BEYOND SOCIAL CAPITAL: SPATIAL DYNAMICS OF COLLECTIVE EFFICACY FOR CHILDREN*

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We propose a theoretical framework on the structural sources and spatially embedded nature of three mechanisms that produce collective efficacy for children. Using survey data collected in 1995 from 8,782 Chicago residents, we examine variations in intergenerational closure, reciprocal local exchange, and shared expectations for informal social control across 342 neighborhoods. Adjusting for respondents' attributes, we assess the effects of neighborhood characteristics measured in the 1990 census and the role of spatial interdependence. The results show that residential stability and concentrated affluence, more so than poverty and racial/ethnic composition, predict intergenerational closure and reciprocal exchange. Concentrated disadvantage, by contrast, is associated with sharply lower expectations for shared child control. The importance of spatial dynamics in generating collective efficacy for children is highlighted—proximity to areas high in closure, exchange, and control bestows an advantage above and beyond the structural characteristics of a given neighborhood. Moreover, spatial advantages are much more likely to accrue to white neighborhoods than to black neighborhoods.

The study of "neighborhood effects" has gained prominence in social science research, especially with respect to child and adolescent development. Psychologists, economists, political scientists, and sociologists have rediscovered the importance of local community context in an era of increasing globalization and the emergence of the "network society" (Castells 1996). Spurred by Wilson's (1987) book, *The Truly Disadvantaged*, neighborhood research has focused primarily on the effects of concentrated urban poverty and related dimensions of economic disadvantage such as racial and ethnic exclusion (Jargowsky 1996, 1997; Massey and Denton 1993). The child and adolescent outcomes associated with concentrated disadvantage include teenage childbearing, dropping out of high school, low measured IQ, child maltreatment, and adolescent delinquency (Brooks-Gunn et al. 1993; Brooks-Gunn, Duncan, and Aber 1997; Coulton et al. 1995; Duncan, Brooks-Gunn, and Klebanov 1994; Sucoff and Upchurch 1998).

By contrast, the social mechanisms hypothesized to mediate the effects of neighborhood structural characteristics remain relatively unexplored, both theoretically and empirically. Why, for example, should concentrated poverty (which is, after all, the concentration of poor *people*) matter? If

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neighborhood effects on child outcomes exist, presumably they are constituted from social processes that involve collective aspects of community life (Mayer and Jencks 1989). An emerging body of research has begun to explore how mechanisms like informal social control bear on the well-being of children (Elliott et al. 1996; Furstenberg et al. 1999; Sampson forthcoming; Sampson, Raudenbush, and Earls 1997).[1] How do we theorize and measure neighborhood variations in child-related social mechanisms? What are their structural antecedents? Are the collective properties of neighborhood social organization embedded in larger spatial processes that transcend local boundaries and internal structural characteristics?

Unlike deficit models of the "inner city" or "underclass" and medical-model approaches that privilege person-based accounts (Earls and Carlson 1996, 1998), we address these questions by extending Coleman's (1990) notion of social capital to explicate what constitutes and sustains collective efficacy for children (Sampson et al. 1997). We examine the structural sources of neighborhood-level variations in intergenerational closure, reciprocal exchange, and shared expectations for child social control by combining census data with data from a survey of more than 8,500 residents of 342 neighborhoods in Chicago. Emphasizing the spatial interdependence of closure, exchange, and control processes, we reveal the systemic nature of spatial externalities and draw their implications for racial and ethnic inequality at the neighborhood level.

NEIGHBORHOODS AND SOCIAL ORGANIZATIONAL PROCESSES

Rejecting the fiction that society consists of independent individuals, Coleman (1988) argues that social capital is a form of social organization created when the structure of relations among persons facilitates action, "making possible the achievement of certain ends that in its absence would not be possible" (p. 98; Coleman 1990:300). Bourdieu (1986) writes of the "actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition" (p. 249). Putnam (1993) defines social capital in a more expansive fashion as "features of social organization, such as networks, norms, and trust, that facilitate coordination and cooperation for mutual benefit" (p. 36). Social capital is thus a resource that is realized through relationships (Coleman 1990:304); whereas physical capital takes observable material form, and human capital rests in the skills and knowledge acquired by an individual.

Unfortunately, over time the concept of social capital has come to mean many different things (Portes 1998; Sandefur and Laumann 1998). Coleman's formulation has been recast either too expansively or, more frequently, as individual-level attributes, perhaps because Coleman (1990:595–96) uses individual-level data to illustrate his points. Using measures such as "single parenthood" and "number of family moves" as indicators of social capital has become commonplace. Sociologists and life-course theorists studying children's social capital have also tended to adopt a within-family framework for processes such as parental monitoring and expectations (e.g., Hagan, MacMillan, and Wheaton 1996; Sampson and Laub 1993). Yet Coleman's narrative descriptions, such as his comparison of social capital available to mothers in Detroit and Jerusalem (1990: 303), refer to the extra-individual properties of social-organizational structure—particularly as grounded in local communities. This is important because sources of social capital tied to local community context are analytically distinct from (and may be no less consequential than) the more proximate family processes and relationships observed inside the home. Indeed, recent efforts seem to have bypassed Coleman's essential theoretical claim—*that social capital is lodged not in individuals but in the structure of social organization* (1990:302).

We tackle this idea directly by highlighting three dimensions of neighborhood social organization that affect the lives of children. The neighborhood context of childrearing

[1] For example, Sampson et al. (1997) showed that a combination of neighborhood social control and social cohesion predicted lower rates of violence. Similar constructs also predict better health outcomes for children (Morenoff 1999; Sampson forthcoming).

was one of Coleman's major interests and provides guidance for our formulation of analytic strategies and hypotheses. Consider first the question of *intergenerational closure*—are the adults and children in a community linked to one another? Childrearing is typically analyzed from the perspective of individual families. Although within-family processes are clearly important, Coleman (1990:593) observes that when parents know the parents of their children's friends, they can observe the child's actions in different circumstances, talk with other parents about their child, and establish norms (also see Furstenberg et al. 1999). Such structural and normative adult-child closure gives children social support, provides parents with information, and facilitates control (Sandefur and Laumann 1998:486). Note that the mere presence of a relationship among adults is not sufficient to produce social capital for children: A parent who has many friends or acquaintances, even within a given community, is limited in the benefits he or she can offer if those friends do not include the parents or relatives of his or her own children's friends. The idea of intergenerational closure can also be generalized to include any local adult—a teacher, religious leader, businessperson, agent of juvenile justice, or concerned resident. To our knowledge, the analysis of intergenerational closure across a wide range of neighborhood contexts has not been undertaken.

A second dimension of neighborhood-level social organization studied here is *reciprocated exchange* (Coleman 1990:590). What is the intensity of interfamily and adult interaction with respect to childrearing? An adult may know other parents and children by face or name in a community, but rarely exchange information or otherwise interact. Social capital is reinforced by interactions such as the exchange of advice, material goods, and information about childrearing (Blau 1964). Reciprocated (or relatively equal) exchange leads to social support that can be drawn upon (Portes and Sensenbrenner 1993), not just by parents but by children themselves as they develop. This sort of exchange may be facilitated by, but does not require, the presence of strong personal ties such as those found in tightly bounded friendship and kinship networks.

A third but often neglected aspect of neighborhood social organization concerns expectations for the *informal social control and mutual support* of children. The expectation that neighborhood residents can and will intervene on the behalf of children depends on more than shared values among neighbors. Extending Sampson et al. (1997), we argue that collective efficacy for children is produced by the shared beliefs of a collectivity in its conjoint capability for action. The notion of collective efficacy emphasizes residents' sense of active engagement that is not well captured by the term social capital. As Bandura (1997) argues, the meaning of efficacy is captured in expectations about the exercise of control, elevating the "agentic" aspect of social life over a perspective centered on the accumulation of "stocks" of social resources. This conception of collective efficacy is consistent with the redefinition of social capital by Portes and Sensenbrenner (1993:1323) as "expectations for action within a collectivity."

In our view, then, social capital for children refers to the resource potential of personal and organizational networks, whereas collective efficacy is a task-specific construct that relates to the shared expectations and mutual engagement by adults in the active support and social control of children (Sampson et al. 1997). Although these two concepts have much in common, our distinction differentiates the *process* of activating or converting social ties to achieve desired outcomes from the ties themselves (cf. Bandura 1997; Portes 1998). From this perspective, resources or networks alone (e.g., voluntary associations, friendship ties, organizational density) are neutral—they may or may not be effective mechanisms for achieving an intended effect. In fact, strong personal ties can often inhibit effective action (Granovetter 1973; Wilson 1987). Rather than lament the paucity of "urban villages" in modern cities, our framework focuses on mechanisms that facilitate childrearing without requiring "strong" ties or associations. As Warren (1975) noted, the common belief that neighborhoods have declined in importance as social units "is predicated on the assumption that neighborhood is exclusively a primary group and therefore should possess the 'face-to-face,' intimate, affective rela-

tions which characterize all primary groups" (p. 50). We reject this outmoded assumption.

