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Racial Residential Segregation and Health Care Access

The link between racial residential segregation and health has been documented since the 1950s (Kramer and Hogue, 2009). For the most part, the findings have been consistent: segregation is deleterious to health (Grady and McLafferty, 2007; Chang, 2006; Subramanian et al., 2005; LaVeist, 2003; Cooper et al., 2001; Jackson et al., 2000). One mechanism by which a segregated neighborhood environment may negatively affect health is through decreased access to health care. For example, a recent study showed that racial/ethnic composition, i.e. the proportion or percent of a group (e.g. blacks) in a given area (e.g. census tract), is negatively related with health care access and utilization. Gaskin et al. (2011) found that compared to whites, African Americans living in zip codes that were predominately white, black, or Hispanic, were less likely to use health care services. Hispanic Americans were also disadvantaged in health care access when living in predominately white or Hispanic zip codes, compared to whites. Overall, the results indicate that health care disparities are related to the racial/ethnic composition of the neighborhood, as well as individual race and ethnic status (Gaskin et al., 2011). This study was unable to look at Asian Americans because there were only a few of them in the sample that lived in predominately Asian zip codes.

Other studies report different findings, however. For example, Coughlin et al. (2007) found that for African Americans, living in counties with a higher percentage of black women, is positively associated with having had a recent mammography or Pap smear. Similarly, Bennjamins and colleagues (2004) showed a positive relationship between racial homogenous neighborhoods and use of preventive health care services. Some authors suggest that residing in a racially homogenous community aids in the formation of social networks, which in turn can open up channels of information regarding the health care system and health behaviors (Gresenz et al., 2009; Hass et al., 2004). More research is needed to determine whether living in these communities produces a health-protective effect for their residents, net of the social and economic isolation.

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New Contribution

While there are a range of measures, many researchers continue to use racial/ethnic composition as a proxy for residential segregation. Some scholars argue that this is a very crude measure of segregation (Kramer and Hogue, 2009; Acevedo-Garcia et al., 2003). It says nothing about the distribution of people in space and does not specify a particular reference group. Moreover, decades of work by social scientists on the nature of racial residential segregation have produced more precise measurements. Indeed, the segregation-health literature has been critiqued for its lack of attention to the different dimensions of segregation (Acevedo-Garcia et al., 2003; Chang, 2006). Massey and Denton (1988) describe its five dimensions: evenness, isolation, concentration, clustering, and centralization.

Here, I examine two different segregation measures and determine their impact on health care access and utilization. This is part of a larger dissertation project aimed at understanding the link between segregation and health care access. My goal is to examine multiple indices of segregation what effect they have, if any, on health care outcomes. Because each measure reflects a particular dimension or facet of segregation (Massey and Denton, 1988), it may shed light on the mechanisms and pathways that link segregation to health care outcomes. Furthermore, it may begin to uncover which social or environmental characteristics of the neighborhood are driving this relationship. To my knowledge, no prior studies have compared the effect of different dimensions of segregation on access to health care.

Methods

Data sources: Individual-level data are from the 2009 Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS, initiated in 1984, is an annual telephone interview survey coordinated by the Centers for Disease Control (Mokdad, 2009). The survey includes representative samples of non-institutionalized U.S. adult population from each of the 50 states, including the District of Columbia and three U.S. territories. Its objective is to collect data on health practices and health-related conditions including tobacco use, health care coverage, HIV/AIDS knowledge and prevention, physical activity, and fruit and vegetable consumption. County-level data are from the 2009 American Community Survey and the 2009 Area Resource File. These data were merged with the BRFSS by matching the Federal Information Processing Standards (FIPS) codes with each survey respondent's residence. County is the lowest level of geography available from the BRFSS for public use.

Sample: The overall sample size in the 2009 BRFSS is 432,607. This analysis excludes data from the three U.S. territories (Guam, Puerto Rico, and Virgin Islands) and is limited to Asians, blacks, Hispanics, and whites (aged 18-99 years). After adjustment for missing data, the resulting sample size is 315,160, consisting of 5,891 Asians; 25,686 blacks; 20,459 Hispanics/Latinos; and 262,124 whites. There are 2,236 counties in the sample, with an average of 621 persons per county.

