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Source: *Demography*, Vol. 26, No. 3 (Aug., 1989), pp. 373-391
Published by: Springer on behalf of the Population Association of America
Stable URL: http://www.jstor.org/stable/2061599
Accessed: 16/10/2014 12:06

Demography, Vol. 26, No. 3, August 1989

Hypersegregation in U.S. Metropolitan Areas: Black and Hispanic Segregation Along Five Dimensions

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Residential segregation has traditionally been measured by using the index of dissimilarity and, more recently, the P^* exposure index. These indices, however, measure only two of five potential dimensions of segregation and, by themselves, understate the degree of black segregation in U.S. society. Compared with Hispanics, not only are blacks more segregated on any single dimension of residential segregation, they are also likely to be segregated on all five dimensions simultaneously, which never occurs for Hispanics. Moreover, in a significant subset of large urban areas, blacks experience extreme segregation on all dimensions, a pattern we call hypersegregation. This finding is upheld and reinforced by a multivariate analysis. We conclude that blacks occupy a unique and distinctly disadvantaged position in the U.S. urban environment.

Since Duncan and Duncan's (1955) seminal paper, ecologists have relied primarily on the index of dissimilarity to measure residential segregation. Over the years, however, and especially since the critique of Cortese, Falk, and Cohen (1976), many other measures of segregation have been proposed (see James and Taeuber, 1985, and White, 1986, for reviews). In a recent paper, we identified 20 such measures and undertook a detailed conceptual and statistical analysis of their properties and interrelationships (Massey and Denton, 1988a). On both theoretical and empirical grounds, we concluded that segregation is a global construct that subsumes five distinct dimensions of spatial variation.

These five dimensions are evenness, exposure, clustering, centralization, and concentration. *Evenness* is the degree to which the percentage of minority members within residential areas equals the citywide minority percentage; as areas depart from the ideal of evenness, segregation increases. *Exposure* is the degree of potential contact between minority and majority members; it reflects the extent to which groups are exposed to one another by virtue of sharing neighborhoods in common. *Clustering* is the extent to which minority areas adjoin one another in space; it is maximized when minority neighborhoods form one large, contiguous ghetto and minimized when they are scattered widely in space. *Centralization* is the degree to which minority members are settled in and around the center of an urban area, usually defined as the central business district. Finally, *concentration* is the relative amount of physical space occupied by a minority group; as segregation rises, minority members are increasingly concentrated within a small, geographically compact area.

A high level of segregation on any one of these dimensions is problematic because it isolates a minority group from amenities, opportunities, and resources that affect social and economic well-being (cf. Logan, 1978; Massey, Condran, and Denton, 1987; Schneider and Logan, 1982, 1985). As high levels of segregation accumulate across dimensions, the deleterious effects of segregation multiply because isolation intensifies. Indices of evenness and exposure, by themselves, cannot capture this multidimensional layering of segregation and, therefore, misrepresent the nature of black segregation and understate its severity. Not only are blacks more segregated than other groups on any single dimension of segregation, they are also more segregated across all dimensions simultaneously. In an important subset of urban areas, blacks are extremely segregated on each dimension, a pattern we call hypersegregation. The purpose of this article is to show that blacks occupy a unique and distinctly disadvantaged position in U.S. urban society by comparing their pattern of segregation with that of another disadvantaged minority group, Hispanics, and to demonstrate that the pattern of hypersegregation holds after the application of statistical controls for major confounding variables.

Data and Measures

Data are taken from the 1980 Summary Tape Files (STF4) of the U.S. Bureau of the Census (1980) and cover the 50 largest standard metropolitan statistical areas (SMSAs) plus 10 others that contain large numbers of Hispanics. The units of analysis are census tracts. Hispanics are defined by using the Spanish-origin item, and whites and blacks are identified from the census question on race, both 100 percent items (U.S. Bureau of the Census, 1982). The cross-classification of race and Spanish origin permits the definition of the mutually exclusive ethnic/racial categories (black Hispanics, white Hispanics, non-Hispanic blacks, and non-Hispanic whites) that are employed in this analysis. These groups were created by subtracting white and black Hispanics from the respective total counts of whites and blacks. For convenience, we refer to non-Hispanic whites as Anglos, though we are well aware that the terms "Anglo" and "Hispanic" mask considerable diversity in national origins and characteristics (Bean and Tienda, 1987; Greeley, 1974). A more detailed description of the data set is found in Massey and Denton (1987).

In our earlier methodological article (Massey and Denton, 1988a), we described in detail the choice of an index for each of the five dimensions of segregation, so only a brief review of their computational formulas is provided here. Evenness is measured with the traditional index of dissimilarity, which varies between 0 and 1.0, and represents the proportion of minority members that would have to change tracts to achieve an even distribution (Jakubs, 1977, 1979, 1981). The dissimilarity index may be defined as

$$D = \sum_{i=1}^{n} \frac{t_i|p_i - P|}{2TP(1 - P)}, \tag{1}$$

where t_i and p_i are the total population and minority proportion of areal unit i and T and P are the population size and minority proportion of the whole city, which is subdivided into n areal units.

Exposure is measured with the P^* measure, which has two basic forms. The first is the interaction index (${}_xP^*_y$), which measures the probability that members of minority group X share a tract with members of majority group Y. The other is the isolation index (${}_xP^*_x$), which measures the probability that group X members share a tract with each other. Both measures vary between 0 and 1.0 and in the two-group case sum to unity. Since higher values on the isolation index signify greater segregation, we chose it as our indicator of exposure. It is computed as the minority-weighted average of each unit's minority proportion (Lieberson, 1980, 1981):

$${}_xP^*_x = \sum_{i=1}^{n} \left[\frac{x_i}{X}\right]\left[\frac{x_i}{t_i}\right], \tag{2}$$

where x_i and t_i are the numbers of X members and the total population of tract i and X represents the number of X members citywide.

Clustering is the extent to which tracts inhabited by minority members adjoin one another, or cluster, in space. A high degree of clustering implies a residential structure in which minority areas are contiguous and closely packed, creating one large ethnic or racial enclave, whereas a low level of clustering means that minority areal units are widely scattered around the urban environment. The index of clustering we selected is White's (1983) index of spatial proximity, *SP*. It takes the average proximity between members of the same group and the average proximity between members of different groups and then computes a weighted average of these quantities. The average proximity between group X members is

$$P_{xx} = \sum_{i=1}^{n} \sum_{j=1}^{n} \frac{x_i x_j c_{ij}}{X^2}, \tag{3}$$

and the average proximity between members of X and Y is

$$P_{xy} = \sum_{i=1}^{n} \sum_{j=1}^{n} \frac{x_i y_j c_{ij}}{XY}, \tag{4}$$

where Y is the number of Y members citywide, x_i and y_j are the numbers of X and Y members in units i and j, and c_{ij} is a distance function between these two areas, defined here as a negative exponential: $c^{ij} = \exp(-d^{ij})$. The term d^{ij} indicates the linear distance between the centroids of units i and j, and d^{ii} is estimated as $0.6a_i \times 5$, where a_i is the area of the tract. The negative exponential assumes that the likelihood of intragroup interaction drops off rapidly with distance (White, 1983).