Recent writing on social capital also tends to gloss over its potential downside—namely that social capital can be drawn upon for negative as well as positive goals. After all, resources can be put to many uses, and therefore some constraints on goals are theoretically necessary. For example, we would not consider racial exclusion, such as practiced in the "defended" neighborhood, as a desirable form of social capital. As Sugrue's (1996) research on Detroit circa 1940–1970 reveals, neighborhood associations were exploited by whites to keep blacks from moving to white working-class areas. Thus, social capital (and by implication, collective efficacy) has a valence depending on the goal in question (Sandefur and Laumann 1998: 493). The need to invoke a normative or goal-directed dimension when evaluating social capital reveals the connection of Coleman's (1990) theory to moral philosophy (see Favell 1993).

Recognizing the valence of social capital, we apply the nonexclusivity requirement of a social good (Coleman 1990:315–16; Hechter 1987:9) to judge whether neighborhood structures serve the collective needs of children. We argue that the active maintenance of intergenerational ties, the reciprocal exchange of information and services among families, and the shared willingness to intervene on behalf of children produce a social good that, in Coleman's (1990:34) terms, yields positive externalities that potentially benefit all children. As with other resources (e.g., safety) that produce positive externalities (see Coleman 1990:250–51), we believe that support for children is consensually desired but problematically achieved, owing in large part to variabilities in structural constraints. Ultimately, then, we view social capital and collective efficacy for children not as some all-purpose elixir but as normatively situated and endogenous to specific structural contexts (Portes 1998; Sandefur and Laumann 1998). We argue that these structural contexts are both internal and external to the neighborhood.[2]

STRUCTURAL DIFFERENTIATION AND SPATIAL DYNAMICS

Economic resources and social-structural differentiation in the United States are very much a spatial affair. Physical capital and human capital (e.g., income, education, housing stock) are unevenly distributed across neighborhoods, often in association with ascribed characteristics such as racial or ethnic composition (Massey and Denton 1993). Moreover, recent changes in racial inequality appear to be linked to extra-neighborhood spatial dynamics (Morenoff and Sampson 1997). The continuing significance of ecological differentiation is fundamental to a full understanding of what communities supply for children.

Coleman's (1988, 1990) theory proposes that the continuity of community structure is one key to the emergence of social capital (also see Kasarda and Janowitz 1974). By stability we do not mean lack of change, but rather the social reproduction of neighborhood residential structure, typically when population gains offset losses and home values appreciate. A high rate of residential turnover, especially excessive population loss, fosters institutional disruption and weakens interpersonal ties. Residential instability not only hinders the formation of new social networks, but the severing of existing social ties initiates a disruptive process that affects the entire system of social networks (Coleman 1990:316). Homeowners also have a shared financial interest in supporting neighborhood life. Thus, we expect that residential tenure coupled with homeownership

[2] Our theoretical strategy also addresses recent criticisms of Coleman and Putnam for confounding the sources of social capital with their individual-level consequences ("outcomes"), leading to tautological formulations of social capital—particularly in aggregate-level analyses (see Portes 1999:5, 19–21). Moreover, we agree with critics of Coleman who argue that the conception of social capital as an attribute of large groups (e.g., nations, states, racial groups) is problematic (Astone et al. 1999:8–9; Portes 1999:19–21). Individuals differentially appropriate social capital, and "mechanisms" (e.g., control) are social actions undertaken by individuals (Hedström and Swedberg 1998). Recognizing these criticisms, we focus on neighborhood-level and independently defined sources of variation in mechanisms that combine to generate social capital and collective efficacy for children.

will promote collective efforts to maintain neighborhood exchange values (Logan and Molotch 1987) and social control (Sampson et al. 1997).

A second component of ecological differentiation stems from socioeconomic disadvantage and racial and ethnic segregation. Wilson (1978) argues that the geographical concentration of low-income residents, especially of African Americans and female-headed families, stems from macroeconomic changes related to the deindustrialization of central cities and the out-migration of middle-class residents. Massey and Denton (1993) argue that the greater the race/class segregation in a metropolitan area, the fewer the neighborhoods that can absorb economic shocks and the more severe the resulting concentration of poverty. Economic stratification by race and residence thus fuels the neighborhood concentration of cumulative forms of disadvantage, intensifying the social isolation of low income, minority, and single-parent residents from resources that could support collective social control. Sampson et al. (1997) argue that such extreme resource deprivation combined with racial exclusion acts as a centrifugal force that hinders collective efficacy. Even when personal ties are strong in areas of concentrated disadvantage, daily experiences with distrust, fear of strangers, uncertainty, and economic dependency are likely to reduce expectations for taking effective collective action (Woolcock 1998:207). Moreover, the concentration of immigrant groups is likely to impede public orientations because of linguistic barriers and cultural isolation. Thus, neighborhoods characterized by concentrated disadvantage and immigration are expected to face multiple barriers to generating collective efficacy for children.

We also consider the related but conceptually distinct factor of concentrated *affluence* (Brooks-Gunn et al. 1993; Massey 1996). Not only has poverty become more concentrated in recent years, so has the "spatial sorting" of residents by resources such as education, occupation, and income. Recent scholarship argues for the importance of separating the upper tail of the socioeconomic distribution from the lower tail. Brooks-Gunn et al. (1993), for example, argue that it is the positive influence of concentrated socioeconomic resources, rather than the presence of low-income neighbors, that enhances adolescent outcomes. Yet research on child and adolescent development has tended to focus on poverty, neglecting the growing phenomenon of concentrated wealth. We therefore explicitly assess the role of concentrated affluence in generating social capital and collective efficacy for children.

Of course other characteristics affect the ability of local communities to engage effectively in collective aspects of childrearing. For example, the density of adults relative to children indicates the child-centered nature of neighborhood life. Although the constraints imposed by group size are often overlooked (Blau 1994), some neighborhoods may generate little social capital for children simply because of the relative absence of adults. Another factor is the sheer concentration of the overall population. High population density and its accompanying anonymity form a structural limit to what can be achieved through relational ties.

Finally, the embeddedness of neighborhoods within a larger system of citywide dynamics has been neglected in prior discussions of social capital. If social capital is truly relational, then research that considers neighborhoods as islands unto themselves misses the theoretical point. The political economy perspective argues that the resources in one neighborhood are linked to those in surrounding neighborhoods (Logan and Molotch 1987). Moreover, recent research on neighborhood change shows that abandonment of neighborhoods is driven as much by their proximity to poverty and violent crime as by the structural characteristics of neighborhoods themselves (Morenoff and Sampson 1997). This suggests that housing decisions are influenced by the quality of a neighborhood relative to the quality of neighborhoods that surround it. Parents with young children are particularly sensitive to the geographic location of neighborhoods and schools as well as to a given neighborhood's internal characteristics.

Spatial "flows" for dimensions of social capital are also theoretically compelling because social networks and exchange processes cross the artificial boundaries of analytically defined macro-level units. If the resources of social capital and the active pro-

cesses generating collective efficacy are not exclusive (Coleman 1990:250–51), then their benefits may spill over to neighboring communities, producing what we call "spatial externalities." For example, the benefits of intergenerational closure and supervision of children accrue not just to the residents of a particular neighborhood, but potentially to residents in adjacent areas. Like the decision to move or stay in a neighborhood, adults are more likely to invest effort in the monitoring of children when others around them are doing likewise. Like a good school, then, neighborhoods endowed with collective efficacy for children produce positive spatial externalities. By contrast, neighborhoods with minimal expectations for social control and sparse interfamily exchange produce negative spatial externalities for parents and children who live in adjoining areas. Therefore, we hypothesize that social capital and collective efficacy for children are partly conditioned by the characteristics of nearby neighborhoods, which in turn are conditioned by the neighborhoods adjoining them in a spatially linked process that ultimately characterizes an entire metropolitan system. If African American neighborhoods are embedded in more disadvantaged environments than are similarly endowed white neighborhoods, then the consequences of racial segregation may be greater and more systemic than previously thought.

DATA AND METHODS

Neighborhood-level research is dominated by studies of poverty rates and other social-demographic characteristics based on census data or other government statistics that do not provide information on the social organizational dynamics of administrative units. To assess our theoretical framework, we therefore draw on original data from a study designed to examine social organization across a large number of ecologically defined units—the Project on Human Development in Chicago Neighborhoods (PHDCN). The extensive social class, racial, and ethnic diversity of the Chicago population is a major reason we selected the city for our study: Neither whites, nor blacks, nor Latinos represented more than half of the population.

