



# Residential segregation and racial disparities in self-rated health: How do dimensions of residential segregation matter?



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## ABSTRACT

Previous research on segregation and health has been criticized for overlooking the fact that segregation is a multi-dimensional concept (i.e., evenness, exposure, concentration, centralization, and clustering) and recent evidence drawn from non-black minorities challenges the conventional belief that residential segregation widens racial health disparities. Combining a survey data ( $n = 18,752$ ) from Philadelphia with the 2010 Census tract ( $n = 925$ ) data, we examine two theoretical frameworks to understand why the association of segregation with health may differ by race/ethnicity. Specifically, we investigate how each dimension of segregation contributed to racial disparities in self-rated health. We found (1) high levels of white/black concentration could exacerbate the white/black health disparities up to 25 percent, (2) the white/Hispanic health disparities was narrowed by increasing the level of white/Hispanic centralization, and (3) no single dimension of segregation statistically outperforms others. Our findings supported that segregation is bad for blacks but may be beneficial for Hispanics.

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## 1. Introduction

A decade ago, Acevedo-Garcia et al. (2003) encouraged health researchers to use a multilevel research framework to investigate the association of racial segregation with individual health outcomes. Since then, hierarchical modeling has been commonly used to explore whether an individual's health outcomes are associated with his/her neighborhood racial segregation (Chang, 2006; Subramanian et al., 2005). The majority of the research focusing on non-Hispanic black population (blacks hereafter) found that segregation from non-Hispanic whites (whites hereafter) is adversely related to individual health (Chang, 2006; Kramer and Hogue, 2009; Subramanian et al., 2005) and this knowledge stream has formed the common belief that segregation exacerbates racial/ethnic health disparities (Kramer and Hogue, 2009; Williams and Collins, 2001). However, whether this negative association holds true for non-black minorities remains unclear. Several recent studies in the United States (US) (Kershaw et al., 2013; Osypuk et al., 2009; Vega et al., 2011; Walton, 2009; Yang et al., 2014) reported protective relationships between racial segregation and health outcomes (e.g., depression, maternal smoking, and birth outcomes) among Hispanics and Asians, which contradicts the contention that "racial segregation is bad for health" (Kramer and Hogue, 2009).

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In addition, the concept of segregation is defined as the extent to which two or more social groups are spatially differentiated across subunits that comprise a main unit of interest (Massey and Denton, 1988). When race/ethnicity is used to classify social groups, racial segregation is hence defined. More importantly, segregation consists of five dimensions, namely evenness, exposure, concentration, centralization, and clustering (Massey and Denton, 1988). Each dimension represents a unique spatial distribution pattern of race/ethnicity groups within an area (Reardon and O'Sullivan, 2004) and the five dimensions may not be highly correlated with one another (Wilkes and Iceland, 2004). Thus, their relationships with individual health outcomes may be discordant. However, the literature on segregation and health heavily relied on the exposure and evenness dimension (Kramer and Hogue, 2009) and little research has examined the five dimensions simultaneously (c.f. Biello et al., 2013) to understand if the association between segregation and health varies by the dimension of segregation.

The goal of this study is two-fold. One is to argue that the recent findings related to the protective associations between segregation and health among non-black minorities may not be “unexpected” as the social processes of racial segregation essentially differ by race/ethnicity. We propose two theoretical frameworks for black and non-black minorities, respectively, in order to explain why segregation may widen the white/black health disparities but narrow the white/non-black minorities ones. On the other hand, we will empirically examine the theoretical frameworks using all five dimensions of segregation to understand whether the choice of segregation dimension matters.

Following is a comprehensive review of relevant literature and a proposal for the theoretical frameworks that explain why the relationships between segregation and health vary between black and non-black minorities, followed by a discussion of data and methods used to examine the frameworks. Then the analytic results will be presented and we will discuss the findings and revisit the hypotheses in the last section.

## 2. Literature review

### 2.1. Segregation and health: divergent findings

Since the call for research on how segregation is associated with racial/ethnic health disparities (Acevedo-Garcia et al., 2003), a growing body of literature has adopted a multilevel framework to heed this call. Given the history of racial segregation in the US, the majority of the studies in the past decade have been focused on white/black segregation and health disparities and their findings largely supported the notion that white/black segregation is detrimental to white/black health disparities (Kramer and Hogue, 2009). For example, using the concept of hypersegregation developed by Wilkes and Iceland (2004), Osypuk and Acevedo-Garcia (2008) found that black infants in hypersegregated metropolitan areas were more likely to be preterm births. Similarly, Kershaw et al., (2011) reported that the white-black disparity in hypertension was larger in highly segregated (measured with isolation index) areas than in low-segregation places. Only a few studies have found that segregation improves health outcomes among blacks or narrows the white/black health gaps (such as birth weight and cancer diagnosis) after controlling for other confounders (Bell et al., 2006; Corral et al., 2012; Grady, 2010; Haas et al., 2008; Mobley et al., 2006).

Due to the rapid change in the racial/ethnic landscape, researchers, particularly urban sociologists, have begun to investigate the causes and consequences of segregation between whites and other non-black minorities, such as Hispanics and Asians (Glaeser and Vigdor, 2001; Iceland and Scopilliti, 2008). With this growing interest, several studies have expanded the scope to inquire whether the negative relationship between segregation and health can be applied to non-black minorities, and their findings challenge the literature based on white/black segregation. More specifically, white/Hispanic segregation has been found to protect Hispanics from an array of adverse health outcomes, such as coronary heart disease (Mobley et al., 2006), physical disability (Lee and Ferraro, 2007), late diagnosis of breast cancer (Haas et al., 2008), obesity (Kershaw et al., 2013), and maternal smoking (Yang et al., 2014). That is, living in areas where Hispanics are segregated from whites is beneficial to Hispanics' health outcomes.

With respect to Asians, the support for a protective effect of segregation on health remains scant. We found only two studies that explicitly measured white/Asian segregation and explored the relationship between segregation and health. Walton (2009) adopted two dimensions of segregation—exposure and clustering—to examine if the odds of having a low birth weight infant were associated with segregation. It was concluded that the odds were lower among Asian mothers who lived in a high-segregation metropolitan area than their counterparts in a low-segregation area. A similar finding was reported by Yang et al. (2014) that living in a racially segregated (i.e., exposure dimension) county reduces the probability of maternal smoking during pregnancy. It should be noted that other individual and ecological factors could not fully explain this protective effect of segregation among Asians.

The discussion above suggests that the effect of segregation on health disparities varies by minority groups and, in general, white/black segregation is detrimental to blacks while the segregation between whites and non-black minorities is beneficial. One plausible explanation for the divergent findings is that the social processes of racial segregation in the US differ by race/ethnicity, which will be elaborated on in the subsequent section.

### 2.2. White/black segregation: ethnic stratification

The conventional wisdom that racial segregation is negatively associated with health may be rooted in the ethnic stratification perspective. The ethnic stratification perspective indicates that the existence of social, cultural, and economic

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