Average proximities may also be calculated among Y members (P_{yy}) and among all members of the population (P_{tt}) by analogy with equation (3). White's index is the average of intragroup proximities, P_{xx}/P_{tt} and $P_{yy}/P_{tt,}$ weighted by the fraction of each group in the population:

$$SP = \frac{XP_{xx} + YP_{yy}}{TP_{tt}}, \tag{5}$$

producing a ratio that equals 1.0 when there is no differential clustering between X and Y and a ratio that is greater than 1.0 when members of X live nearer to each other than to members of Y. The ratio would be less than 1.0 in the unusual circumstance that members of X resided closer to members of Y than to other X members. In our data, all *SP* indices varied between 1 and 2, so we subtracted 1.0 from each index to produce a measure that varied between 0 and 1.

The fourth dimension of segregation is centralization, which is the degree to which a group is located near the center of an urban area. During the 1960s and 1970s, blacks were increasingly isolated in central cities, away from suburban areas where whites congregated increasingly (Farley et al., 1978; Massey and Denton, 1988b). Centralization is measured by an index that reflects the extent to which a group is spatially distributed close to, or far away from, the central business district (CBD). It compares a group's distribution by distance from the CBD to the distribution of land area around the CBD by using a formula adapted from Duncan (1957), Duncan, Cuzzort, and Duncan (1961), and Glaster (1984):

$$CE = \left(\sum_{i=1}^{n} X_{i-1}A_i\right) - \left(\sum_{i=1}^{n} X_iA_{i-1}\right), \tag{6}$$

where the n areal units are ordered by increasing distance from the central business district and X_i and A_i are the respective cumulative proportions of X's population and land area in tract i. This index varies between $+1$ and -1, with positive values indicating a tendency for group X members to reside close to the city center and negative values indicating a tendency to live in outlying areas. A score of 0 means that the group has a uniform distribution throughout the metropolitan area. The index therefore gives the proportion of X members required to change residence to achieve a uniform distribution of population around the central business district.

The last dimension of segregation that we consider is concentration, which is the relative amount of physical space occupied by a minority group in the urban environment. Concentration is a relevant dimension of segregation because discrimination often restricts minorities to a small number of neighborhoods that together comprise a small share of the urban environment (Hirsch, 1983; Kain and Quigley, 1975; Spear, 1967). It is measured by computing the average amount of physical space occupied by group X relative to group Y and comparing this quantity with the ratio that would be achieved if group X were maximally concentrated and group Y were maximally dispersed. This relative concentration index is computed as follows:

$$CO = \frac{\left[\sum_{i=1}^{n} \frac{x_i a_i}{X} \Big/ \sum_{i=1}^{n} \frac{y_i a_i}{Y}\right] - 1}{\left[\sum_{i=1}^{n_1} \frac{t_i a_i}{T_1} \Big/ \sum_{i=n_2}^{n} \frac{t_i a_i}{T_2}\right] - 1}, \tag{7}$$

where areal units are ordered by geographic size from smallest to largest, a_i is the land area of unit i, and the two numbers n_1 and n_2 refer to different points in the rank ordering of areal units from smallest to largest: n_1 is the rank of the tract where the cumulative total population of areal units equals the total minority population of the city, summing from the smallest unit up; n_2 is the rank of the tract where the cumulative total population of units equals the minority population totalling from the largest unit down. T_1 equals the total population of tracts from 1 to n_1, and T_2 equals the total population of tracts from n_2 to n. As before, t_i refers to the total population of area i and X is the number of group X members in the city.

The numerator of this index divides the average land area of units inhabited by group X members by the average area of units inhabited by Y members, and the denominator takes the average that would be obtained if X members lived in the smallest space possible and divides it by the average that would be obtained if Y members fit into the largest possible area. The quotient is then standardized to vary between -1.0 and $+1.0$. A score of 0 means that the two groups are equally concentrated in urban space. A score of -1.0 means that Y's concentration exceeds X's to the maximum extent possible, and a score of 1.0 means the converse.

Spatial Segregation of Blacks

These five indices were computed for blacks in 60 metropolitan areas and are reported in Table 1. Since measures of evenness and isolation were analyzed in detail elsewhere (Massey and Denton, 1987, 1988b), we focus on the remaining three dimensions of segregation. Intercorrelations between the measures are shown at the bottom of the table. They range from 0.105 to 0.877 and average 0.525. Although the five dimensions overlap empirically, no index perfectly replicates another. Two indices share at most 77 percent common variance and at the least only 1 percent. In general, the evenness, exposure, and clustering indices are more highly intercorrelated than the centralization and concentration measures. The interrelationships among the indices were discussed in detail in our earlier article (Massey and Denton, 1988a).

Five key metropolitan areas with large minority populations are highlighted at the top of the table, and regional and national averages are reported at the bottom. Measures of black clustering are shown in the *SP* columns of Table 1. In general *SP* indices above 0.600 are very high and imply the existence of a large enclave of contiguous tracts containing most blacks. Indices between 0.400 and 0.600 are still high but indicate the presence of scattered black neighborhoods away from the principal ghetto. *SP* values between 0.100 and 0.400 are moderate and correspond to a pattern of scattered black and racially mixed neighborhoods. Finally, indices under 0.100 are very low, indicating a spatial configuration dominated by racially mixed neighborhoods that are widely scattered about the city (see Massey and Denton, 1988a; White, 1983, 1986).

In most cities, the clustering of blacks is moderate or low. The average *SP* index for all 60 SMSAs is only 0.292, and 14 metropolitan areas have indices in the lower range (under 0.100). Another 29 display indices that are in the moderate range (under 0.400). Clustering is notably lower in Western SMSAs, with a regional average of only 0.141, as well as in the South, where the average is 0.259. In short, blacks in the vast majority of metropolitan areas do not live in a spatially distinct ghetto of contiguous minority tracts.

Despite the scant evidence of clustering in most metropolitan areas, spatial agglomeration is pronounced in SMSAs with large black populations. The lowest clustering indices are generally observed in metropolitan areas with very few black residents, such as Albany, Albuquerque, Bakersfield, Minneapolis, Sacramento, and Tucson. Although SMSAs with clustering indices in the high or very high range are few in number, they generally include areas with the largest urban black populations in the United States. Nine SMSAs have *SP* indices of 0.600 or more, including Chicago, Los Angeles, Baltimore, Cleveland, Detroit, Newark, Philadelphia, and Milwaukee. Metropolitan areas with indices in the 0.400 to 0.600 range include New York, Atlanta, Gary, Kansas City, Memphis, Washington, Buffalo, Boston, and Indianapolis.