Grounded in a systemic theory of the local community in mass society (Janowitz 1975; Kasarda and Janowitz 1974), we define neighborhoods ecologically. When formulated in this way, dimensions of collective efficacy for children are variable and analytically separable not only from hypothesized sources of variation (e.g., economic resources, residential stability) but from the definition and operationalization of the units of analysis. Chicago's 865 census tracts were combined to create 343 "neighborhood clusters." These clusters are composed of geographically contiguous and socially similar census tracts. They are smaller than the established 77 "community areas" in Chicago (average size = 40,000) but large enough to approximate local neighborhoods—they average around 8,000 people each. Major geographic boundaries (e.g., railroad tracks, parks, freeways), knowledge of Chicago's local neighborhoods, and cluster analyses of census data guided the construction of the neighborhood clusters so that they are relatively homogeneous with respect to racial/ethnic mix, socioeconomic status, housing density, and family structure (Sampson et al. 1997:924).

The Community Survey of the PHDCN was initiated in late 1994 and conducted mostly in 1995. To gain a complete picture of the city's neighborhoods, 8,782 Chicago residents representing all 343 neighborhood clusters were interviewed in their homes.[3]

[3] By "neighborhood," the survey protocol stated, ". . . we mean the area around where you live and around your house. It *may* include places you shop, religious or public institutions, or a local business district. It is the general area around your house where you might perform routine tasks, such as shopping, going to the park, or visiting with neighbors." The survey also asked each respondent to name and draw their self-defined neighborhood using ecological referents. Over 70 percent of respondents reported that their neighborhood had a name, and the mean number of blocks reported in the neighborhood was approximately 25. The sampling frame for neighborhood clusters and the use of census data required that we use administratively defined boundaries. The use of administrative units to define local communities is not ideal (see Fischer 1982:271–72), but it is unavoidable when the interest is in macro-level variations across a large number of areas. We address the issue of artificial bound-

The Community Survey had three stages. At stage 1, city blocks were sampled within each neighborhood cluster; at stage 2, dwelling units were sampled within blocks; at stage 3, one adult resident (18 or older) was sampled within each selected dwelling unit. Abt Associates carried out the screening and data collection in cooperation with the research staff of PHDCN, achieving a final response rate of 75 percent. The plan was designed to yield a representative probability sample of Chicago residents and a large enough within-cluster sample to create reliable between-neighborhood measures. The samples within neighborhood clusters were designed to be approximately self-weighting, and thus the between-neighborhood analysis is based on unweighted data (see Sampson et al. 1997:924).

Measures of Social Organizational Processes

Five items measure *intergenerational closure* for children. Each respondent was asked whether: "Parents in this neighborhood know their children's friends," "Adults in this neighborhood know who the local children are," "There are adults in this neighborhood that children can look up to," "Parents in this neighborhood generally know each other," and "You can count on adults in this neighborhood to watch out that children are safe and don't get in trouble." Coded on a five-point scale from strongly disagree to strongly agree, these five questions tap varied possibilities for intergenerational connections and active support of neighborhood children by adults—whether or not the adults are parents.

Reciprocated exchange is measured here by a five-item scale tapping the relative frequency of social exchange within the neighborhood on issues of consequence for children. The items used were: "About how often do you and people in your neighborhood do favors for each other? By favors we mean such things as watching each other's children, helping with shopping, lending garden or house tools, and other small acts of kindness?" (never, rarely, sometimes, or often). "How often do you and people in this neighborhood have parties or other get-togethers where other people in the neighborhood are invited?" "When a neighbor is not at home, how often do you and other neighbors watch over their property?" "How often do you and other people in this neighborhood visit in each other's homes or on the street?" "How often do you and other people in the neighborhood ask each other advice about personal things such as childrearing or job openings?"

A three-item Likert scale disaggregated from the collective-efficacy scale used by Sampson et al. (1997) represents *child-centered social control.* Specifically, we separate aspects of child-centered behavior from more general aspects of social cohesion and neighborhood control (e.g., mutual trust, mobilization to keep open a local fire station). Residents were asked about the likelihood ("Would you say it is very likely, likely, neither likely nor unlikely, unlikely, or very unlikely?") that their neighbors could be counted on to "do something" if (1) children were skipping school and hanging out on a street corner, (2) children were spray-painting graffiti on a local building, and (3) children were showing disrespect to an adult. We took the average of these items as our measure.

To assess the construct validity of these three measures, we examine their relationships with each other and with five measures that tap related but conceptually distinct dimensions of neighborhood social capital. *Organizations/services* is a nine-item index of reported local organizations and programs (e.g., presence of a block group, tenant association, crime prevention program, family health service) combined with a six-item inventory of youth services (youth center, recreational programs, after-school programs, mentoring/counseling services, mental health services, and crisis intervention). *Kinship/friendship ties* measures the number and relative proportion of friends and relatives that respondents reported living in the neighborhood. *Voluntary associations* taps involvement by residents in local religious or-

aries by using a spatial dependence model that captures the citywide influence of all other neighborhoods weighted by geographical contiguity (see Anselin 1988). Moreover, following Lee and Campbell's (1998) suggestion, in a preliminary analysis we introduced controls for respondents' differing perceptions of the size and name of their neighborhood: These controls did not influence the main pattern of results.

ganizations; neighborhood watch programs; block group, tenant associations, or community council; business or civic groups; ethnic or nationality clubs; and local political organizations. *Neighborhood activism* summarizes responses to five questions on whether respondents had contacted local officials (e.g., politician, church leader) or otherwise taken action "to take care of a local problem, or to make the neighborhood a better place to live." A single item measured *mutual trust* among neighbors: "People in this neighborhood can be trusted" (strongly agree to strongly disagree). We expect that intergenerational closure, reciprocated exchange, and child-centered control will correlate positively with these five measures of neighborhood social life.

Structural Antecedents

We examine five indexes of neighborhood structural differentiation that build on our theoretical framework and prior analyses of census data in Chicago (Morenoff and Sampson 1997; Sampson et al. 1997). We employ data from the 1990 census because they were collected five years earlier and independently from the PHDCN community survey, thus permitting temporal prediction.

Concentrated disadvantage is a scale that represents economic disadvantage in racially segregated urban neighborhoods. The scale is defined by percent below the poverty line, percent receiving public assistance, percent unemployed, percent female-headed families with children, and percent black. These variables are highly interrelated and load on a single factor using either principal components or alpha-scoring factor analysis with an oblique rotation (see Sampson et al. 1997: 920). This result reflects neighborhood allocation mechanisms that concentrate the poor, African Americans, and single-parent families (Massey and Denton 1993; Wilson 1987).

The second scale captures areas of *concentrated immigration*. The variables that define this dimension are percent Latino (in Chicago approximately 70 percent of Latinos are Mexican-American) and percent foreign born.

Consistent with a long line of urban research, the third scale captures neighborhood *residential stability*, defined as the percentage of residents five years old and older who resided in the same house five years earlier, and the percentage of owner-occupied homes. All three scales above are based on the summation of equally weighted z-scores divided by the number of items; factor-weighted scales yielded the same results.

To these basic dimensions of urban social structure we introduce three additional measures. *Concentrated affluence* taps the upper end of the SES distribution and is defined by percentage of families with incomes higher than $75,000, the percentage of adults with a college education, and the percentage of the civilian labor force employed in professional or managerial occupations. Because of our focus on youth and our need to account for structural imbalances across neighborhoods in the relative number of adults, we constructed the *ratio of adults to children* (persons 18 and over in relation to persons under 18). Finally, *population density* is defined as persons per square kilometer.

Hierarchical Linear Models

The nested structure of the PHDCN research design is addressed by adapting hierarchical linear models (HLM) that account for the nonindependence of observations within neighborhood clusters. The HLM procedures described in Bryk and Raudenbush (1992) were used to simultaneously estimate *within-neighborhood* and *between-neighborhood* equations. The within-neighborhood model regresses the three measures of social mechanisms (intergenerational closure, reciprocated exchange, and child-centered social control) on a core set of individual and group-level characteristics that have been shown in prior research to influence both perceptions and behavior relevant to neighborhoods (Kasarda and Janowitz 1974; Lee and Campbell 1997). Although our theoretical interest is in collective or neighborhood-level variance in social mechanisms, our measurement strategy uses person-level attributes to control for within-neighborhood variation in residents' reports (see Raudenbush and Sampson forthcoming). Specifically, we examine 11 person-level (or household-level) attributes: race/ethnicity (composed of indicators for *Latino American* and *non-Latino African American*—the ref-

erence category is non-Latino white/other); a composite measure of *socioeconomic status* (first principal component of the factor analysis of education, income, and occupational prestige); *sex* (1 = female, 0 = male); current marital status (composed of separate indicators for *married*, *separated or divorced*, and *single*); *homeownership*; *mobility* (number of moves in the past five years); *years in the neighborhood*; and *age*.[4] Using informal social control of children as the example, the within-neighborhood model is:

$$Child\ control_{ij} = \beta_{0j} + \sum_{q=1}^{11} \beta_q X_{qij} + \varepsilon_{ij},$$

where β_{0j} is the intercept; X_{qij} is the value of covariate q associated with respondent i in neighborhood j; and β_q is the partial effect of that covariate on informal social control. The error term, ε_{ij}, is the unique contribution of each individual, which is assumed to be independently and normally distributed with constant variance σ^2.

