

Residential Segregation and Health

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Chapter #

Residential Segregation and Health

The evidence showing that neighborhood characteristics influence health continues to grow. However, neighborhoods occur in a larger context and research on neighborhoods and health needs to relate neighborhood characteristics to metropolitan-area wide processes. Residential segregation is a key variable in explaining the socioeconomic organization of U.S. metropolitan areas.

Residential segregation "sorts" population groups into various neighborhood contexts and shapes the living environment at the neighborhood level. Integrating research on neighborhoods and health, and segregation and health may elucidate mechanisms at the level of the larger socio-geographic context as well as at the neighborhood level, which in turn may have implications for social and public health policy.

1. OVERVIEW OF RACIAL RESIDENTIAL SEGREGATION

1.1 General definition

Segregation refers to the differentiation of two or more population groups among subunits of a given social space. Population groups can be divided along

racial/ethnic, social class, gender or age lines. The social space can be a geographic social space such as a metropolitan area or a school district, or an economic social space such as a labor market. Since this book is concerned with the relationship of neighborhood living conditions to health outcomes, we focus on *residential segregation*. We acknowledge, though, that other forms of segregation, e.g. racial segregation in hospital care (Smith, 1998), may also influence health.

Patterns of residential segregation are well documented for other developed and developing countries, e.g. South Africa (Christopher, 1994), Great Britain (Daley, 1998, Phillips, 1998) and Singapore (van Grunsven, 1992). However, the relationship of residential segregation by race/ethnicity to health outcomes has only been examined for the United States and South Africa. Here we focus on the U.S. studies because the South African literature has examined residential segregation in combination with other facets of the apartheid system (Heggenhougen, 1995, Kaufman, 1998, Lubanga, 1993, Nightingale *et al.*, 1990, Sarkin, 1999, Turton and Chalmers, 1990, Yach and Tollman, 1993).

1.2 Race/ethnicity or class

In the United States, there is substantial evidence that race/ethnicity is the stronger force driving residential segregation. Racial/ethnic segregation *sorts*

individuals of comparable socioeconomic status into vastly different neighborhood environments. For example, in 1990, the probability that a poor person would live in a high-poverty neighborhood (i.e. a neighborhood where the poverty rate was at least 40%) was only 6.3% whites, but 22.1% for Hispanics, and 33.5% for African Americans (Jargowsky, 1997). Although levels of racial segregation remain much higher than levels of economic segregation¹, segregation by class has been increasing, especially for African Americans and Hispanics (Darden and Bagaka's, 1997, Jargowsky, 1996).

¹ Economic segregation refers to segregation by income. However, in this Chapter, economic segregation will be used interchangeably with the term class segregation.

Additionally, in the U.S., racial residential segregation varies by demographic group. African Americans are considerably more segregated from the white population than other racial/ethnic minorities (Massey and Denton, 1993).

Overall discrimination in housing and mortgage markets and prejudice has shaped African American segregation (Yinger, 1995). Hispanic and Asian segregation is considerably less pronounced than black segregation (Massey and Denton, 1989) even though recent immigrants often settle down in "ethnic enclaves" to ease their adjustment to U.S. society (Fernandez Kelly and Schaffler, 1996).

1.3 Discrimination versus preferences

Segregation may originate from discrimination such as racial/ethnic prejudice. However, segregation may also be the result of choices or preferences, i.e. members of various population groups may choose to live separate from each other. Whether U.S. racial/ethnic residential segregation is driven by discrimination in either public or private housing markets or by choice has been the subject of considerable debate (Clark, 1989, Clark, 1991, Galster, 1988, Galster, 1989, Galster, 1996). However, because of the evidence of persistent racial discrimination in housing and mortgage markets (Yinger, 1995), the majority of U.S. studies on segregation and health have hypothesized that residential segregation is a result of institutional racism (Collins and Williams,

1999, LaVeist, 1989, LaVeist, 1993, Polednak, 1991, Polednak, 1993, Polednak, 1996, Williams, 1997, Williams, 1998).