As is obvious from this list, the clustering of black neighborhoods is especially prevalent in older industrial areas of the Northeast and Midwest. The regional average was 0.474 among SMSAs in North Central states and 0.368 among those in the Northeast. In these areas, blacks segregated on one dimension also tend to be segregated on others. Among the nine SMSAs with clustering indices above 0.600, seven had dissimilarity indices of 0.800 or more and all were greater than 0.750. All of these SMSAs had P^* isolation indices in excess of 0.600, and six of the nine areas displayed indices greater than 0.700.

The *CE* column of Table 1 contains indices of black centralization, which measure the extent to which blacks are distributed closely round the central business district. We found in earlier work that blacks have little access to the suburbs of U.S. cities (Massey and Denton 1987, 1988b), so it is not surprising to find that most SMSAs display very high levels of black centralization. In general, a *CE* index above 0.800 is very high, indicating that 80 percent of the black population would have to move to be uniformly distributed in the urban environment. More than two-thirds of the metropolitan areas (43 of 60) display centralization indices of 0.800 or more; and this list contains all SMSAs with high or very high clustering indices. Only eight metropolitan areas have centralization indices below 0.600: Miami, Anaheim, Ft. Lauderdale, Greensboro, Jersey City, Salt Lake City, Tampa, and San Antonio.

The CO column in Table 1 displays black concentration indices, which indicate the extent to which blacks occupy a small amount of urban space relative to Anglos. In this context, an index value of 0.700 or greater indicates a high level of concentration, with black residents being packed into a limited number of geographically small census tracts. Blacks in 28 of the SMSAs—nearly half—experience a high level of spatial concentration. This list includes 14 of the 17 SMSAs we have already identified as being highly or very highly segregated on the dimensions of clustering and centralization, including Chicago,

Table 1. Five Indices of Black Residential Segregation in 60 U.S. SMSAs in 1980

	Segregation index				
Metropolitan area	D	${}_bP^*_b$	SP	CE	CO
Key SMSAs					
Chicago	0.878	0.828	0.793	0.872	0.887
Los Angeles–Long Beach	0.811	0.604	0.765	0.859	0.695
Miami	0.778	0.642	0.344	0.463	0.565
New York	0.819	0.627	0.468	0.795	0.892
San Francisco–Oakland	0.717	0.511	0.282	0.836	0.687
Other SMSAs					
Albany–Schenectady–Troy	0.622	0.276	0.088	0.848	0.748
Albuquerque	0.390	0.050	0.008	0.795	0.371
Anaheim–Santa Ana–Garden Grove	0.458	0.038	0.018	0.576	−0.442
Atlanta	0.762	0.714	0.398	0.827	0.686
Austin	0.608	0.349	0.123	0.778	0.567
Bakersfield	0.644	0.346	0.101	0.827	0.652
Baltimore	0.747	0.723	0.622	0.857	0.763
Birmingham	0.419	0.496	0.059	0.830	0.775
Boston	0.774	0.550	0.491	0.871	0.799
Buffalo	0.794	0.635	0.443	0.884	0.882
Cincinnati	0.723	0.543	0.158	0.883	0.669
Cleveland	0.875	0.804	0.743	0.898	0.927
Columbus	0.724	0.571	0.321	0.933	0.854
Corpus Christi	0.717	0.267	0.130	0.910	0.793
Dallas–Fort Worth	0.771	0.645	0.334	0.749	0.693
Dayton	0.780	0.650	0.336	0.861	0.600
Denver–Boulder	0.685	0.410	0.211	0.719	0.385
Detroit	0.867	0.773	0.846	0.924	0.842
El Paso	0.347	0.050	0.013	0.687	0.382
Fort Lauderdale	0.816	0.702	0.237	0.593	0.784
Fresno	0.624	0.377	0.159	0.968	0.598
Gary–Hammond–East Chicago	0.906	0.773	0.561	0.887	0.869
Greensboro–Winston-Salem	0.564	0.496	0.053	0.601	0.613
Houston	0.695	0.593	0.238	0.840	0.569
Indianapolis	0.762	0.623	0.411	0.942	0.804
Jersey City	0.765	0.604	0.335	0.560	0.555
Kansas City	0.789	0.689	0.461	0.921	0.857
Louisville	0.718	0.628	0.249	0.894	0.699
Memphis	0.695	0.737	0.440	0.817	0.550
Milwaukee	0.839	0.695	0.689	0.951	0.944
Minneapolis–St. Paul	0.693	0.306	0.102	0.944	0.890
Nashville–Davidson	0.647	0.551	0.244	0.744	0.628
Nassau–Suffolk	0.755	0.469	0.179	0.643	0.194
New Orleans	0.683	0.688	0.327	0.906	0.584
Newark	0.816	0.692	0.755	0.859	0.919

(Table continues)

Table 1. Continued

Metropolitan area	Segregation index: D	$_bP^*_b$	SP	CE	CO
Norfolk–Virginia Beach	0.628	0.625	0.199	0.712	0.559
Oklahoma City	0.710	0.560	0.250	0.886	0.546
Paterson–Clifton–Passaic	0.815	0.489	0.277	0.876	0.929
Philadelphia	0.788	0.696	0.673	0.855	0.757
Phoenix	0.594	0.225	0.041	0.945	0.548
Pittsburgh	0.727	0.541	0.272	0.812	0.821
Portland	0.685	0.316	0.168	0.956	0.826
Providence–Warwick–Pawtucket	0.731	0.253	0.120	0.818	0.803
Riverside–San Bernadino	0.488	0.160	0.048	0.896	0.212
Rochester	0.679	0.437	0.321	0.874	0.792
Sacramento	0.559	0.209	0.096	0.900	0.509
St. Louis	0.814	0.729	0.264	0.931	0.893
Salt Lake City–Ogden	0.533	0.041	0.006	0.443	0.384
San Antonio	0.641	0.358	0.229	0.523	0.544
San Diego	0.643	0.263	0.171	0.902	0.537
San Jose	0.487	0.066	0.032	0.795	0.177
Seattle–Everett	0.682	0.294	0.137	0.952	0.791
Tampa–St. Petersburg	0.735	0.507	0.246	0.581	0.493
Tucson	0.466	0.088	0.014	0.910	0.253
Washington, D.C.	0.693	0.672	0.450	0.850	0.441
Averages					
Total	0.693	0.488	0.292	0.816	0.642
Northeast	0.757	0.522	0.368	0.808	0.757
North Central	0.804	0.665	0.474	0.912	0.836
South	0.669	0.550	0.259	0.752	0.612
West	0.592	0.250	0.141	0.830	0.449
Intercorrelations					
D	1.000	0.795	0.856	0.169	0.702
P^*	0.795	1.000	0.877	0.105	0.528
SP	0.856	0.877	1.000	0.175	0.575
CE	0.169	0.105	0.175	1.000	0.466
CO	0.702	0.528	0.575	0.466	1.000

New York, Los Angeles, Detroit, Cleveland, Gary, Newark, Philadelphia, and Baltimore—in other words, the largest black settlements in the Northern states.

