INTRODUCTION—SEGREGATION AND NEIGHBORHOOD CHANGE: WHERE ARE WE AFTER MORE THAN A HALF-CENTURY OF FORMAL ANALYSIS

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Beginning with the work of University of Chicago sociologists in the 1920s, social scientists have been interested in explaining the uneven group distributions of individuals and households as well as the dynamics driving these distributions by using a human ecological approach (McKenzie, 1924; Park et al., 1925; Park, 1936). By the 1950s, this approach began to take a sharp turn toward formal quantitative analysis, a turn that marked the beginning of segregation analysis. What was diminished by this change was the attention paid to both the spatial dimensions of local unevenness and the dynamic processes of neighborhood change.

The first formal measure of segregation probably was introduced by Bell (1954), yet Duncan and Duncan’s (1955) dissimilarity index D was used far more widely to summarize residential segregation patterns for entire metropolitan areas. There are some disciplinary variations; for example, economists favor using the Gini index (Silber, 1989), which also has a long history, when measuring income segregation. But the study of segregation has become truly interdisciplinary, expanding from its sociological roots to attract the attention of economists (Galster, 1988; Bayer et al., 2004), geographers (Clark, 1986; Wong, 1993), and urban policy analysts and planners (Jargowsky, 1996; Dawkins, 2004).

We are grateful to Bill Clark of UCLA, who encouraged us to launch this special issue project after we organized two special sessions on segregation measurement at the annual meeting of the Association of American Geographers in 2006. Several papers accepted for this and a subsequent special issue of Urban Geography were originally presented in the two special sessions on methodology; other accepted papers have addressed the theory of segregation, segregation as a cause or outcome of other social processes, and additional related issues.

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An important milestone in racial–ethnic segregation studies was the extensive review of segregation measures performed by Massey and Denton (1988) and the resultant five segregation dimensions they identified (evenness, exposure-isolation, concentration, centralization, and clustering). Although some have suggested that these dimensions should be reduced to a smaller number (Reardon and O’Sullivan, 2004; Brown and Chung, 2006), a well recognized deficiency of the five-dimension framework is that the role of space in measuring segregation was not well conceived. There also has been an extension of segregation studies beyond residential space into employment space (Deutsch et al., 1994) and school space (Clotfelter, 1999; Reardon et al., 2000). Furthermore, researchers have expanded the scope of their inquiries to examine segregation not only by race–ethnicity, but by income (Deutsch and Silber, 1997), gender (Blair and Lichter, 1991), and occupational categories (Simkus, 1978).

Since the early 1990s, a series of papers mainly by geographers, starting with Richard Morrill (1991), urged investigators to incorporate space into the measurement of segregation more explicitly. Ideas and concepts originating in spatial statistics were borrowed, including the modeling of spatial relationships among areal units using various forms of spatial weights, and the distinction between segregation measures summarizing the condition of an entire region (global measures) versus those describing conditions at the neighborhood level (local measures; e.g., Fotheringham, 1997; Wong, 2002; O’Sullivan and Wong, 2007). The latter direction addresses the concern that regional indices obscure the spatial patterns of segregation within each region. The former direction tackles the aspatial nature of traditional segregation indices that treat enumeration-unit boundaries as absolute barriers to interaction over space. Most spatial measures introduce concepts to remove or diminish the artificial separation imposed by such boundaries. One spatial concept suggested was the composite population count (Wong, 1998)—the population of the referenced unit plus the populations of surrounding neighboring units—which has been modified into different forms, such as by using a kernel function to smooth the population (Reardon and O’Sullivan, 2004) to remove boundaries as barriers to interaction.

Another popular approach to addressing the spatial dimension of segregation is to evaluate the spatial distribution pattern of the relevant phenomena implicitly. This approach is often adopted in investigating income segregation, and areal units are ranked or sorted according to the attribute values (i.e., income). The evaluations are often based on some variations of the Gini index with respect to the areal units being sorted (Jargowski, 1996; Dawkins, 2004). Though space is not treated explicitly in this approach, it has many mathematical merits (Silber, 1989).