1.4 Dimensions of Residential Segregation

Segregation refers to the composition and spatial distribution of the population of a metropolitan area across neighborhoods. Residential segregation is a multidimensional construct consisting of five distinct geographic patterns: unevenness, isolation, clustering, centralization, and concentration (Massey *et al.*, 1996, Massey and Denton, 1988). Since residential segregation refers to the separation of two groups, usually blacks from whites, we refer to the dimensions in terms of black-white segregation. However, the dimensions equally apply to other race/ethnic groups as well as economic segregation, e.g. poor from non-poor. We briefly describe each of the five dimensions below. A description of each dimension, suggested indices for measurement, and formulas are presented in the Appendix.

Unevenness refers to the distribution of blacks and whites across neighborhoods in an urban area, specifically the degree to which each neighborhood has the same proportion of blacks and whites as the urban area overall. Isolation refers to the average probability of contact at the neighborhood level between blacks and whites in the urban area. Clustering refers to ghettoization, that is to the degree to

which black neighborhoods are contiguous to each other as opposed to dispersed across the metropolitan area. Centralization refers to the degree to which black neighborhoods are located near the metropolitan area's central city as opposed to its suburbs. The dimension of centralization is relevant in the U.S. context, in particular, because segregated minorities are concentrated in central cities, which are typically the oldest, most dilapidated and most socioeconomically deprived part of the metropolitan area². Concentration refers to the population density experienced by the segregated group across the metropolitan area relative to the density experienced by other groups (Massey and Denton, 1988).

Because of the multidimensional conceptualization of segregation, a group can be segregated on more than one dimension simultaneously. For example, Blacks living in metropolitan areas with high levels of isolation might also experience high levels of clustering and concentration. Such patterns are referred to as *hypersegregation*. Although a high level of segregation on any one dimension can have deleterious social and economic consequences for the segregated group, as high levels of segregation accumulate across dimensions, the negative effects of segregation increase. In the U.S., not only do Blacks, compared to Hispanics

² In the U.S., centralization may serve as an indicator of disadvantaged neighborhood conditions. However, in other societies, the geographic concentration of poverty may have a different pattern, i.e. in Latin American developing societies, the urban periphery is generally more deprived than the central city (Lloyd-Sherlock, 1997).

and Asians, experience higher levels of segregation on any single dimension, they are also the group to experience hypersegregation (Massey and Denton, 1989).

1.5 Residential segregation, concentration of poverty and neighborhood conditions

Residential segregation has been long studied as one of the crucial influences on the socioeconomic wellbeing of African Americans. The degree to which residential segregation by race/ethnicity, residential segregation by class and economic conditions (e.g. income distribution) at the metropolitan area level explain poverty concentration among neighborhoods are the subject of a substantial body of research (Jargowsky, 1997, Massey and Denton, 1993, Wilson, 1987, Wilson, 1996). Massey and Denton (Massey and Denton, 1993) hypothesized that at the metropolitan area level, for given a poverty rate, residential segregation (i.e. unevenness) acts to concentrate poverty among neighborhoods.

In the sociological literature (see Appendix), the term poverty concentration usually refers to the distribution of poverty across neighborhoods, that is, like segregation, poverty concentration is an attribute of the entire metropolitan area (Jargowsky, 1997, Massey and Denton, 1993). However, often the term is also used to describe a high poverty rate at the neighborhood level (Wilson, 1996).

Although the two meanings of the term are related and are often confused in both the sociological and the health literature on segregation, they are not interchangeable. Particular neighborhoods may have a high poverty rate whether or not they belong to a metropolitan area characterized by poverty concentration. In this chapter poverty concentration refers to the first meaning, i.e. it is a metropolitan area attribute.

William Julius Wilson (Wilson, 1987, Wilson, 1996) has argued that high poverty in African American inner-city neighborhoods creates a uniquely disadvantaged social environment. Neighborhoods with high poverty are characterized by dilapidated and sub-standard housing, high unemployment rates, and lower average wages. Exposure to such neighborhood conditions has been linked to high rates of teenage pregnancy, as well as higher risk of joblessness and criminality among African American men (Massey and Shibuya, 1995). The potentially deleterious consequences of racial residential segregation are not limited to central cities or to the urban poor. African Americans living in the suburbs are segregated in areas with lower income levels and higher crime rates (Alba *et al.*, 1994, Logan and Alba, 1995).