We have thus identified a significant core of large metropolitan areas in which blacks are highly segregated on multiple dimensions. This conclusion is supported visually by the three panels of Figure 1, which plot indices for each of the three spatial dimensions against the index of dissimilarity. SMSAs on the plot are indicated by two-letter codes, which are paired with the metropolitan areas in Table 2. Eight SMSAs with very high *SP* values are circumscribed by an oval, and those in the moderately high range are enclosed by a rectangle.

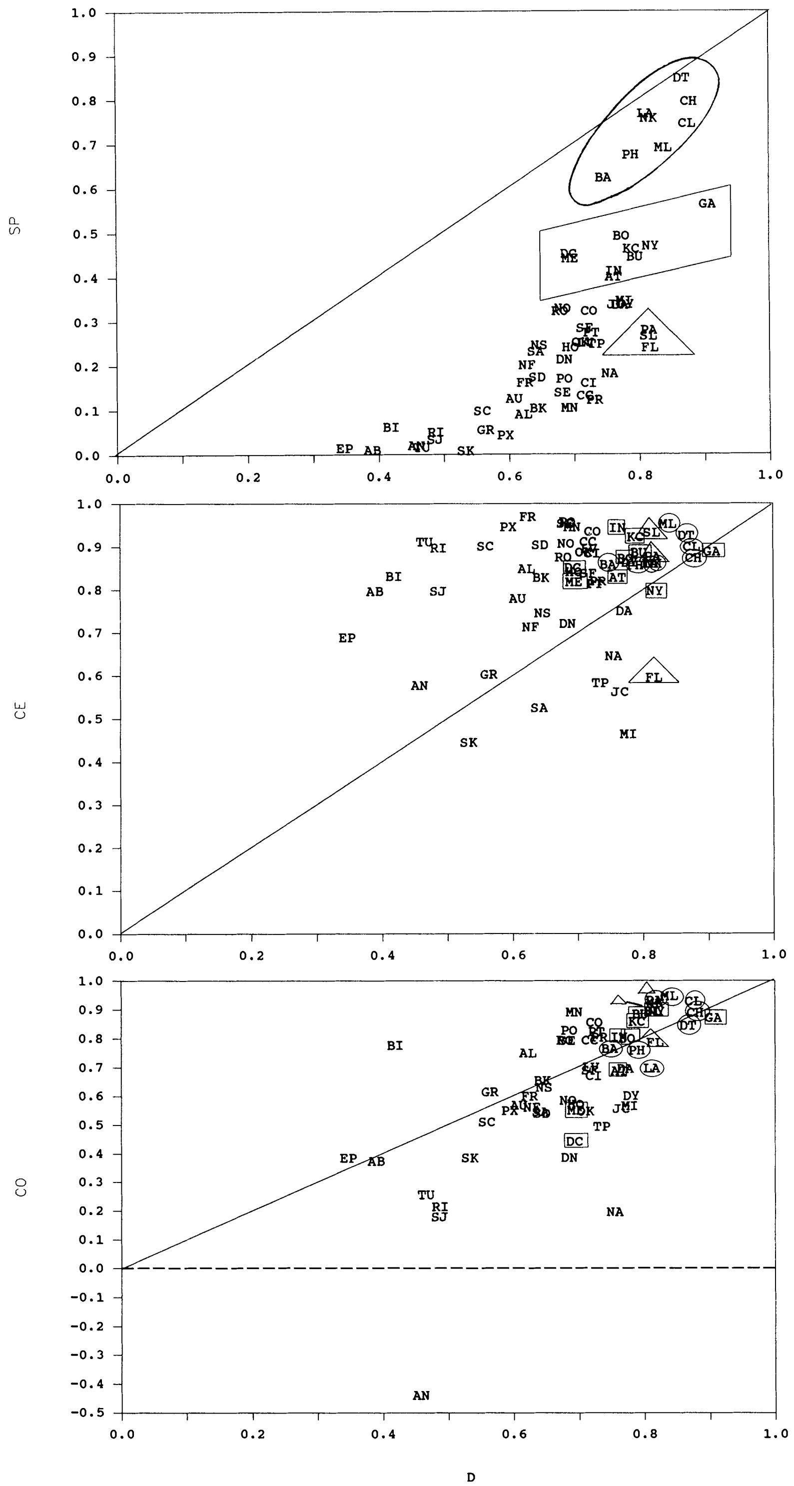

Figure 1. Indices of Clustering, Centralization, and Concentration Plotted Against the Index of Dissimilarity: Blacks in 60 SMSAs, 1980

The figure demonstrates that SMSAs with high *SP* indices generally also have high levels of dissimilarity. Three SMSAs, however, have high dissimilarity measures but only moderate clustering indices—Paterson, St. Louis, and Ft. Lauderdale—and these are enclosed by a triangle.

SMSAs that were enclosed as groups by an oval, a rectangle, or a triangle in the top panel of the figure are enclosed individually by those symbols in the middle and lower panels, so the relative positions of the three sets of SMSAs can be compared and contrasted across panels. The middle panel plots indices of centralization and shows that the same SMSAs that were highly clustered are also highly centralized. They are packed tightly in the upper right sector of the plot, just above the diagonal. The bottom panel shows that the same SMSAs have high levels of geographic concentration, again being packed tightly just above the diagonal in the upper right sector of the scatterplot. Although the plots are not shown, the same SMSAs have high isolation P^*s and display a similar pattern when plotted against *D*.