Dependent Variables: I use two indicators from the BRFSS to measure health care access and utilization. Respondents were asked if they have a personal doctor or health care provider. For simplicity, this variable will be referred to as "regular source of care". Respondents were also asked if during the past 12 months, they got a flu shot. Both variables are dichotomous (0=no and 1=yes), so that odds ratios less than 1 indicate less access to health care.

Independent Variables: I test the two widely used indices in the segregation-health literature: dissimilarity and isolation. These measures are considered more formal measures of segregation compared to racial/ethnic composition.

The dissimilarity index is defined as the proportion of the racial/ethnic group of interest that would need to move across neighborhoods (e.g. census tracts) in a given metropolitan area (e.g. county) in order to achieve even distribution. The index ranges from 0=no residential segregation, to 1=complete segregation.

The isolation index measures the extent to which a member of a racial/ethnic group is likely to be in contact with members of this same group (as opposed to members of other groups). This index also ranges from 0=no residential segregation, to 1=complete segregation. I calculated the isolation index with the non-Hispanic white population as the referent group rather than the total population (excluding the minority group of interest). This calculation replicates those employed in Massey and Denton (1988) and in the *Census 2000 Special Reports, Racial and Ethnic Segregation in the United States: 1980-2000*.

I also control for a large number of individual-level characteristics that have been shown to influence access to care: race/ethnicity, sex, age, marital status, educational attainment, annual household income, and self-rated general health status. In addiiton, I include in the models two county-level variables: percent of people living under the federal poverty level and the number of hospitals per 100,000 population.

Analysis: I used multivariate logistic regression models to analyze the data. The data are weighted to ensure the findings are nationally representative and standard errors are adjusted for clustering by county.

Results

Table 1 models the effect of county-level segregation, as measured by the dissimilarity index, on individual reports of having a regular source of care. Each of the three dissimilarity indices was evaluated separately but none reached statistical significance. In contrast, Hispanic-white isolation and Asian-white isolation were significantly and negatively related to having a regular source of care (Table 2). However, black-white isolation was not significantly associated with this particular outcome.

The model shown in Table 3 accounts for several confounders at the individual-level, including age, sex, marital status, education, household income, health insurance status, and self-rated health. The direct and negative effects of segregation do not go away with the addition of these individual-level controls. The interaction term for asian X asian/white isolation is significant indicating that for Asians, regular source of care is modified by the level of Asian-white isolation. As Asian-white isolation increases, the predicted probability for having a usual source of care goes up. Thus, Asians seem to have better health care access as their level of residential isolation increases. The hispanic X hispanic/white isolation interaction term is negative but is not statistically significant.

Table 4 shows whether the dissimilarity index has an effect on utilization of preventive services, i.e. getting a flu shot in the past year. Dissimilarity indices for blacks, Hispanics, and Asians are not significantly related to getting the flu shot. In contrast, Table 5 shows that black-white, Hispanic-white, and Asian-white isolation are statistically significant and have negative impact on individual reports of getting flu shots.

In the following table (Table 6), several individual-level confounders are added, as well as race-by-isolation interaction terms. Significant interaction terms for Hispanic Americans indicate that the probability of getting a flu shot decreases as the level of Hispanic-white isolation increases. Asian Americans, on the other hand, appear to have slightly better rates of flu shot utilization as the level of Asian-white isolation increases.

Discussion

In contrast to previous studies that have relied on racial/ethnic composition as a proxy for racial residential segregation, I employ more formal measures of segregation to examine disparities in health care access and utilization. Analyses show that the isolation index has a significant effect on usual source of care and getting a flu shot. The dissimilarity index did not research statistical significance, however. Thus, the segregation dimension of exposure may be the mechanism behind the relationship between segregation and access to health care. This is consistent with my hypothesis and prior research, which also find that the

dissimilarity index is not related to other health-related outcomes, such as self-rated health status (Subramanian et al., 2005) and weight gain (Chang, 2006). Indeed, some authors suggest that *exposure* to neighbors with similar racial/ethnic backgrounds, nativity status or common language facilitate social connections (Gresenz et al., 2009; Inagami et al., 2006). For example, Derose (2000) finds that the ability of Hispanic women to obtain care depends heavily on their connections with other Hispanic friends that already have experience navigating the pathways to care. Some immigrant communities also show high levels of social capital, including greater social ties and support networks, as well as better identification with in-group norms and goals (Portes and Rumbaut, 2001).