2. SEGREGATION AND HEALTH

2.1 Empirical evidence

The effects of segregation on health have been examined primarily in relation to the health status of U.S. blacks. Yankauer (Yankauer, 1950) first demonstrated a relationship between the residential segregation of African Americans and infant mortality rates in urban areas. In recent years, there has been an increasing interest in the health consequences of residential segregation in the U.S.

We searched Medline for the years 1966 to June 2000 using “segregation” as a keyword and Sociofile for the years 1974 to February 2000 using “residential segregation” as a keyword. We included studies with the word segregation in the title or abstract, in which segregation referred to residential segregation. Since the majority of studies had mortality as an outcome, we chose only those studies. We also included studies of homicide if this was the main outcome of interest—and not part of battery of crime outcomes. We also reviewed the references from these studies to identify studies published before 1966. We identified 15 studies matching our inclusion criteria. Among these studies, 15 examined the association of racial (black) residential segregation and one examined economic residential segregation (Waitzman and Smith, 1998). The 14 studies focused on African American segregation and mortality are presented in Table 1.

****Insert Table 1****

The studies presented in Table 1 demonstrate that black mortality rates are higher in urban areas with higher levels of segregation. However, it is difficult to summarize the size of the effect of residential segregation on black mortality across these 15 studies because, as shown in Table 1, the outcome variable, sample of geographic areas, and year vary considerably. The few studies that examined the effect of racial residential segregation on white mortality rates had inconsistent findings (Collins and Williams, 1999, Fang *et al.*, 1998, LaVeist, 1993).

2.2 Pathways between segregation and health

In general, in agreement with the sociologic evidence, it is hypothesized that segregation affects health through concentrated poverty, the quality of neighborhood environment, and the individual socioeconomic attainment of minorities (LaVeist, 1996, Williams, 1997, Williams, 1996). For example, Collins (Collins and Williams, 1999), Guest (Guest *et al.*, 1998) and Shihadeh (Shihadeh and Flynn, 1996) examined socioeconomic disadvantage (e.g. poverty, low education, unemployment) as the pathways through which segregation affects mortality. All of these studies found that socioeconomic factors mediated, part, but not all of the association between segregation and mortality. However, these studies did not include distributional measures at the metropolitan area level (e.g.

poverty concentration), nor socioeconomic indicators at the neighborhood or individual level, rather they used aggregate indicators for the metropolitan area (e.g. poverty rate). Therefore, these studies did not directly test the role of poverty concentration nor possible pathways at the neighborhood or individual level.

2.3 Dimensions of segregation

Although residential segregation is a multidimensional construct subsuming five distinct spatial patterns, health research has largely overlooked the complexity of residential segregation. In general, studies have utilized only one dimension of segregation, unevenness, measured by the dissimilarity index. Yet, most studies lack a conceptual justification for focusing on this segregation dimension, that is why would segregation, represented by spatial unevenness, be the most appropriate segregation dimension for the health outcome of interest? Among the studies examining a dimension of segregation other than unevenness, two of the three studies that focused on segregation measured by isolation provided a strong theoretical justification for their choice of this segregation dimension (Collins and Williams, 1999, Shihadeh and Flynn, 1996). Additionally, they addressed the issue of hypersegregation, defined as the conjunction of high dissimilarity and isolation.

The use of segregation in an unspecified manner impedes our understanding of why segregation is related to health. The reliance on one dimension of segregation, unevenness, has implications for the conceptualization and testing of specific pathways. For example, although the most widely discussed pathways pertain to disadvantaged neighborhood environments, unevenness is associated with only a few housing quality, neighborhood quality and socioeconomic status indicators, while isolation is related to many more such indicators and concentration is the segregation dimension most clearly linked to indicators of lower socioeconomic status for African Americans (Denton, 1994).