We can thus identify an important subset of major urban areas in which blacks are very highly segregated on all five dimensions of residential segregation. If we let "high segregation" mean a dissimilarity index of 0.600 or more, an isolation P^* of 0.700 or more,

Table 2. Names and Abbreviations of SMSAs Used in Study of Spatial Segregation

Metropolitan area	Abbreviation	Metropolitan area	Abbreviation
Albany	AL	Memphis	Me
Albuquerque	AB	Miami	MI
Anaheim	AN	Milwaukee	ML
Atlanta	AT	Minneapolis	MN
Austin	AU	Nashville	NS
Bakersfield	BK	Nassau–Suffolk	NA
Baltimore	BA	New Orleans	NO
Birmingham	BI	New York	NY
Boston	BO	Newark	NK
Buffalo	BU	Norfolk	NF
Chicago	CH	Oklahoma City	OK
Cincinnati	CI	Paterson	PA
Cleveland	CL	Philadelphia	PH
Columbus	CO	Phoenix	PX
Corpus Christi	CO	Pittsburgh	PT
Dallas	DA	Portland	PO
Dayton	DY	Providence	PR
Denver	DN	Riverside	RI
Detroit	DT	Rochester	RO
El Paso	EP	Sacramento	SC
Fort Lauderdale	FL	St. Louis	SL
Fresno	FR	Salt Lake City	SK
Gary	GA	San Antonio	SA
Greensboro	GR	San Diego	SD
Houston	Ho	San Francisco	SF
Indianapolis	IN	San Jose	SJ
Jersey City	JC	Seattle	SE
Kansas City	KC	Tampa	TP
Los Angeles	LA	Tucson	TU
Louisville	LV	Washington, D.C.	DC

an *SP* index of 0.600 or greater, a centralization score of 0.800 or higher, and a concentration index in excess of 0.700, then blacks in six SMSAs are highly segregated on all five dimensions (Baltimore, Chicago, Cleveland, Detroit, Milwaukee, and Philadelphia), and in another four SMSAs they are segregated on four dimensions (Gary, Los Angeles, Newark, and St. Louis). Together these 10 SMSAs contain 29 percent of metropolitan blacks and 23 percent of all blacks in the United States.

In short, roughly one-quarter of the American black population lives in an urban environment that is hypersegregated. Blacks in these cities are very unevenly distributed among tracts and live in small, densely settled, monoracial neighborhoods that are part of large agglomerations of contiguous tracts clustered tightly around the city center. Residents of such an environment would be very unlikely to come into regular contact with a member of Anglo society, except through participation in the labor force, an option that is denied to the quarter of central-city blacks who are under- or unemployed (Lichter, 1988). Blacks without jobs would rarely meet, and would be extremely unlikely to know, an Anglo resident of the same metropolis.

On the other hand, if we establish very liberal criteria for defining a "low" level of black segregation (e.g., $D < 0.600$, $P^* < 0.500$, $SP < 0.600$, $CE < 0.800$, and $CO < 0.700$), then blacks in nine SMSAs experience low segregation on at least four of the five dimensions: Albuquerque, Anaheim, El Paso, Greensboro, Salt Lake City, San Jose, Phoenix, Riverside, and Tucson. But together these SMSAs contain only 2 percent of metropolitan blacks and only 1.5 percent of all blacks in the United States, so very few blacks experience a residential pattern that might be called "integrated."

Spatial Segregation of Hispanics

The distinctiveness of the residential situation faced by blacks is emphasized by the data in Table 3, which presents indices of dissimilarity, isolation, clustering, centralization, and concentration for Hispanics in the 60 metropolitan areas. No Hispanic clustering index was high ($SP > 0.600$) or even moderately high ($SP > 0.400$) by black standards. The Hispanic *SP* indices generally fell into the moderate range, with 4 SMSAs lying between 0.300 and 0.400 (San Antonio, Los Angeles, Chicago, and Fresno) and 10 located between 0.150 and 0.300 (New York, Newark, Miami, El Paso, Corpus Christi, Bakersfield, Philadelphia, Paterson, San Diego, and Albuquerque). At the same time, relatively few SMSAs displayed high Hispanic centralization or concentration indices. Whereas black centralization exceeded 0.800 in 43 cases, only 19 Hispanic indices did so; and only 9 SMSAs evinced Hispanic concentration indices of 0.700 or more, compared with 28 for blacks.

In general, low to moderate levels of segregation were observed for Hispanics on all dimensions. The average level of dissimilarity was 0.436 (compared with 0.693 for blacks), with average indices of isolation, clustering, centralization, and concentration of 0.201, 0.090, 0.713, and 0.398, respectively (compared with indices of 0.488, 0.292, 0.816, and 0.642 for blacks). Even in SMSAs with very large Spanish population, such as Los Angeles, San Antonio, Miami, New York, and Chicago, there was little evidence of high segregation on multiple dimensions. For example, the largest concentration of Hispanics in the United States is in Los Angeles, where people of Spanish origin number more than 2 million and represent 28 percent of the metropolitan population. The respective indices of segregation for Hispanic Angelinos were, in the same order as before, 0.570, 0.501, 0.333, 0.772, and 0.619. None of these values would be considered high by black standards.

In general, then, high levels of Hispanic segregation do not appear to correlate strongly across dimensions, and in no SMSA do Hispanics experience the multidimensional hypersegregation of blacks. The relative independence of the indices is also evident in Figure 2, which plots Hispanic clustering, centralization, and concentration indices against the index of dissimilarity. In the top panel, the two highest sets of clustering indices are enclosed by an oval and a rectangle; and in subsequent panels, SMSAs from these groups are identified individually by these symbols. In the middle panel, centralization indices are obviously much more dispersed than was true for blacks. The ovals and rectangles are scattered widely rather than concentrated in the upper right sector of the graph. Concentration indices in the bottom panel are even more scattered, with no detectable grouping of ovals or rectangles.

If we adopt the same criteria used to define high segregation for blacks ($D > 0.600$, $P^* > 0.700$, $SP > 0.600$, $CE > 0.800$, and $CO > 0.700$) and consider the multidimensional structure of Hispanic segregation, the contrast between the two groups stands out clearly. In no metropolitan area are Hispanics highly segregated on five or even four dimensions, and in only four areas are they segregated on as many as three dimensions—Chicago, New York, Newark, and Paterson. Three of these areas are dominated by Puerto Rican populations, which display high levels of segregation compared with other Hispanic groups, a pattern that has been attributed to the Afro-American ancestry of this group (Massey and Bitterman, 1985). Moreover, several of the largest Hispanic concentrations in the United States are not highly segregated on *any* dimension at all, including Los Angeles, San Antonio, Miami, and San Diego. Indeed, a lack of high segregation on any dimension is the most common pattern for Hispanics; among the 60 SMSAs in the data set, 37 were not highly segregated on any of the five dimensions. Thus not only are Hispanics less segregated than blacks on any single dimension, they are very unlikely to accumulate high levels of segregation across multiple dimensions simultaneously.

The Hispanic–Black Differential in Multivariate Perspective

It thus appears that blacks occupy a unique position in the American urban landscape. They are more segregated than Hispanics on every dimension of segregation, and in an important core of metropolitan areas—primarily older industrial areas of the Northeast and Midwest—they are extremely segregated on all five dimensions simultaneously, an unusual condition we have called hypersegregation. This condition is not replicated anywhere by Hispanics or by any other group we have examined (see Langberg and Farley, 1985, and Massey and Denton, 1987, 1988b, for data on Asian segregation).