Although the local spatial analysis of segregation has received a great deal of recent attention, research and methodological advances in neighborhood change have largely been overshadowed by temporally cross-sectional segregation studies. The likely causes for this shortcoming are the difficulty of data processing for trend analysis at the neighborhood (e.g., census tract) scale, and the difficulty of developing statistics that empirically capture transitions in a multigroup context. There has been research on tipping points—the thresholds at which the transition process accelerates—in Clark (1991), Goering (1978), and Schelling (1971). Reibel (2003) developed regional transition statistics that are analogous to segregation indices. And a number of investigators have developed multigroup typologies of transition to describe or model the causes and probabilities of transition as a set of categorical outcomes (White, 1984; Denton and Massey, 1991;
Clark, 1993; Alba et al., 1995). But all these studies use essentially arbitrary thresholds for significant group change specified a priori.

This special issue of *Urban Geography* is the first of two issues that examine the most recent developments in the study of residential segregation and neighborhood change. These developments include methodological innovations for measuring, explaining and assessing the impacts of segregation and neighborhood change, particularly concerning their temporal and local spatial dimensions. The four papers in this first issue all make important methodological contributions, and each illustrates a different set of theoretical concerns in the interpretation of segregation and neighborhood change. Chung and Brown use spatial measures to examine the causes of segregation. Grengs uses methods from analytical cartography to probe segregation at the sub-block scale. Reibel and Regelson apply clustering methods developed in biostatistics to analyze neighborhood change. And Grady and McLafferty employ spatial measures and multilevel models in their examination of the consequences of segregation for public health.

Researchers from different disciplines have applied different emphases when examining the causes of segregation. Economists and some geographers tend to focus on the residential decision process or housing market operations (Clark, 1992), while others focus on racial discrimination in the housing market as a driving force in shaping segregated landscapes (Yinger, 1979; Kiel and Zabel, 1996). The economic status of minority populations mediated by environmental context and quality is another emphasis, as analyzed in the environmental justice literature (Brasington and Hite, 2005). Sociologists also have a long history of examining this issue, from the Chicago School paradigm of invasion and succession to the assimilation theory (Massey, 1985) to the more recently developed model of segmented assimilation (Portes and Rumbaut, 1996).

Chung and Brown identify four major frameworks to explain the emergence or change in segregation. They are assimilation, stratification through various discriminatory processes, resurgent ethnicity due to in-group preferences, and pluralism supported by major actors in the housing market. Previous studies used these frameworks for interurban scale comparisons, but failed to recognize their relevance at the local scale. Therefore, they adopt a local approach to explore the applicability of these frameworks. Changes in local or neighborhood situations should reflect which framework(s) is/are more applicable over time. To measure changes at the neighborhood scale, they use local Moran’s I (LM-I) as a measure of clustering and location quotients (LQ) as a measure of concentration. By comparing the changes of LM-I and LQ over time, new clusters and new concentrations can be identified, respectively. The authors comment on how changes in clusters and concentration areas are related to the four frameworks. Using 1990 and 2000 MSA data for Columbus, Ohio, they compute the changes of the two local measures and conclude that there is support for the assimilation framework, although it is not strong. Whereas stratification is not present in Columbus, resurgent ethnicity is found in at least a portion of the population. Chung and Brown find strong support for market-led pluralism across African American and Hispanic populations, but less so among Asians.

The article by Grengs introduces dasymetric mapping to the debate on poverty concentration while challenging the analytical conventions of using census tracts as units of analysis. Grengs shows that the scale effect of the Modifiable Areal Unit Problem (MAUP; Openshaw, 1983) at the tract level has distorted the results, and in fact reversed the sign of poverty concentration measures. Dasymetric mapping is a technique for...
estimating a nearly continuous surface for a variable originally distributed across discrete spatial units by reference to superimposed ancillary data at a finer-grained spatial resolution; the ancillary data must be correlated with the original variable. The technique is therefore similar to co-kriging in geostatistics. Using his 250-foot-square spatial resolution land use dataset for Detroit to weight and spatially interpolate the distribution of poor populations within census tracts, Grengs demonstrates that the poor are concentrated in small, scattered pockets around the city that disappear at tract-level aggregation. Measured at the finer scale, poverty concentration increased from 1990 to 2000—a finding that contradicts results based on tract-level data. Grengs also shows that abandonment creates small islands of concentrated poverty surrounded by uninhabited areas (extreme social isolation that likewise is not captured by tract-level analysis), and that positive land use changes are associated with declines in poverty concentration.