The between-neighborhood model is:

$$\begin{aligned}\beta_{0j} = {} & \theta_{00} + \theta_{01}(Concentrated\ disadvantage) \\ & + \theta_{02}(Concentrated\ immigration) \\ & + \theta_{03}(Residential\ stability) \\ & + \theta_{04}(Concentrated\ affluence) \\ & + \theta_{05}(Adults\ per\ child) \\ & + \theta_{06}(Population\ density) + U_{0j},\end{aligned}$$

where θ_{00} is the overall average social-control score, and θ_{01} through θ_{06} are the regression coefficients of the effects of concentrated disadvantage, immigrant concentration, residential stability, concentrated affluence, youth concentration, and density, respectively, on neighborhood child control. Because the person-level covariates at level 1 are centered about the sample means, β_{0j} is the mean social control in a neighborhood *after* the effects of the 11 covariates have been controlled. U_{0j} is the neighborhood-level error term, assumed to be normally distributed with a variance of τ. Based on preliminary analysis, we constrain the person-level slopes to be constant across neighborhoods and do not estimate multilevel interactions.[5] Our primary interest is in the main effects on parameter variance across neighborhoods in collective efficacy for children, controlling for individual-level differences in socio-demographic composition.[6]

DESCRIPTIVE RESULTS

We begin by ascertaining the "eco"-metric (Raudenbush and Sampson 1999) as distinct from psychometric properties of the three scales for 7,669 persons with requisite data (86 percent of the sample) residing in 342 of the 343 neighborhood clusters (hereafter "neighborhoods").[7] Partitioning the variance within and between neighborhoods, our goal is to develop measures with acceptable *neighborhood-level* reliability.

The variance decomposition shown in Table 1 yields a neighborhood reliability of .74 for the measure of intergenerational closure. The reliability of our estimate for β_{0j} is defined as:

$$\sum \left[\tau_{00} / (\tau_{00} + \sigma^2 / N_j)\right] / J,$$

the average of neighborhood-specific reliabilities across the set of J neighborhoods (N= 342). Thus neighborhood reliability is a

[4] Unfortunately, we do not have data on the number of children in the household. Child density at the neighborhood level is captured in the census-based measure.

[5] We examined models that first allowed the slopes for person-level covariates to vary randomly across neighborhoods and then to interact with measured structural characteristics of neighborhoods. Overall the slope variances were nonsignificant, unreliable, and not related in a systematic way to structural characteristics.

[6] Raudenbush and Sampson (forthcoming) and Sampson et al. (1997:924) describe a more complicated three-level HLM model to account for measurement error when latent variables are used as predictors. We present a "simpler" two-level HLM model because our purpose is to estimate structural sources of variation in survey-based measures of social capital and collective efficacy for children. Because the survey measures are specified as endogenous, we do not assume perfect measurement (see Bryk and Raudenbush 1992; Raudenbush and Sampson forthcoming, 1999).

[7] One sparsely populated neighborhood (the area around O'Hare International Airport) was dropped because there were not enough respondents to derive a reliable aggregate measure. Further analysis also revealed that missing data within neighborhoods were not confined to any one demographic or social group.

Table 1. Decomposition of Variance and Neighborhood-Level Reliabilities of Scales Measuring Collective Efficacy for Children: Chicago, 1995

Variance Components	Intergenerational Closure	Reciprocated Exchange	Child-Centered Social Control
Within-neighborhood variance (σ^2)	.34	.47	.99
Between-neighborhood variance (τ_{00})	.05	.05	.13
Intraclass correlation	.13	.10	.12
Neighborhood reliability	.74	.65	.72

Note: N = 7,669 persons in 342 neighborhoods.

function of (1) the sample size (N) in each of the j neighborhoods and (2) the proportion of the total variance that is between neighborhoods (τ_{00}) relative to the amount that is within neighborhoods (σ^2). A reliability of .74 suggests that we reliably tap parameter variance in intergenerational closure at the between-neighborhood level. The results also reveal an intraclass correlation of .13, meaning that 13 percent of the scale's variance is between neighborhoods, with the remainder attributable to random error and individual-level variation.

The reliability of the reciprocated exchange scale is a bit lower, at .65. Just under 10 percent of the variance is between neighborhoods, meaning that, like the intergenerational closure scale, there are considerable differences among individuals within the same neighborhood. The reliability for child-centered social control is .72 with an intraclass coefficient of .12. The proportion of variation that is between neighborhoods is small for all three measures, but is consistent with previous research (e.g., Elliott et al. 1996).[8] For present purposes, our "ecometric" analysis of aggregate-level reliabilities suggests that we can assess, with reasonable precision, meaningful differences among neighborhoods in social mechanisms of collective efficacy for children.

Table 2 examines construct and discriminant validity. The three scales measuring collective efficacy for children are significantly and strongly related to each other in a positive direction. Conforming to extant neighborhood theory, intergenerational closure, reciprocated exchange, and child-centered control are also significantly and positively related to more general components of neighborhood social capital— organizational services, density of kinship/friendship ties, participation in voluntary associations, local activism, and mutual trust. However, these correlations are generally lower than the correlations among closure, exchange, and control, which supports the discriminant validity of our scales.

All three scales measuring collective efficacy for children are significantly lower in disadvantaged, residentially unstable, and high-density areas, but are only weakly related to immigrant concentration and youth concentration. Interestingly, child-centered social control is linked much more closely to disadvantage than is reciprocated exchange or intergenerational closure. The intergenerational closure scale, by contrast, is correlated more strongly with residential stability and low levels of immigrant concentration. The observed differential relationships of the three child-based measures with independent measures of neighborhood structural characteristics provide further evidence of discriminant validity (cf. Cook, Shagle, and Degirmencioglu 1997; Furstenberg et al. 1999, chap. 7).

Table 3 presents bivariate correlations among the neighborhood structural predic-

[8] The large within-neighborhood variations challenge neighborhood-level theory. Duncan and Raudenbush (1999), however, advise caution in interpreting small intraclass correlations, as large neighborhood effects can translate into small proportions of variance in individual measures explained by neighborhood membership. For example, a neighborhood effect of .8 of a standard deviation difference can yield an intraclass correlation as low as .14. Thus, a small correlation among neighbors does not rule out a large effect associated with a measured difference *between* neighborhoods.

Table 2. Bivariate Correlation Coefficients between Neighborhood-Level Measures of Social Organization and Structural Differentiation: Chicago, 1995

Measure	Intergenerational Closure	Reciprocated Exchange	Child-Centered Social Control
Neighborhood Social Organization			
Reciprocated exchange	.71**	—	—
Child-centered social control	.67**	.58**	—
Organizations/services	.24**	.37**	.15**
Kinship/friendship ties	.51**	.61**	.39**
Voluntary associations	.40**	.45**	.36**
Neighborhood activism	.32**	.42**	.23**
Trust among neighbors	.29**	.25**	.33**
Neighborhood Structural Differentiation			
Concentrated disadvantage	−.27**	−.27**	−.55**
Concentrated affluence	.27**	.31**	.44**
Residential stability	.58**	.43**	.49**
Immigrant concentration	−.24**	−.18**	−.12*
Adults per child	−.04	.04	.17**
Population density	−.54**	−.38**	−.42**

Note: Total number of neighborhoods equals 342.
*$p < .05$ **$p < .01$ (two-tailed tests)

tors measured by 1990 census data. As expected, concentrated disadvantage and concentrated affluence are inversely related (−.56), but do not present severe multicollinearity problems. This relatively modest association suggests the ecological juxtaposition in many Chicago neighborhoods of poor residents and affluent residents. Concentrated disadvantage is inversely related to immigrant concentration, reflecting in large part the segregation of African Americans from Latino Americans in Chicago. Immigrant areas tend to be low in residential stability, and affluent areas have a low density of children. Overall, the correlations in Tables 2 and 3 support construct and discriminant validity for census measures as well as for the survey-based measures of social capital and collective efficacy for children.[9]

[9] Although the intercorrelations among predictor variables are under .65, we examined each multivariate model for evidence of multicollinearity and influential observations. These and other robustness tests yielded no evidence suggesting a problematic model specification.