We hesitate, however, to make a strong statement about the relative segregation of blacks and Hispanics in U.S. metropolitan areas, since the two groups differ on many variables that directly influence patterns of residential location. Differences in regional concentration, relative population size, nativity composition, socioeconomic status, and local economic conditions could account for all or part of the black–Hispanic differential in the SMSAs under study, and it would be wrong to infer that black segregation is exceptional from a descriptive study of the indices alone.

To test how robust the apparent contrast between blacks and Hispanics is, we estimated multivariate models of segregation that directly compare the two groups, controlling for possible confounding variables. Table 4 presents regression equations measuring the impact of selected explanatory factors on each of the five dimensions of segregation. We pool black and Hispanic indices for each dimension and then regress them on a set of factors that are theoretically expected to influence the level of minority segregation. For each of the five regressions, a dummy variable under the heading "Minority group" indicates whether the segregation index pertains to blacks (Blacks = 1) or Hispanics (Blacks = 0). If the black–Hispanic differential is explained by variables in the model, then the coefficient for this dummy variable should be statistically insignificant.

Four of the five indices of segregation were transformed into logits before undertaking the regression analyses, since their limited range (0–1) would bias ordinary least squares (OLS) estimates. For any limited-range variable P, the logit transformation—logit(P) =

Table 3. Five Indices of Hispanic Residential Segregation for 60 SMSAs in 1980

Metropolitan area	Segregation index				
	D	$_hP_h^*$	SP	CE	CO
Key SMSAs					
Chicago	0.635	0.380	0.317	0.813	0.746
Los Angeles–Long Beach	0.570	0.501	0.333	0.772	0.619
Miami	0.519	0.583	0.240	0.542	0.360
New York	0.657	0.399	0.263	0.841	0.878
San Francisco–Oakland	0.402	0.193	0.083	0.628	0.340
Other SMSAs					
Albany–Schenectady–Troy	0.367	0.036	0.006	0.499	0.358
Albuquerque	0.429	0.505	0.149	0.768	0.470
Anaheim–Santa Ana–Garden Grove	0.416	0.310	0.115	0.635	0.449
Atlanta	0.337	0.021	0.003	0.696	0.349
Austin	0.449	0.336	0.100	0.639	0.454
Bakersfield	0.545	0.421	0.197	0.761	0.401
Baltimore	0.381	0.015	0.007	0.657	0.306
Birmingham	0.226	0.009	0.001	0.625	0.461
Boston	0.579	0.129	0.083	0.788	0.705
Buffalo	0.491	0.077	0.028	0.808	0.590
Cincinnati	0.303	0.010	0.001	0.704	0.236
Cleveland	0.554	0.082	0.047	0.842	0.704
Columbus	0.350	0.013	0.003	0.789	0.414
Corpus Christi	0.516	0.636	0.225	0.644	0.712
Dallas–Fort Worth	0.478	0.240	0.085	0.732	0.511
Dayton	0.328	0.010	0.002	0.702	0.282
Denver–Boulder	0.475	0.274	0.104	0.778	0.494
Detroit	0.451	0.065	0.062	0.746	0.374
El Paso	0.512	0.741	0.223	0.737	0.145
Fort Lauderdale	0.255	0.053	0.008	0.307	−0.065
Fresno	0.454	0.446	0.286	0.800	−0.221
Gary–Hammond–East Chicago	0.562	0.237	0.105	0.835	0.694
Greensboro–Winston-Salem	0.321	0.010	0.001	0.495	0.318
Houston	0.464	0.328	0.119	0.818	0.532
Indianapolis	0.332	0.012	0.004	0.777	0.392
Jersey City	0.488	0.465	0.108	0.129	0.606
Kansas City	0.422	0.104	0.031	0.854	0.508
Louisville	0.281	0.009	0.001	0.645	0.219
Memphis	0.406	0.013	0.004	0.707	0.206
Milwaukee	0.562	0.162	0.078	0.848	0.718
Minneapolis–St. Paul	0.418	0.046	0.013	0.860	0.498
Nashville–Davidson	0.371	0.012	0.003	0.559	0.158
Nassau–Suffolk	0.362	0.096	0.027	0.606	0.222
New Orleans	0.251	0.063	0.029	0.809	0.250
Newark	0.656	0.263	0.255	0.807	0.796

(Table continues)

Table 3. Continued

Metropolitan area	Segregation index				
	D	$_hP^*_h$	SP	CE	CO
Norfolk–Virginia Beach	0.284	0.020	0.003	0.721	−0.026
Oklahoma City	0.316	0.054	0.011	0.804	0.338
Paterson–Clifton–Passaic	0.722	0.375	0.190	0.802	0.900
Philadelphia	0.629	0.216	0.193	0.780	0.549
Phoenix	0.494	0.321	0.077	0.925	0.348
Pittsburgh	0.419	0.013	0.003	0.642	0.211
Portland	0.250	0.028	0.005	0.782	−0.081
Providence–Warwick–Pawtuckett	0.567	0.085	0.038	0.718	0.716
Riverside–San Bernadino	0.364	0.316	0.101	0.829	0.338
Rochester	0.580	0.116	0.081	0.808	0.688
Sacramento	0.364	0.165	0.054	0.756	−0.030
St. Louis	0.340	0.019	0.003	0.754	0.468
Salt Lake City–Ogden	0.308	0.090	0.013	0.216	0.206
San Antonio	0.569	0.665	0.384	0.532	0.660
San Diego	0.421	0.269	0.185	0.793	0.140
San Jose	0.445	0.317	0.118	0.729	0.109
Seattle–Everett	0.213	0.026	0.003	0.846	0.222
Tampa–St. Petersburg	0.489	0.175	0.071	0.701	0.211
Tucson	0.519	0.431	0.122	0.866	0.219
Washington, D.C.	0.307	0.054	0.017	0.758	0.517
Averages					
Total	0.436	0.201	0.090	0.713	0.398
Northeast	0.543	0.189	0.106	0.686	0.602
North Central	0.438	0.095	0.055	0.794	0.503
South	0.387	0.202	0.077	0.656	0.331
West	0.417	0.288	0.122	0.743	0.251
Intercorrelations					
D	1.000	0.699	0.786	0.324	0.656
P^*	0.699	1.000	0.951	0.185	0.321
SP	0.786	0.951	1.000	0.243	0.400
CD	0.324	0.185	0.243	1.000	0.306
CO	0.656	0.321	0.400	0.306	1.000

$\ln[P/(1 - P)]$—creates a new variable ranging from negative to positive infinity, thus enabling the use of OLS estimation procedures. The concentration index was not transformed because it included a few negative values, reflecting its theoretical range from -1 to $+1$.