Several recent health studies have used population composition at the neighborhood level as a proxy for segregation (Fang *et al.*, 1998). However, neighborhood population composition is not the same as either metropolitan area-wide segregation or neighborhood segregation. This is not merely a technical point. Not distinguishing between population composition and segregation is also a conceptual problem. As Jargowsky has argued, it is necessary to link within-neighborhood factors to a larger distribution of neighborhoods and to ask what metropolitan-area factors shape this larger distribution (Jargowsky, 1997).

Neighborhood population composition is a within-neighborhood factor, which is linked to the spatial distribution of the population across the metropolitan area.

Residential segregation by race and by class contributes to the shape of this

distribution. Studies of neighborhoods and health may incorporate neighborhood population composition as a neighborhood level factor but should acknowledge that population composition is distinct from residential segregation.

In summary, the studies in Table 1 demonstrate that racial residential segregation in urban areas has a significant effect on both black infant and adult mortality rates, after adjusting for other socioeconomic and demographic characteristics of the area. However, existing studies have not fully utilized the multidimensional nature of segregation. Explanations of why and how residential segregation influences health, the testing of specific pathways and the development of multilevel models remain underdeveloped.

3. NEW DIRECTIONS

The studies in Table 1 represent an important step in understanding the role that residential segregation plays in influencing health disparities. However, several areas that need to be addressed in future studies if we are to fully understand the health consequences of segregation.

3.1 The conceptualization and operationalization of segregation

An important conceptual and methodological issue for segregation and health research is to determine which dimensions of residential segregation are most

relevant and to identify potential pathways to particular health outcomes.

Previous research on segregation and socioeconomic outcomes (Denton, 1994), and segregation and crime (Shihadeh and Flynn, 1996) has indicated the importance of recognizing that

- (i) Segregation has different dimensions;
- (ii) Each dimension is conceptually associated with distinct pathways to the outcome of interest;
- (iii) Each dimension is empirically correlated differently with the outcome of interest.

Future studies should choose a measure or measures of segregation and provide a justification for using that measure by identifying the specific mechanisms linking it to the health outcome of interest. To date only a few studies on segregation and health have begun to address the relationship of various segregation dimensions to specific health outcomes and have provided a conceptual framework for doing so (Acevedo-Garcia, 2000, Acevedo-Garcia, 2001, Collins and Williams, 1999).

3.2 The specification of pathways linking segregation to health

Segregation may be one of the structural factors at the metropolitan area level that contributes to the observed differences in neighborhood socioeconomic status, and neighborhood quality and amenities. Various reviews of U.S. segregation and

health research (Acevedo-Garcia, 2000, Williams, 1996) have concluded that the majority of studies in this area have conceptualized an indirect effect of residential segregation on health outcomes, primarily through neighborhood poverty. This can be summarized as a mediational model (Baron and Kenny, 1986), i.e. segregation has an effect on social conditions at the neighborhood level, e.g. neighborhood poverty, which in turn influence health outcomes (pathway a). To the extent that segregation is hypothesized to have an effect on multiple mediator variables, segregation may have a residual statistical effect on the health outcome of interest (pathway c). This residual effect should not be confused with a conceptually grounded direct effect of segregation on health.

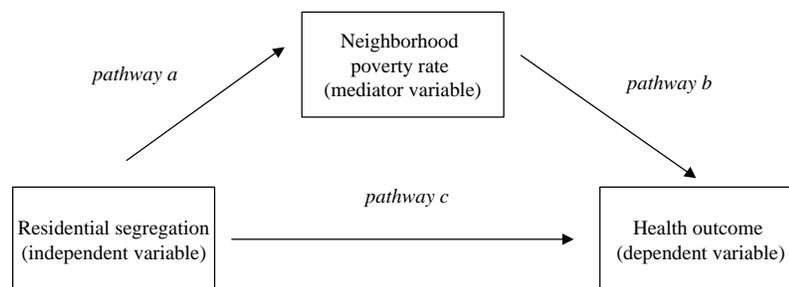


Figure 1. Mediational model

As mentioned earlier, studies often conflate metropolitan-area poverty concentration with neighborhood-level poverty. Future studies should explicitly address the role of racial/ethnic residential segregation in determining poverty concentration at the metropolitan-area level and, in turn, neighborhood socioeconomic characteristics thought to influence health outcomes. In addition, future studies should test the effect of segregation independent of poverty concentration.