MULTILEVEL STRUCTURAL MODELS

We now turn to the multilevel results in multivariate context. The main question is, once individual correlates of intergenerational closure, reciprocated exchange, and child-centered social control are controlled, what is the relative predictive power of exogenous structural characteristics? The upper panel of Table 4 shows that, controlling for socioeconomic status and seven other person-level predictors, respondents who are homeowners, long-term residents, as well as those with few residential moves, tend to report high levels of intergenerational closure. Adjusting for these variables, however, the bottom panel reveals that neighborhoods characterized by residential stability exhibit significantly higher levels of adult-child connections. This result suggests a contextual effect of neighborhood residential stability on social ties and intergenerational support.

The data also reveal a clear pattern of economic stratification. For intergenerational closure at least, it is concentrated affluence and not the level of disadvantage that mat-

ters. Controlling for number of adults per child, population density, and residential stability, the closure of cross-generational ties is most closely associated with concentrated affluence. Note too that the coefficient for immigrant concentration is not significant, and that where there is a high ratio of adults to children, intergenerational closure is *low*. This latter finding suggests a demographic dimension to an inhospitable climate for adult-child ties that stretches beyond the immediate family. Not surprisingly, high population density undermines the formation of intergenerational ties.

The next outcome in Table 4—reciprocated exchange—was measured from reports of respondents' actual exchanges with neighbors rather than their perceptions of the neighborhood. Perhaps because of this difference, more variance is explained *within* neighborhoods, although it remains low overall. Reciprocated exchange is significantly more likely among homeowners, long-term residents, young residents, those with few moves, whites, and males. Controlling for these person-level variables, three neighborhood-level predictors of reciprocated exchange are significant—residential stability, concentrated affluence, and low population density. Again, the data suggest contextual effects of stability and affluence. Because person-level measures of stability (homeownership, residential moves, and years in neighborhood) and socioeconomic status (education, income, and occupation) all significantly influence respondents' exchange patterns, the estimated neighborhood effects of residential stability and concentrated affluence are noteworthy. Note also that, as with intergenerational closure, concentrated affluence seems to matter more than concentrated disadvantage.

The final results in Table 4, on the informal social control of children, differ in important respects from those for intergenerational closure and reciprocated exchange. More variance is explained at the neighborhood level, and concentrated disadvantage has by far the largest estimated effect. Concentrated affluence is positively related to shared expectations for child-centered social control, but its coefficient is less than one-third the size of the coefficient for disadvantage. Apparently, residents of disadvantaged neighborhoods have much lower expectations for shared intervention on behalf of children in public settings. Thus, while personal ties and even intergenerational closure may be little affected by the concentration of disadvantage, expectations for collective action are attenuated (cf. Woolcock 1998:207). Immigrant concentration also is linked to low expectations for child-centered social control, as is the ratio of adults to children. It appears that adult-oriented neighborhoods share a reluctance to supervise youth. Similar to results for intergenerational closure and reciprocated exchange, residential stability and population density are related to child-centered social control in the expected direction. After adjusting for homeownership, residential moves, and years in the neighborhood, neighborhood residential stability has a positive association with collective expectations for child-centered social control, whereas population density has a negative association.

The general pattern, then, seems to be that concentrated affluence is linked primarily to mechanisms that activate social networks

Table 3. Intercorrelations between Measures of Neighborhood Structural Differentiation: Chicago, 1995

Structural Differentiation	(2)	(3)	(4)	(5)	(6)
(1) Concentrated disadvantage	−.56**	−.17**	−.43**	−.40**	.05
(2) Concentrated affluence	—	.02	−.21**	.62**	−.02
(3) Residential stability	—	—	−.34**	−.17**	−.59**
(4) Immigrant concentration	—	—	—	−.07	.34**
(5) Adults per child	—	—	—	—	.19**
(6) Population density	—	—	—	—	—

**$p < .01$ (two-tailed tests)

Table 4. HLM Coefficients from the Regression of Intergenerational Closure, Reciprocated Exchange, and Child-Centered Social Control on Person-Level and Neighborhood-Level Predictors: Chicago, 1995

	Intergenerational Closure		Reciprocated Exchange		Child-Centered Social Control	
Statistic/Independent Variable	Coefficient	*t*-Ratio	Coefficient	*t*-Ratio	Coefficient	*t*-Ratio
Intercept	3.717**	(145.28)	2.607**	(96.98)	3.560**	(95.42)
Person-Level						
African American	.006	(.24)	−.082**	(−2.69)	−.011	(−.27)
Latino American	.000	(.01)	−.039	(−1.29)	.090*	(2.32)
Female	−.003	(−.23)	−.054**	(−3.18)	.005	(.24)
Socioeconomic status	.015*	(2.14)	.041**	(5.31)	.007	(.64)
Age[a]	−.005	(−.87)	−.035**	(−5.62)	.007	(.69)
Married	.021	(1.09)	.033	(1.35)	−.047	(−1.43)
Separated/divorced	−.006	(−.25)	−.020	(−.72)	−.032	(−.79)
Single	.004	(.19)	−.046	(−1.61)	−.070	(−1.90)
Homeowner	.075**	(3.98)	.139**	(6.37)	.124**	(3.81)
Residential moves	−.029**	(−4.30)	−.038**	(−5.56)	−.038**	(−3.96)
Years in neighborhood	.002**	(2.84)	.005**	(5.60)	.000	(−.17)
Neighborhood-Level						
Concentrated disadvantage	−.008	(−.31)	.041	(1.37)	−.227**	(−6.12)
Concentrated affluence	.076**	(3.27)	.086**	(3.64)	.074*	(2.42)
Residential stability	.093**	(4.98)	.048*	(2.42)	.061*	(2.38)
Immigrant concentration	.006	(.29)	.008	(.33)	−.112**	(−3.38)
Adults per child	−.003*	(−2.46)	−.002	(−1.70)	−.003*	(−2.07)
Population density[b]	−.019**	(−6.65)	−.010**	(−2.97)	.018**	(−4.04)
Percentage of Variance Explained:						
Within neighborhoods	2		4		1	
Between neighborhoods	61		48		73	

Note: N = 7,699 for the person-level variables; N = 342 for the neighborhood-level variables.

[a] Coefficients are multiplied by 10.

[b] Coefficients are multiplied by 1,000.

*$p < .05$ **$p < .01$ (two-tailed tests)

(intergenerational closure and reciprocated exchange), whereas concentrated disadvantage is linked mainly to low shared expectations for public action regarding children. Consistent across all three outcomes, moreover, is a significant direct association with neighborhood residential stability and a negative association with population density.

SPATIAL EMBEDDEDNESS OF SOCIAL MECHANISMS

We argue that the emergence of intergenerational closure, reciprocal exchange, and child-centered social control in a neighborhood benefits not only residents of that area but also others who live nearby. Methodologically, this leads to a model of spatial dependence in which neighborhood observations are interdependent and are characterized by a functional relationship between what happens at one place and what happens elsewhere (Anselin 1988:11). Spatial dependence also arises as a result of the often-inexact correspondence between the neighborhood boundaries imposed by the census and the ecological patterning of social interactions.

We estimate spatial interdependence by constructing "spatially lagged" versions of our measures of closure, exchange, and control. For a given observation i, a spatial lag, Wy_i, is the weighted average of values of y in neighboring locations, $\sum_j w_{ij}y_j$.[10] The weights matrix is expressed as first-order contiguity, which defines neighbors as those neighborhoods that share a common border or corner (referred to as the queen criterion).[11] We then test formally for the independent role of spatial dependence in a multivariate model by introducing the spatial lag, Wy, as an explanatory variable. Specifically,

$$y = \rho Wy + X\beta + \varepsilon,$$

where y is an N × 1 vector of observations on the dependent variable, Wy is an N × 1 vector of spatial lags for the dependent variable, ρ is the spatial autoregressive coefficient, X is an N × K matrix of observations on our (exogenous) explanatory variables with an associated $K \times 1$ vector of regression coefficients β, and ε is an N × 1 vector of normally distributed random error terms with means equal to 0 and constant (homoskedastic) variances.[12] Although our specification of the weights matrix limits the calculation of Wy to contiguous first-order neighbors, this model incorporates the spatial dynamics and structural characteristics of the entire city of Chicago through a spatial multiplier process. Namely, spatial dependence is modeled as a ripple effect, through which a change in X at location i influences not only the value of y at location i but also (indirectly) at all other locations in the city.[13]

The simultaneous estimation of spatial models within HLM is currently not available. Nonetheless, we achieve a spatial HLM by adopting a two-stage procedure proposed by Stephen Raudenbush (personal communication). First, the values of intergenerational closure, reciprocated exchange, and child-centered social control were adjusted for the 11 personal-level covariates based on the multilevel results in Table 4. That is, before the spatial analysis, the neighborhood-level measures were adjusted for the potentially confounding effects of individual-level covariates *within* neighborhoods.[14] In the

[10] Spatial dependence may also be treated as a "nuisance" in a spatial error model (Anselin 1988). The spatial lag model was chosen because it conforms to our theoretical approach, which specifies spatial dependence as a substantive phenomenon rather than as a nuisance (also see Tolnay, Deane, and Beck 1996). Moreover, the spatial lag models generally outperformed the corresponding spatial error models in a variety of diagnostic tests.