The explanatory variables fall into one of five categories: indicators of acculturation, socioeconomic status, population composition, regional location, metropolitan context, and sample selectivity. Specific variables were selected by following a line of empirical research and theoretical reasoning developed in our earlier papers (Massey and Denton, 1987, 1988b). Initial tests revealed few problems with nonlinearity or multicolinearity among variables in the equations, and controls for compositional diversity among Hispanics proved to be in-

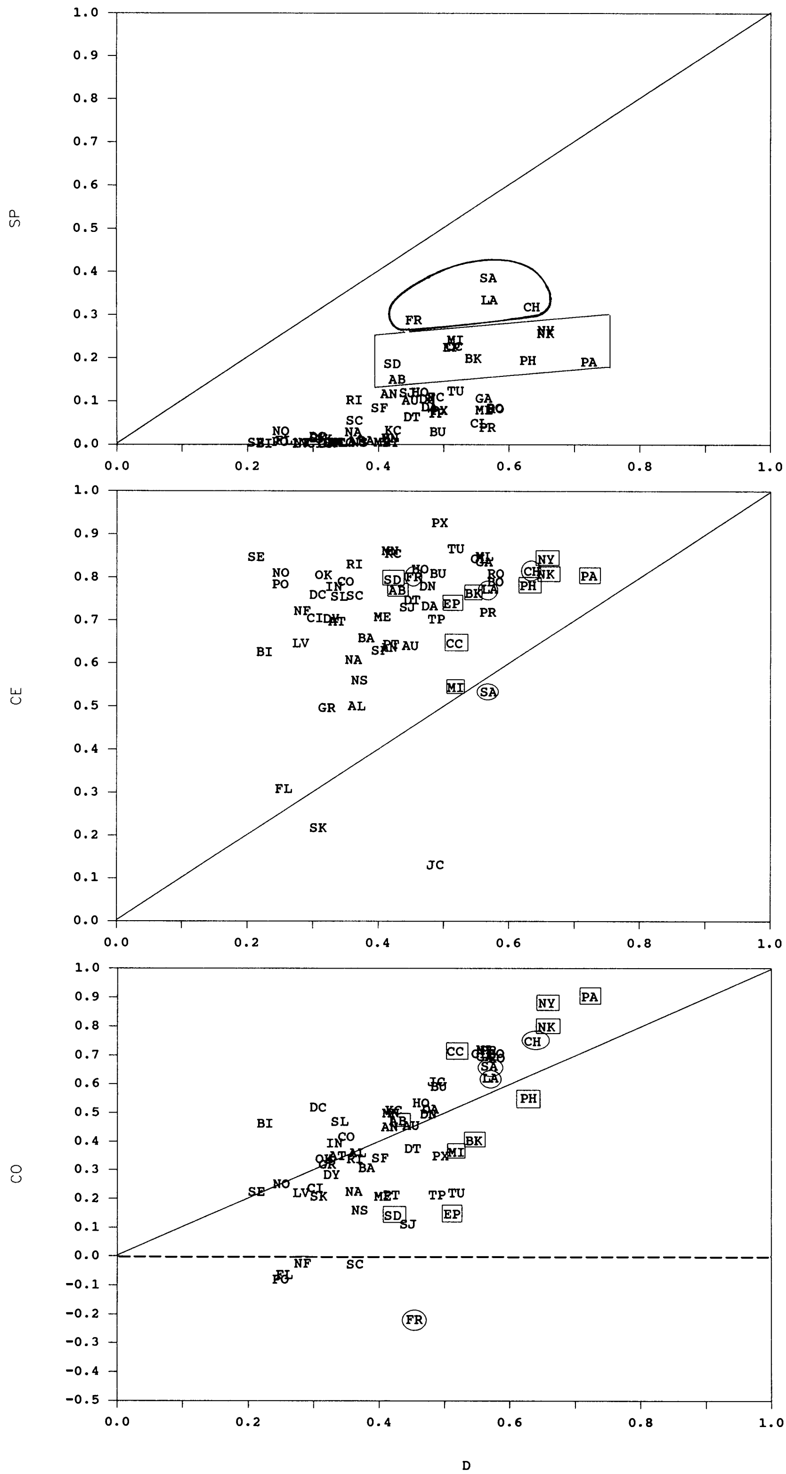

Figure 2. Indices of Clustering, Centralization, and Concentration Plotted Against the Index of Dissimilarity: Hispanics in 60 SMSAs, 1980

Table 4. Regression of Five Segregation Indices on Selected Explanatory Variables: 60 SMSAs in 1980

Explanatory variables	Dependent variables									
	D		*P**		*SP*		*CE*		*CO*	
	B	SE	B	SE	B	SE	B	SE	B	SE
Acculturation										
Proportion native born	0.055	0.446	−0.897	0.740	−0.066	1.170	0.868	0.900	0.047	0.214
Socioeconomic status										
Occupational status	−0.096[a]	0.018	−0.222[a]	0.030	−0.248[a]	0.048	−0.015	0.037	−0.040[a]	0.009
Family income	−0.022	0.018	−0.021	0.030	−0.028	0.047	−0.078[a]	0.036	−0.020[a]	0.009
Population Composition										
Minority proportion	1.429[a]	0.414	7.138[a]	0.687	6.528[a]	1.085	−0.279	0.835	0.010	0.198
Proportion black Hispanic	0.295	0.844	−4.647[a]	1.402	−6.675[a]	2.215	−0.627	1.705	−0.112	0.405
Minority group										
Blacks	1.114[a]	0.177	1.654[a]	0.294	1.430[a]	0.465	0.271	0.357	0.193[a]	0.085
Region										
Northeast	0.495[a]	0.230	0.265	0.381	0.754	0.602	−0.149	0.464	0.032	0.110
North Central	0.573[a]	0.167	0.272	0.277	0.641	0.437	0.512	0.337	0.210[a]	0.080
South	0.066	0.130	0.003	0.217	0.163	0.342	−0.558[a]	0.263	0.092	0.080
Metropolitan context										
Housing inflation	1.085	1.770	0.573	2.939	6.239	4.645	−0.675	3.574	−0.040	0.849
Employment growth	−0.162	3.356	−5.349	5.572	−7.245	8.806	2.096	6.776	−0.330	1.610
Minority immigration	0.251	0.524	0.526	0.871	−0.304	1.376	0.004	1.059	0.145	0.252
Growth differential	−1.027	2.001	−7.283[a]	3.321	−2.855	5.249	−2.065	4.039	−0.853	0.960
Age of housing	0.002	0.011	−0.006	0.019	0.003	0.029	−0.016	0.023	0.011[a]	0.005
Selectivity										
$P - 1$	0.749[a]	0.175	1.268[a]	0.290	2.355[a]	0.459	0.672[a]	0.354	0.212[a]	0.084
Intercept	2.647[a]	0.887	6.036[a]	1.473	4.722[a]	2.328	2.771	1.792	1.655[a]	0.426
R^2 (adjusted)	0.803[a]		0.881[a]		0.787[a]		0.312[a]		0.607[a]	
n	120		120		120		120		120	

Note: B = regression coefficient; SE = standard error.
[a] $p < 0.05$.

significant and were eliminated. A full description of the explanatory variables, the theoretical model, and the selectivity correction is given in Massey and Denton (1987).