The findings also reveal that having a regular source of care and use of preventive services is more limited in counties with higher Hispanic-white and Asian-white segregation. This relationship remains significant after adjusting for several individual-level characteristics, such as race/ethnicity, educational attainment, and annual household income. However, results also suggest that for Asian Americans, a very high degree of contact with other Asians becomes positively associated with health care access and utilization. While for Hispanic Americans, higher residential isolation is negatively related with getting a flu shot.

Table 1. Effect of segregation (as measured by the dissimilarity index) on regular source of care

	OR(SE)[1]		
	Models		
	(1)	(2)	(3)
Independent Variables			
black/white dissimilarity	1.361 (0.348)		
hispanic/white dissimilarity		0.881 (0.332)	
asian/white dissimilarity			1.565 (0.340)

[1] Odds ratio less than 1 indicates no regular source of care.
*** p<0.001, ** p<0.01, * p<0.05

Table 2. Effect of segregation (as measured by the isolation index) on regular source of care

	OR(SE)[1]		
	Models		
	(1)	(2)	(3)
Independent Variables			
black/white isolation	0.832 (0.124)		
hispanic/white isolation		0.410***(0.044)	
asian/white isolation			0.355***(0.073)

[1] Odds ratio less than 1 indicates no regular source of care.
*** p<0.001, ** p<0.01, * p<0.05

Table 3. Effect of segregation on regular source of care (full model, includes individual-level and county-level variables)

	OR(SE)[1]	
	Models	
	(1)	(2)
Independent Variables		
Segregation Measures (county-level)		
hispanic/white isolation	0.704***(0.061)	
asian/white isolation		0.531***(0.0678)
Interaction terms		
hispanic X hispanic/white isolation	0.915 (0.253)	
asian X asian/white isolation		2.572** (0.995)

Model includes individual-level variables: age, sex, martial status, educational attainment, annual income, health insurance status, and self-rated health; and county-level variables: % poverty and number of hospitals.
[1] Odds ratio less than 1 indicate no regular source of care.
*** p<0.001, ** p<0.01, * p<0.05 † p<0.10

Table 4. Effect of segregation (as measured by the dissimilarity index) on getting a flu shot

	OR (SE)[1]		
	Models		
	(1)	(2)	(3)
Independent Variables			
black/white dissimilarity	0.795 (0.112)		
hispanic/white dissimilarity		0.756 (0.154)	
asian/white dissimilarity			0.918 (0.109)

[1] Odds ratio less than 1 indicates no flu shot.
*** p<0.001, ** p<0.01, * p<0.05

Table 5. Effect of segregation (as measured by the isolation index) on getting a flu shot

	OR (SE)[1]		
	Models		
	(1)	(2)	(3)
Independent Variables			
black/white isolation	0.770***(0.062)		
hispanic/white isolation		0.614***(0.047)	
asian/white isolation			0.557***(0.093)

[1] Odds ratio less than 1 indicates no flu shot.
*** p<0.001, ** p<0.01, * p<0.05

Table 6. Effect of segregation on getting a flu shot (full model, includes individual-level and county-level variables)

	OR(SE)[1]		
	Models		
	(1)	(2)	(3)
Independent Variables			
Segregation Measures (county-level)			
black/white isolation	0.874† (0.072)		
hispanic/white isolation		0.784*** (0.056)	
asian/white isolation			0.615*** (0.084)
Interaction terms			
black X black/white isolation	0.997 (0.157)		
hispanic X hispanic/white isolation		0.478*** (0.070)	
asian X asian/white isolation			1.641* (0.448)

Model includes individual-level variables: age, sex, martial status, educational attainment, annual income, health insurance status, and self-rated health; and county-level variables: % poverty and number of hospitals.

[1] Odds ratio less than 1 indicate no flu shot.

*** p<0.001, ** p<0.01, * p<0.05 † p<0.10

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