[11] Before computing the spatial lag term, we standardized the weights matrix by dividing each element in a given row by the corresponding row sum (see Anselin 1995a). Defined formally as

$$w_{ij} \Big/ \sum_j w_{ij},$$

row standardization constrains the range of the parameter space in such a way that the resulting coefficient is no longer dependent on the scale of the distance employed in the weights matrix. The spatial lag parameter can be interpreted as the estimated effect of a one-unit change in the scale of the original variable from which it was created.

[12] This model is often referred to as the simultaneous spatial autoregressive model because the presence of the spatial lag is similar to the inclusion of endogenous explanatory variables in systems of simultaneous equations. The maximum-likelihood estimation of the spatial lag model is based on the assumption of normal error terms, which our data meet (see Table 5). We derived all estimates of the spatial proximity models using the program "SpaceStat" (Anselin 1995a).

[13] The expected value of y at location i depends on the values of X at location i and on values of y in i's first-order neighbors. In turn, the first-order neighbors' values of y are functions of X in i's first-order neighbors and y in i's second-order neighbors, and so on. This process continues in a step-like fashion, incorporating the spatial dynamics and structural characteristics of succeedingly higher-order neighbors of i (also see Tolnay et al. 1996). Specifically,

$$E(y) = X\beta + \rho WX\beta + \rho^2 W^2 X\beta + \rho^3 W^3 X\beta + \ldots.$$

We replicated the spatial models using a distance matrix defined by the inverse of the geographical distance between neighborhood centroids, including specifications for squared, cubed, and unexponentiated distance (also see Anselin 1995b; Tolnay et al. 1996). Moreover, we explored contiguity weights defined by "distance bands" (Anselin 1995a). The results for inverse distance and distance bands were substantively similar to those for simple contiguity.

[14] The adjustment used the following equation:

$$Y_j - \overline{Y} - \left[\sum \beta_{wp} \times (X_{pj} - \overline{X}_p)\right],$$

where $Y_j - \overline{Y}$ represents the deviation of Y in neighborhood j from the sample mean; $X_{pj} - \overline{X}_p$

Table 5. Maximum-Likelihood Coefficients from the Spatial-Lag Regression of HLM-Adjusted Scales of Adult-Child Exchange and Child-Centered Social Control on Neighborhood Predictors: Chicago, 1995

Statistic/ Independent Variable	Adult-Child Exchange [a]				Child-Centered Social Control			
	Model 1		Model 2		Model 1		Model 2	
	Coef.	z-Value	Coef.	z-Value	Coef.	z-Value	Coef.	z-Value
Intercept	.118**	(4.69)	.191**	(2.70)	.148**	(3.63)	.759**	(6.79)
Spatial proximity	.313**	(4.47)	.305**	(4.32)	.233**	(3.58)	.167**	(2.60)
Concentrated disadvantage	−.002	(−.07)	.010	(.40)	−.212**	(−5.61)	−.131**	(−3.36)
Concentrated affluence	.069**	(3.57)	.069**	(3.58)	.074*	(2.33)	.072*	(2.37)
Residential stability	.041*	(2.45)	.037*	(2.22)	.047	(1.75)	.020	(.77)
Immigrant concentration	.009	(.46)	.011	(.54)	−.080*	(−2.42)	−.072*	(−2.27)
Adults per child	−.002	(−1.78)	−.002	(−1.91)	−.002	(−1.24)	−.003	(−1.95)
Population density[a]	−.013**	(−4.29)	−.012**	(−3.97)	−.018**	(−3.58)	−.012*	(−2.46)
Perceived violence	—		−.041	(−1.11)	—		−.339**	(−5.81)
Pseudo R^2	.33		.33		.53		.58	
Log-likelihood	105.03		105.63		−62.01		−46.02	
Likelihood-ratio test for lag	17.83**		16.66**		12.35**		6.54**	
Diagnostic tests (p-values):								
Spatial error dependence	.71		.83		.24		.32	
Heteroskedasticity	.53		.71		.50		.82	

[a] The "Adult-Child Exchange" measure combines intergenerational closure and reciprocal exchange.

[b] Coefficients are multiplied by 1,000.

*$p < .05$ **$p < .01$ (two-tailed tests)

second stage, we enter the HLM-adjusted scores as dependent variables in the spatial analysis, effectively joining a multilevel and spatial-lag model. In the interest of parsimony, we collapsed the adjusted measures of intergenerational closure and reciprocal exchange into a combined index because they exhibited similar associations with the structural predictors (Table 4) and were correlated at .63 ($p < .01$) with each other. For simplicity, we refer to this combined measure as "adult-child exchange" to convey the measured and theoretically compatible aspects of reciprocated exchange and closure among parents, other adults, and children.

Model 1 in Table 5 displays the maximum-likelihood results for the spatial regression. The significant coefficients for the spatial proximity terms provide evidence of spatial interdependence in both outcomes. Substantively, these findings suggest that residents take a more active role in child supervision and intergenerational exchange when others around them are doing likewise. Diagnostic tests in Table 5 show no evidence of spatial correlation or heteroskedasticity in the error terms, both of which were present before the spatial lag term was introduced.

Concentrated affluence, residential stability, and low population density are significant predictors of adult-child exchange after controlling for spatial dynamics, whereas concentrated disadvantage and immigration continue to play nonsignificant roles in constraining or generating adult-child exchange. By contrast, concentrated disadvantage *and*

represents the deviation of X in neighborhood j from the sample mean (for $p = 1$–11); and the β_{wp} are the HLM within-neighborhood slope parameters from a regression where the X_{pj} covariates are centered around their $group_j$ means. Essentially, then, each estimate of Y for neighborhood j is adjusted (or "penalized") according to the overall magnitude of the biasing effects of *individual-level* covariates weighted by the neighborhood's relative composition on those covariates.

concentrated affluence, immigrant concentration, and population density remain predictors of child-centered social control after accounting for spatial dependence. The main change is that introducing the spatial lag term diminishes the estimated effect of residential stability on child-centered social control (z-ratio = 1.75, $p < .10$). Thus while residential stability facilitates intergenerational ties and social exchange, it is less important in generating shared expectations for child-centered social control.

A potential objection to these findings, especially with respect to child-centered social control, is that the shared willingness of neighbors to assume responsibility for children may be undermined by the prevalence of crime, most particularly interpersonal violence (Skogan 1990). Liska and Warner (1991), for example, found that robbery constrained social interaction in public settings, potentially decreasing social exchange and hindering the emergence of shared expectations for socializing youth. Fear of dangerous teens (e.g., gangs) in particular may, in accordance with "streetwise" norms (Anderson 1990), discourage residents from intervening to control suspicious or unruly public behavior. Because violent crime is strongly correlated with concentrated disadvantage and other structural characteristics (Sampson et al. 1997), our models may be misspecified. To address this possibility, we control directly for the level of violence in the neighborhood as perceived by residents. This measure of violence tests the alternative hypothesis that respondents' reports of higher or lower levels of adult-child exchange and social control are confounded with their perceptions of neighborhood violence. Respondents were asked how often each of the following occurred in the neighborhood during the past six months: a fight in which a weapon was used, a violent argument between neighbors, gang fights, a sexual assault or rape, and a robbery or mugging. A summary scale yielded a high reliability (.83) at the neighborhood level.[15]

Model 2 of Table 5 shows the effect on the coefficients of including perceived violence. Generally all predictors from Model 1 retain their significance. Perceived violence has no significant association with adult-child exchange, and it does not significantly reduce the size of other coefficients in the model. However, perceived violence is strongly associated with lower expectations for child-centered social control. Although directionality is ambiguous, we assume that part of this association arises from a reduction in shared expectations for child control in neighborhoods in which violence is perceived to be a problem. The introduction of the perceived violence scale has surprisingly little effect on the magnitude of most coefficients in the child-centered social control model, but it does significantly reduce the association with concentrated disadvantage, indicating some overlap in the variance explained by violence and disadvantage. In light of the strong association between perceived violence and child control, it is noteworthy that the estimated spatial and structural effects are largely unchanged.[16]

[15] We urge caution when interpreting the coefficients for perceived violence because they do not take into account the possibility of reverse causation. Other research suggests that the presence of informal social control reduces neighborhood violence (Sampson et al. 1997). Our purpose here is simply to ascertain the robustness of the model specification.