The estimates of Table 4 generally confirm the exceptional nature of black segregation in U.S. metropolitan areas. The large discrepancy between black and Hispanic segregation indices observed in the earlier tables cannot be accounted for by the explanatory factors that we have identified. The coefficient for black minority status is large and highly significant in four of the five regression equations. Black race is particularly significant in the equations for dissimilarity and spatial isolation, where the coefficient exceeds its standard error by a factor of about six. All four of the equations fit the data well, accounting for between 61 and 88 percent of the intermetropolitan variance in segregation. The only dimension on which black race was not significant was centralization, the equation that most poorly fits the data, explaining only 31 percent of the variance in the *CE* index.

In other words, controlling for a variety of possible confounding factors, blacks are significantly more segregated than Hispanics on four of five dimensions of residential segregation. Apart from black minority status, segregation was strongly reduced by rising socioeconomic status; and on three dimensions (dissimilarity, isolation, and clustering), it was strongly increased by a high proportion of minority members. A relatively large number of black Hispanics reduced the level of Hispanic isolation and clustering, probably by promoting intergroup contact with blacks. Regional location in the Northeast and North Central states increased the level of dissimilarity, and a North Central location increased the level of concentration. In all equations, the selectivity coefficient was highly significant, indicating that the large metropolitan areas chosen for study are considerably more segregated than the smaller ones we left out, creating a selection bias that was corrected by using the technique of Olsen (1980).

Conclusion

Many earlier studies have documented the persistent and high degree of black residential segregation in U.S. metropolitan areas (Duncan and Duncan, 1957; Farley, 1977; Massey, 1979; Massey and Denton, 1987; Sorensen, Taeuber, and Hollingsworth, 1975; Taeuber and Taeuber, 1965). This investigation not only confirms these earlier studies but suggests that black segregation is even more extreme than previously imagined. By focusing on the index of dissimilarity, and more recently on measures of exposure, earlier work has understated the unique situation of blacks in American urban areas and has not appreciated the full extent of their segregation in U.S. society. Alone among U.S. minority groups, blacks often face conditions of hypersegregation.

Being black not only greatly accentuates the level of segregation on any single dimension but also increases markedly the dimensionality of segregation, generating an accumulation of segregation across multiple dimensions simultaneously. From our descriptive analyses, we identified a significant core of 10 large metropolitan areas within which blacks are very highly segregated on at least four dimensions of residential segregation. These areas contain 29 percent of all urban blacks in the United States. They include Baltimore, Chicago, Cleveland, Detroit, Milwaukee, and Philadelphia—which are highly segregated on all five dimensions—as well as Gary, Los Angeles, New York, and St. Louis—which are highly segregated on four dimensions.

In no SMSA were Hispanics highly segregated on more than three dimensions simultaneously, and in 37 of the 60 SMSAs, they were not highly segregated on any dimension at all. Even in large Hispanic settlements such as Los Angeles, Miami, San Antonio, San Francisco, and San Diego, segregation was low or moderate on all dimensions. In other words, not only is the average level of Hispanic segregation lower on any given dimension, but there is a striking absence of the multidimensional layering of high segregation across dimensions. To be sure, layering does occur in a few cities; but it is always at a moderate level. In SMSAs such as San Antonio, Miami, and Corpus Christi, Hispanics are moderately but consistently segregated across all five dimensions, implying a more restricted social environment than if they displayed low segregation on some dimensions. Hispanics never, however, display both multidimensional layering and high segregation.

Blacks are thus unique in experiencing multidimensional hypersegregation. The contrast between them and Hispanics is not easily explained by different socioeconomic characteristics, varying population sizes, different regional locations, or contrasting metropolitan conditions. Although our models cannot eliminate the view that some unmeasured objective factor accounts for the discrepancy between blacks and Hispanics, the models lend credence to the view that blacks remain the object of significantly higher levels of Anglo prejudice than Hispanics. Two decades after the 1968 Civil Rights Act, blacks still have not achieved the freedom to live where they want.

These results underscore the complexity of urban segregation patterns and the extent to which they have been oversimplified in the past by using one or two indices. Groups differ not only in the degree of their segregation but also in the dimensional structure of their segregation. A minority that is highly segregated on only one dimension is "less segregated," in a very real sense, than one highly segregated on five. Likewise, a group that is moderately segregated on five dimensions is "more segregated" than one displaying low levels on four and a moderate level on the fifth. Recognizing five distinct dimensions of segregation yields considerably more information than using one dimension by itself.

An appreciation of the multidimensional structure of segregation is especially important in the case of blacks. Segregation becomes more profound as it accumulates across dimensions, and hypersegregation across five dimensions simultaneously implies a level of spatial isolation that is much greater than heretofore recognized. From studies based on the index of dissimilarity, it has been known for some time that blacks are unevenly distributed in many metropolitan areas, meaning that most tracts where blacks live contain a disproportionate number of black residents. Our results, however, paint a more extreme picture. Not only are blacks in our largest cities disproportionately likely to share tracts with other blacks, they are very unlikely to share a tract with any whites at all. Moreover, if they go to the adjacent neighborhood, or to the neighborhood adjacent to that, they are still unlikely to encounter a white resident. These agglomerations of monoracial tracts are densely settled and geographically restricted, comprising a small portion of the urban environment closely packed around the city center, a zone known for poverty and social disorganization long before blacks arrived there (Park and Burgess, 1925).

This extreme level of residential segregation across multiple dimensions is important because of the social isolation it implies. For blacks in large ghettos of the north, this isolation must be extreme. Unless a resident of these ghettos works in the Anglo-dominated economy, he or she is unlikely to come into contact with anyone other than another black ghetto-dweller. Indicators of the accompanying social isolation are not hard to find. Over the past decade, black ghetto speech has grown progressively more distant from the standard English spoken by most non-Hispanic whites (cf. Labov, 1972; Labov and Harris, 1986), and black marriage, fertility, and family patterns have diverged more sharply from the mainstream (Espenshade, 1985; Farley, 1984; Farley and Allen, 1987; Pratt et al., 1984). Over the same period, poverty, labor force withdrawal, and unemployment have come to be increasingly concentrated in inner-city black neighborhoods (Wilson, 1987), particularly for young men (Lichter, 1988). Our results suggest that the extremity of black residential segregation and its unique multidimensional character may help explain the growing social and economic gap between the black underclass and the rest of American society.

Acknowledgments

The research reported in this article was supported by National Institute for Child Health and Human Development Grants HD-18594 and HD-22992. We thank Mitchell Eggers and two anonymous reviewers for their helpful comments. We are also grateful to John M. Goering for suggesting the term hypersegregation to us.

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