					(0.016)				(0.016)	
% Unemployed					0.018	1.042			0.019	1.043
					(0.016)				(0.017)	
% Recent Immigration							0.002	1.016	0.001	1.009
							(0.005)		(0.005)	
Random Effect:										
Intercept Variance		0.087		0.087		0.083		0.087		0.083
Level 2 Pseudo R^2		0.230		0.230		0.265		0.230		0.265
AIC		36551.380		36553.190		36555.000		36555.050		36556.970
BIC		36713.440		36732.300		36759.710		36742.690		36770.200

Note: Level 1 N=37,398. Level 2 N=161. The models also include constants. β=Coefficient. OR=Odds ratio (factor change). [a]Reference = Employed. [b]Reference = < $15K. *p<.05, **p<.01, ***p<.001 (two-tailed). The Level 2 Pseudo R^2 is the proportion reduction in the intercept variable from a model with only level 1 variables to the current model. The intercept variance for model with only level 1 variables is: 0.113. The odds ratios for all continuous variables are x-standardized.

TABLE 4. Coefficients (Standard Errors) and Odds Ratios for Multilevel Binary Logistic Regression Models of Poor Self-Rated Health for Asian Respondents

	Model 1		Model 2		Model 3		Model 4	
Variable Name	β	OR	β	OR	β	OR	β	OR
Fixed Effects:								
Level 1 Variables:								
Age	0.027***	1.583	0.027***	1.582	0.027***	1.582	0.026***	1.582
	(0.002)		(0.002)		(0.002)		(0.002)	
Female	-0.162*	0.850	-0.164*	0.849	-0.163*	0.850	-0.162*	0.850
	(0.064)		(0.064)		(0.064)		(0.064)	
Education	-0.059***	0.853	-0.059***	0.853	-0.059***	0.853	-0.059***	0.852
	(0.011)		(0.011)		(0.011)		(0.011)	
Married	-0.072	0.931	-0.071	0.932	-0.070	0.933	-0.071	0.931
	(0.067)		(0.067)		(0.067)		(0.067)	
Employment Status[a]								
Self-Employed	-0.051	0.950	-0.051	0.950	-0.046	0.955	-0.050	0.951
	(0.133)		(0.134)		(0.133)		(0.133)	
Unemployed	0.540***	1.716	0.540***	1.717	0.541***	1.718	0.539***	1.714
	(0.118)		(0.118)		(0.118)		(0.118)	
Outside Workforce	0.339***	1.404	0.339***	1.404	0.338***	1.403	0.340***	1.404
	(0.076)		(0.076)		(0.076)		(0.076)	
Income[b]								
$15K to <$25K	-0.171	0.843	-0.172	0.842	-0.166	0.847	-0.168	0.846
	(0.123)		(0.123)		(0.123)		(0.123)	
$25K to <$35K	-0.391**	0.676	-0.393**	0.675	-0.387**	0.679	-0.387**	0.679
	(0.136)		(0.136)		(0.136)		(0.136)	
$35K to <$50K	-0.517***	0.596	-0.518***	0.595	-0.512***	0.599	-0.511***	0.599
	(0.129)		(0.129)		(0.129)		(0.129)	
>$50K	-0.818***	0.441	-0.821***	0.440	-0.816***	0.442	-0.813***	0.444
	(0.118)		(0.118)		(0.118)		(0.118)	
Don't Know/Refused	-0.468***	0.626	-0.471***	0.625	-0.464***	0.629	-0.463***	0.629
	(0.127)		(0.127)		(0.127)		(0.127)	
Insured	-0.131	0.877	-0.132	0.876	-0.135	0.874	-0.132	0.876
	(0.098)		(0.099)		(0.099)		(0.098)	
Exercise	-0.621***	0.538	-0.620***	0.538	-0.621***	0.537	-0.621***	0.537
	(0.067)		(0.067)		(0.067)		(0.067)	

Smoker	0.463***	1.589	0.462***	1.587	0.460***	1.584	0.462***	1.587
	(0.098)		(0.098)		(0.098)		(0.098)	
Drinker	-0.216**	0.805	-0.217**	0.805	-0.217**	0.805	-0.216**	0.805
	(0.068)		(0.068)		(0.068)		(0.068)	
Level 2 Variables:								
Asian Isolation	0.007*	1.058	0.008**	1.070	0.009**	1.083	0.004	1.040
	(0.003)		(0.003)		(0.003)		(0.003)	
Log Population			-0.066	0.928	-0.024	0.973		
			(0.038)		(0.058)			
Income Segregation					-3.857	0.873		
					(2.114)			
% Unemployed					0.058*	1.139		
					(0.023)			
% Recent Immigration							-0.017*	0.854
							(0.007)	
Random Effect:								
Intercept Variance		0.034		0.026		0.028		0.026
Level 2 Pseudo R^2		0.534		0.644		0.616		0.644
AIC		7712.307		7711.366		7703.592		7708.961
BIC		7853.771		7860.275		7867.393		7857.871

Note: Level 1 N=12,651. Level 2 N=159. The models also include constants. β=Coefficient. OR=Odds ratio (factor change). [a]Reference = Employed. [b]Reference = < $15K. *p<.05, **p<.01, ***p<.001 (two-tailed). The Level 2 Pseudo R^2 is the proportion reduction in the intercept variable from a model with only level 1 variables to the current model. The intercept variance for model with only level 1 variables is: 0.073. The odds ratios for all continuous variables are x-standardized.