[16] We also investigated whether the results were robust with regard to additional controls for police-recorded rates of violence. We ran a series of models that introduced both temporally lagged homicide rates from 1990 and change in neighborhood homicide rates from 1990 to 1995. The 1990 homicide rate had no significant effect on either adult-child exchange (z-value = .2) or child-centered social control (z-value = .4). Moreover, the introduction of the 1990 homicide rate did not significantly change any other coefficients, including that for spatial proximity. Change in neighborhood homicide rates from 1990 to 1995 had a small but significant negative association with child-centered social control (z-value = −2.10) but not with adult-child exchange. None of the other coefficients were affected by the introduction of this variable. Overall, then, the level of neighborhood violence (whether official or perceived) does not change the main results. As an additional test, we controlled for the five neighborhood measures that were used for construct validation (e.g., voluntary associations, friend/kinship ties, activism). Although these measures display significant and positive bivariate correlations with the dependent variables (see Table 2), the key predictors in our multivariate models of

SPATIAL EXTERNALITIES AND RACIAL INEQUALITY IN LOCAL FORM

The results thus far signal a citywide pattern of spatial association in both adult-child exchange and expectations for child-centered social control that is unaccounted for by internal neighborhood characteristics. These findings suggest that a neighborhood's relative geographical position is an independent source of its ability to generate social capital and collective efficacy for children. In fact, the results in Table 5 suggest that a neighborhood's spatial context is at least as strong a predictor as is either its concentrated disadvantage or concentrated affluence.

To shed more light on the patterning and magnitude of spatial externalities, we explore a typology of spatial association that decomposes the citywide pattern into its specific local forms. The typology we employ, referred to as a Moran scatterplot, classifies each neighborhood based on its value of y (i.e., adult-child exchange or child-centered social control) and the weighted average of y in contiguous neighborhoods, as captured by the spatial lag term, Wy. Following Anselin (1995a, 1995b), neighborhoods that are above the mean on y are considered to have "high" values of y, while neighborhoods below the mean are classified as "low." The same distinction is made with respect to values of Wy for each neighborhood, resulting in a four-fold classification. Using child-centered social control as the example, we have: (1) *low-low*, for neighborhoods that have low levels of control and are near other neighborhoods with low levels of control; (2) *low-high*, for neighborhoods that have low levels of control but are near others with high levels; (3) *high-low*, for neighborhoods that have high levels of child control but are near others with low levels; and (4) *high-high*, for neighborhoods with high levels of control that are also near others with high levels of control (Anselin 1995a). Within each category of this typology, we applied tests of statistical pseudo significance developed for the presence of spatial association at each location i, yielding the local Moran statistic (see Anselin 1995b).[17]

Figure 1 reveals that neighborhoods with high levels of intergenerational closure and reciprocal exchange ("adult-child exchange") tend to cluster on the western boundaries of Chicago, particularly on the far northwest and southwest sides. Some significant clusters (indicated on Figures 1 and 2 by asterisks) are located toward the interior of the city, but only one, the university community of Hyde Park, appears on the eastern boundary (on the shore of Lake Michigan). Significant concentrations of low levels of adult-child exchange are located primarily on the periphery of the southern and western corridors of Chicago's traditional Black Belt and also in the northeast corner of the city.

Figure 2 shows that child control follows a somewhat different mosaic of spatial association. One distinctive feature of the map for child control is that there are more statistically significant local pockets of spatial association.[18] This observation may seem para-

Table 5 were surprisingly robust. In particular, the z-ratios for the estimated effect of spatial proximity on child control and adult-child exchange were 3.41 and 2.87, respectively ($p < .01$).

[17] Specifically, the local Moran statistic is defined as $I_i = (z_i / m_2)\sum_j w_{ij} z_j$ with $m_2 = \sum_i z_i^2$, where z_i and z_j are the standardized values of y_i and y_j expressed as deviations from the mean (Anselin 1995a, 1995b). Under a conditional randomization approach, the value of z_i at location i is held fixed, and the remaining values of z_j over all other neighborhoods in the city are randomly permuted in an iterative fashion. We carried out 1,000 permutations as a basis for assessing significance at $p < .10$. With each permutation, a new value of the quantity is computed, and the statistic is recalculated. This permutation operationalizes the null hypothesis of complete spatial randomness. A test for pseudo significance is then constructed by comparing the original value of I_i to the empirical distribution that results from the permutation process (Anselin 1995b). As a check, we carried out additional tests using 10,000 permutations and a more stringent significance criterion ($p < .05$). Although the results were very similar, the number of significant neighborhoods was reduced by about one-third. Because of the exploratory nature of our local spatial analysis and the relatively small number of neighborhoods when disaggregated by race/ethnicity, we present the results for $p < .10$.

[18] This observation is supported by statistics that summarize the overall level of spatial association throughout the city, such as Moran's I and

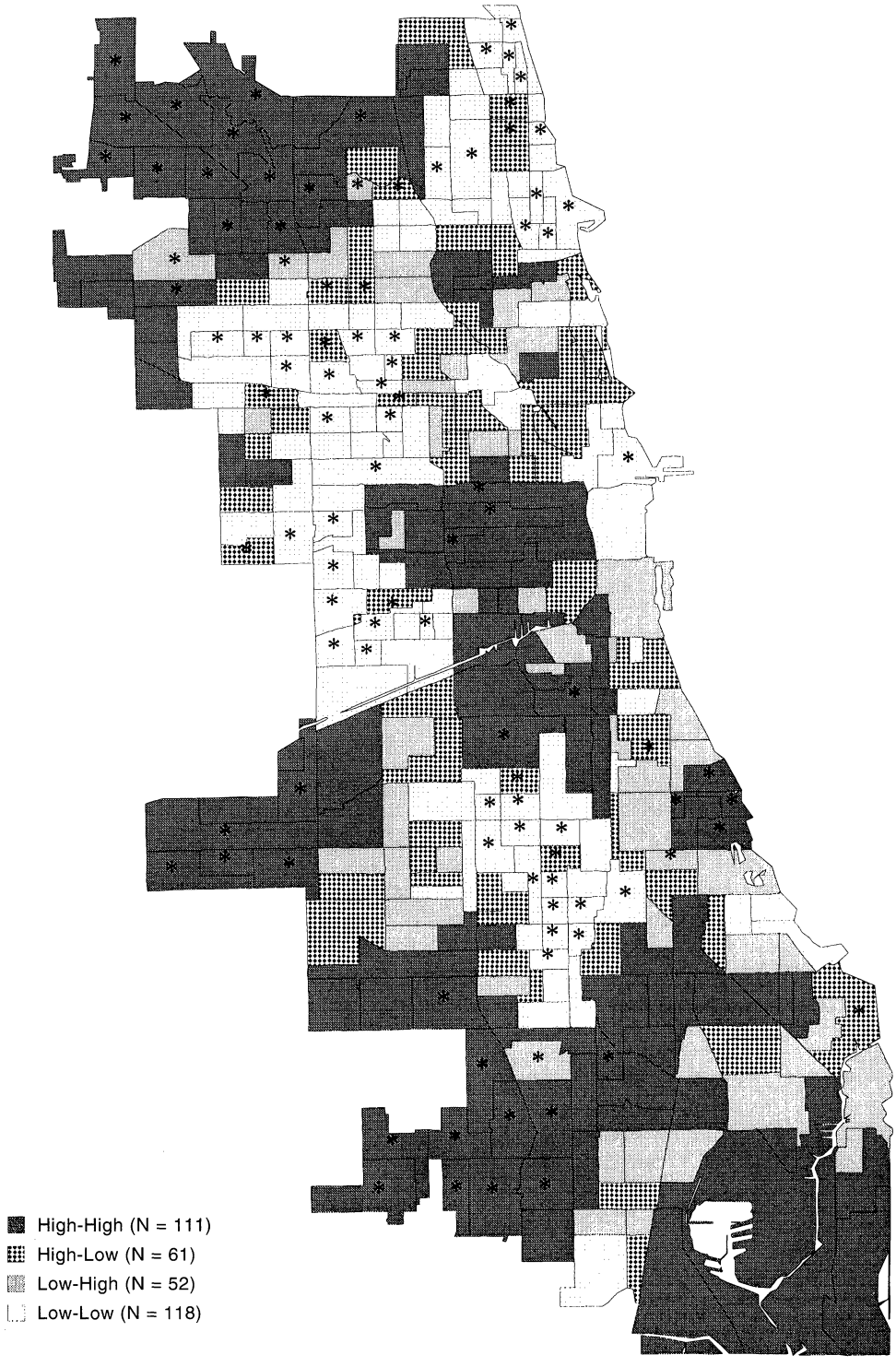

Figure 1. Spatial Typology of Adult-Child Exchange: Chicago, 1995

Note: More discriminating color-shaded maps can be viewed at: http://phdcn.harvard.edu/asrmaps.