3.3. Level of analysis

In general, segregation and health research has focused on ecological analyses at the metropolitan area level. This has been due mainly to data availability. Nonetheless, ecologic studies prevent us from determining whether the health effects of segregation are occurring to those blacks living in predominantly black neighborhoods or to blacks living in predominantly white neighborhoods and assessing the relationship between segregation and neighborhood living conditions. In order to untangle the complex processes by which segregation may influence health, we need data at different levels including segregation and economic variables at the metropolitan area level, neighborhood-level variables, and individual-level variables (see Chapter by Diez-Roux).

3.4 Class segregation

U.S. research on segregation and health has focused on residential segregation by race/ethnicity. Only one study matching our inclusion criteria for Table 1 examined economic segregation (Waitzman and Smith, 1998). Future research should address the relationship of both racial/ethnic segregation, economic segregation and metropolitan area economic variables (e.g. income distribution) to health outcomes.

3.5 Other racial/ethnic groups

Due to the saliency of race in the U.S. and the large health disparities between African Americans and whites, the health literature has focused on black-white segregation. However, the variation in levels of residential segregation among U.S. minority groups suggests that future studies should compare the effect of segregation on health for African Americans, Hispanics and Asians.

3.6 Protective effects of segregation

Most of the literature on residential segregation has examined the detrimental effects of segregation on socioeconomic, crime and health outcomes for African Americans³. Although it is key to continue exploring the adverse health

³ Only a few studies (Fang *et al.*, 1998) have suggested that residential segregation may also have positive or protective effects. However, this evidence is fragmentary.

consequences of segregation, future research should also examine the possibility that segregation may have positive effects. Future studies may focus on certain racial/ethnic groups for whom spatial concentration may (in combination with quality of resources) be beneficial, e.g. some U.S. immigrant groups (Fernandez Kelly and Schauffler, 1996). Additionally, some dimensions of residential segregation may be favorable for certain health outcomes. For example, studies have shown that discrimination adversely affects psychological distress and wellbeing for African Americans (Williams and Harris-Reid, 1999). Isolation could lead to better mental health for racial/ethnic minorities living in predominantly black neighborhoods since those living outside of those areas may be experiencing hostility and discrimination.

4. Conclusion

Both theoretically and empirically, research on neighborhood effects needs to relate neighborhood characteristics to the metropolitan-area wide processes such as class segregation, racial/ethnic segregation and residential mobility (Jargowsky, 1997, Sampson and Morenoff, 1997). For example, is the level of class segregation at the metropolitan area level positively related to mortality/disease rates and individual level outcomes at the neighborhood level, after controlling for the level of neighborhood deprivation? So far U.S. research on segregation and health has not addressed this type of question. Multilevel

studies that address that neighborhoods do not occur in isolation but are influenced by their metropolitan area may enrich the research on neighborhoods and health.

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Table 1: Studies of racial¹ residential segregation in relation to mortality

Study	Segregation measure	Year	Geographic area	Mechanisms ²	Findings
1. Collins and Williams, 1999 ³	Isolation index	1990	107 U.S. cities with population of least 100,000 and 10% Black	Socioeconomic deprivation. % below poverty line, % persons not employed in managerial/professional positions	Black social isolation directly related to the Black male and female all cause ($\beta = .30$, $p < .01$) and cancer ($\beta = .23 - .36$, $p < .05$) mortality rate after adjustment for socioeconomic deprivation indicators ⁴
2. Fang et al., 1998	Black pop. $\geq 75\%$ White pop. $\geq 75\%$	1990	177 zip codes in NYC		% Blacks in area unrelated to the Black mortality rate (25-64 years) and inversely related to the Black mortality rate (≥ 65 years); adjusted for socioeconomic indicators
3. Guest et al., 1998 ³	Isolation index	1990	40 Black areas 51 non-black areas, e.g. contiguous census tracts, in Chicago	Neighborhood socioeconomic conditions. % adults (≥ 25 years) with $<$ high school degree % unemployed	Modest direct association between Black isolation and the Black infant and working-age mortality rate, but statistically non significant. Effects appear to be mediated by % unemployed in area
4. Hart et al.,	Dissimilarity index	1990	114 U.S. MA		