Reibel and Regelson present a clustering approach to neighborhood change in multi-ethnic context. In contrast to the studies discussed above, which set arbitrary thresholds for meaningful group change, Reibel and Regelson first apply the prediction strength method to determine the proper number of multigroup transition clusters into which the set of study area tracts naturally falls. They then perform a cluster analysis for that number of clusters and examine the group change characteristics and geographic distribution of each cluster. They argue that dynamic processes constitute a separate and distinct set of measurements and research questions from static segregation, and that both are equally necessary for a complete understanding of neighborhood group demographic conditions.

Developing better segregation measures and explaining the causes of segregation have dominated segregation studies. However, an equally important question concerns the consequences of segregation. Surprisingly, this issue has not been thoroughly addressed, partly because it is generally accepted that segregation is undesirable. How undesirable it is, however, and its specific consequences, have not been adequately addressed except for a few isolated studies on school segregation (DuBois, 1934) and access to resources (Massey, 1990). Recently, community health researchers have attempted to link segregation with health outcomes (e.g., Kawachi and Berkman, 2003), and the final article in this special issue adds to that literature.

Studies have shown in general that the African American residents of more segregated areas exhibit poorer health outcomes than those living in less segregated areas. Grady and McLafferty focus on low birthweight among infants born to native-born and immigrant Black women. The first hypothesis is that racially segregated neighborhoods adversely affect health through various physical, social, and psychological factors. However, Black immigrants in general have stronger social ties and community support in their neighborhoods versus U.S.-born Black women who have to deal with the cumulative effects of racial isolation and discrimination in segregated neighborhoods. Thus the second hypothesis is that high ethnicity density due to voluntary clustering may be beneficial to health. Using Year 2000 birth statistics for New York City, multilevel models are developed to model the impacts of individual and neighborhood characteristics on low birthweights as the outcome variable. One of the neighborhood characteristics in the models is an exposure-based local segregation index, whose purpose is to test if the two groups of women of the same race, but different in nativities, encounter different experiences.

Results indicate that poverty plays an important role in low birthweight for U.S.-born women in segregated neighborhoods, but has little impact on immigrant Black women. In
addition, segregation itself imposes health risks on these women. Surprisingly, immigrant women have a higher risk in low-poverty, less segregated areas. This article also makes many comparisons between the two groups of women. One interesting finding is that segregated neighborhoods may produce negative impacts, but the high ethnic density in those neighborhoods can be accompanied by positive impacts to offset the negatives.

Studies in this issue as well as those to appear in the second special issue are snapshots of the current state of research on segregation and neighborhood change. Many unresolved issues remain to be explored and some are hinted at in these papers. Reibel and Regelson provide a promising beginning for cluster analysis—based transition studies, but the method must be refined, expanded to broader areas, and applied to model the causes of particular change patterns in multiethnic context. Grengs’s paper essentially questions at what spatial scale one should measure segregation—a subset of the MAUP problem in segregation studies first discussed more than a decade ago (Wong, 1997); Grengs’s work revisits this issue, but questions remain. Chung and Brown use two dimensions (clustering and concentration) to evaluate the applicability of the four frameworks in explaining segregation, but the debate about the causes of segregation is far from resolved. The difficulty in identifying the consequences of segregation is that segregation is not a simple variable such as age or income, but is a multidimensional, multifaceted phenomenon. Low birthweight is one of many possible health outcomes that appears to be associated with segregation, but much methodological and empirical work remains in the investigation of other social consequences of segregation.

REFERENCES