1998						
5.	Polednak, 1996	Dissimilarity index	1990	38 and 92 U.S. MA	Poverty concentration Quality of life	In 38 MA, segregation was unrelated to the Black IMR; in 92 MA, segregation directly related to the Black IMR, but with adjustment for poverty and unmarried mother rate the association with segregation did not hold
6.	Shihadeh and Flynn, 1996³	Isolation index	1990	151 U.S. cities with a population of at least 100,000 and 5,000 blacks in	Economic factors % Black (16-64 years) employed % Blacks below poverty % Blacks renting vs. owning home Cultural factors % Black teens (16-19 years) unemployed, not in school, no high school degree, not in armed forces % Black female headed HH Political factors Black empowerment (ratio of % Black city councilors to % city Black voting age pop.)	Black isolation was directly related to the Black homicide rate ($\beta = 0.31, p < .05$) ⁴ . The effect is mediated, in part (approx. 25%), by socioeconomic, cultural, and political variables.

7.	Bird, 1995	Dissimilarity index (based upon MSA)	1990	34 U.S. states	(return to page 1510, 2 nd column, 1 st paragraph for possible mechanisms to be included here)	Segregation was directly associated with the Black IMR, adjusting for other state-level structural variables ($\beta = .38$, $p < .05$) ⁴ .
8.	LaVeist, 1993³	Dissimilarity index	1980	176 U.S. cities with a population of at least 50,000 and 10% Black	% Black below poverty Black political power (ratio of % Black city councilors to % city Black voting age pop)	Segregation is directly associated with the Black IMR, adjusted for Black poverty and political power ($\beta = .065$, $p < .05$) ⁵ . Black political power is inversely related to the Black IMR, but the effect is not strong enough to significantly reduce the Black-White disparity in IMR.
9.	Peterson and Krivo, 1993	Dissimilarity index	1980	125 U.S. cities with a population of at least 100,000 and a Black population of at least 50,000	Black social isolation Black socioeconomic deprivation	Segregation was directly related to the Black homicide rate, adjusted for indicators of Black socioeconomic status ($\beta = .70$, $p < .01$) ⁴
10.	Polednak, 1993; 1991	Dissimilarity index	1980	38 U.S. MA with a population at least 1 million	Quality of residential environment; Quality and availability of health care	Segregation was directly related to the Black/White ratio of the age-standardized mortality rate. Segregation was directly

						related to the Black-White difference in the IMR as well as the Black IMR, adjusted for the Black-White difference in poverty rate.
11. Potter, 1991	Isolation index	1980	27 MA		Black socioeconomic status	Black isolation was directly associated with the White/Black male life expectancy differential ($\beta = .54, p < .05$) ⁴ , which was driven by the association between Black isolation and the homicide differential.
12. LaVeist, 1989	Dissimilarity index	1980	176 U.S. cities with population of at least 50,000 and 10% Black		Socio-environmental conditions	Segregation was directly associated with the Black IMR ($\beta = .13$) ⁴ adjusted for socioeconomic factors and geographic region.
13. Massey et al., 1987	Racial compositional and pop. change (1970-80)	1980	359 census tracts in Philadelphia in		Neighborhood quality and environment	Black death rates were highest in established Black census tracts and those with declining White population.
14. Yankauer, 1950	% non-White live births in area	1940	NYC health areas		Socioeconomic and physical environment of neighborhoods	The non-White and White IMR increased as the proportion of non-White births increased.

¹ Refers exclusively to the residential segregation of Blacks from Whites or non-Blacks.

² Includes mechanisms that were explicitly tested or discussed.

³ Examined mechanisms in model.

⁴ Beta coefficients are standardized to distribution of variables used in study.

⁵ Unstandardized coefficient.

MA = metropolitan area