$^{*}p < .10$ (two-tailed tests)

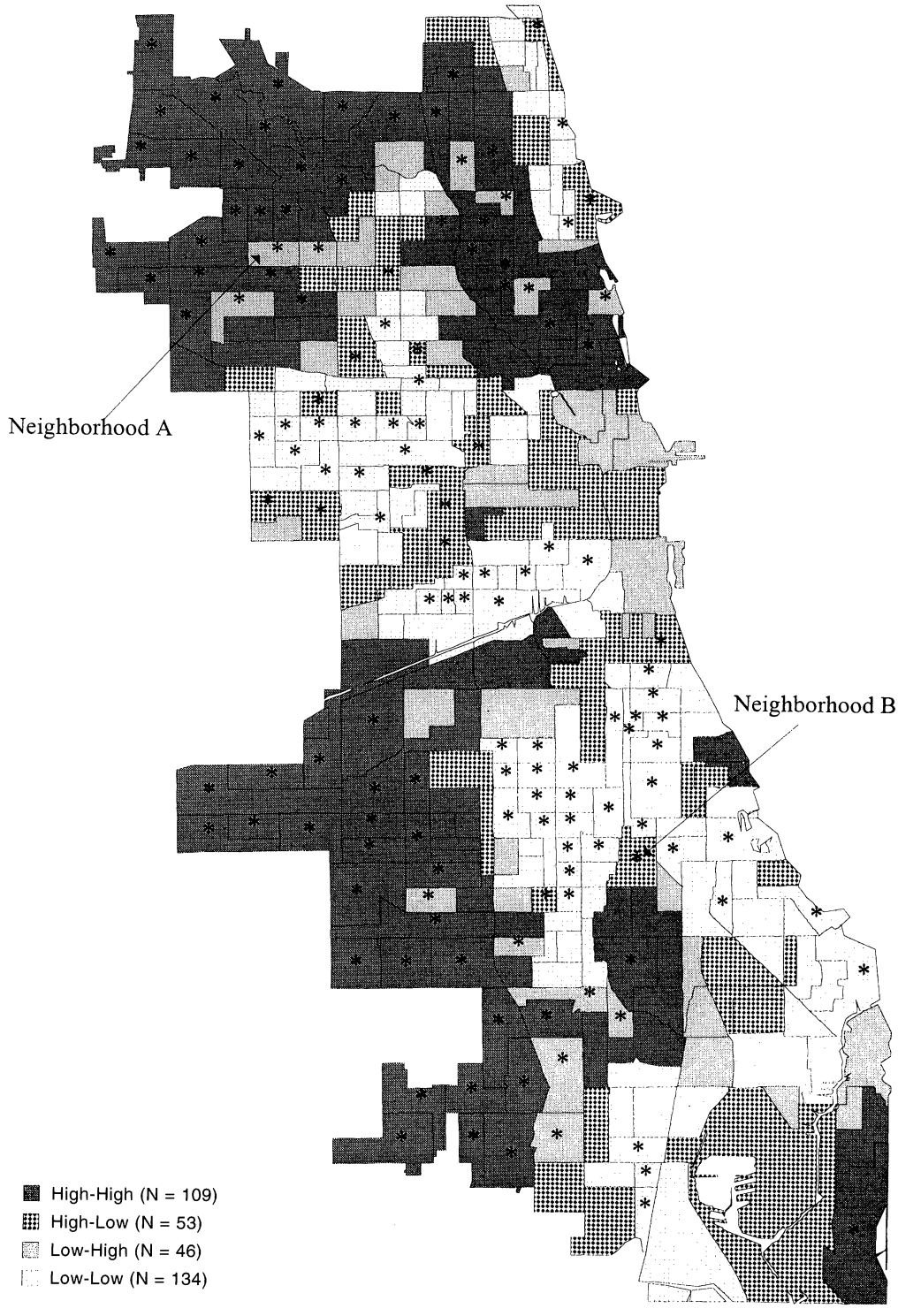

Figure 2. Spatial Typology of Child-Centered Social Control: Chicago, 1995

Note: More discriminating color-shaded maps can be viewed at: http://phdcn.harvard.edu/asrmaps.

$^{*}p < .10$ (two-tailed tests)

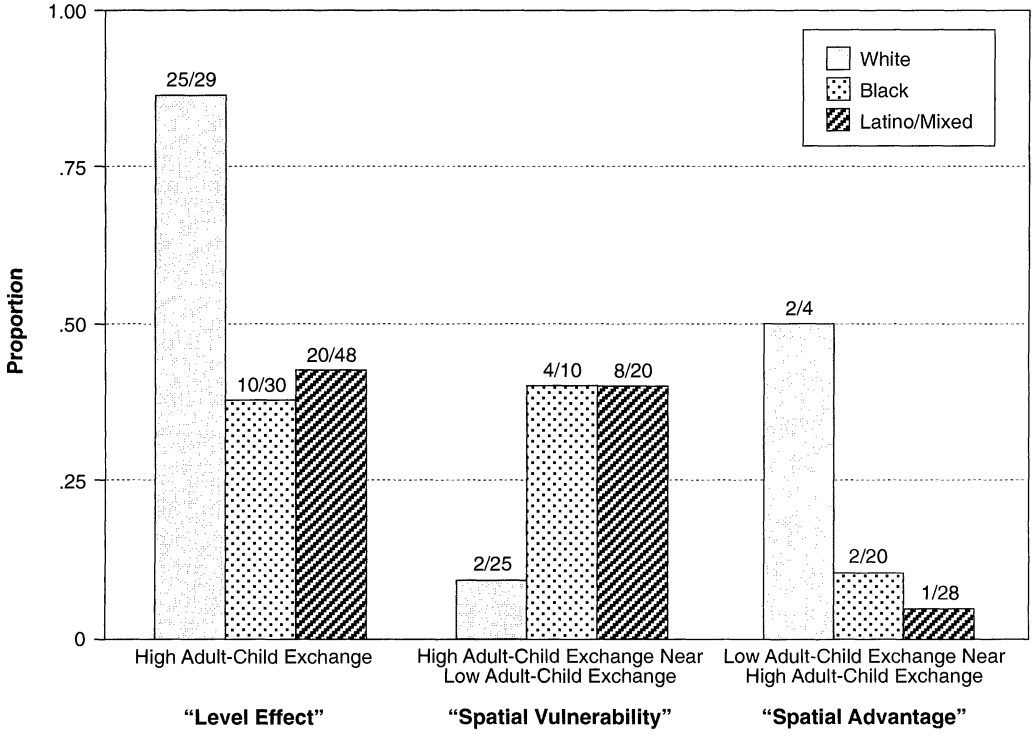

Figure 3. Proportion of Neighborhoods by Spatial Typology and Race/Ethnicity: Adult-Child Exchange, Chicago 1995

doxical in light of the spatial regression models, which estimated spatial effects to be *lower* for child control than for adult-child exchange. In fact, these apparently contradictory results arise because the spatial clustering of child control, although higher than that of adult-child exchange, is more closely related to other structural characteristics in the regression models, particularly concentrated disadvantage. For example, a comparison between Figures 1 and 2 reveals that more of the low-low neighborhoods for child control overlap with areas of concentrated poverty on the near south and west sides. The correlation of concentrated poverty with the spatial lag is also –.56 for child control and –.20 for adult-child exchange. Not surprisingly, then, the estimated direct effect of spatial proximity on child control is comparatively smaller than that for adult-child exchange.

Neighborhoods in which the level of collective efficacy for children is at variance with that in surrounding neighborhoods are important theoretically because they pinpoint neglected forms of spatial advantage and disadvantage. For example, in Figure 2, neighborhood A has low shared expectations for child social control but adjoins a cluster of neighborhoods in which expectations are significantly higher. This type of neighborhood, despite lacking a crucial element of collective efficacy, is likely to derive a spatial advantage from the spillover of child control in surrounding areas. Neighborhood A is 90 percent white. On the other hand, neighborhood B illustrates the potential operation of "off-diagonal" (negative) spatial externalities: Despite having high expectations for child control (y is .80 standard deviations above the mean), this neighborhood is located near areas in which there is significantly less shared willingness to intervene on behalf of children (Wy is .71 standard deviations below the mean). The predicament faced by this type of neighborhood is similar to one Pattillo (1998) describes from her ethnography of a middle-class African American neighborhood at spatial risk—one sur-

Geary's c. These measures confirm that there is a greater degree of bivariate spatial association for child control than for adult-child exchange.

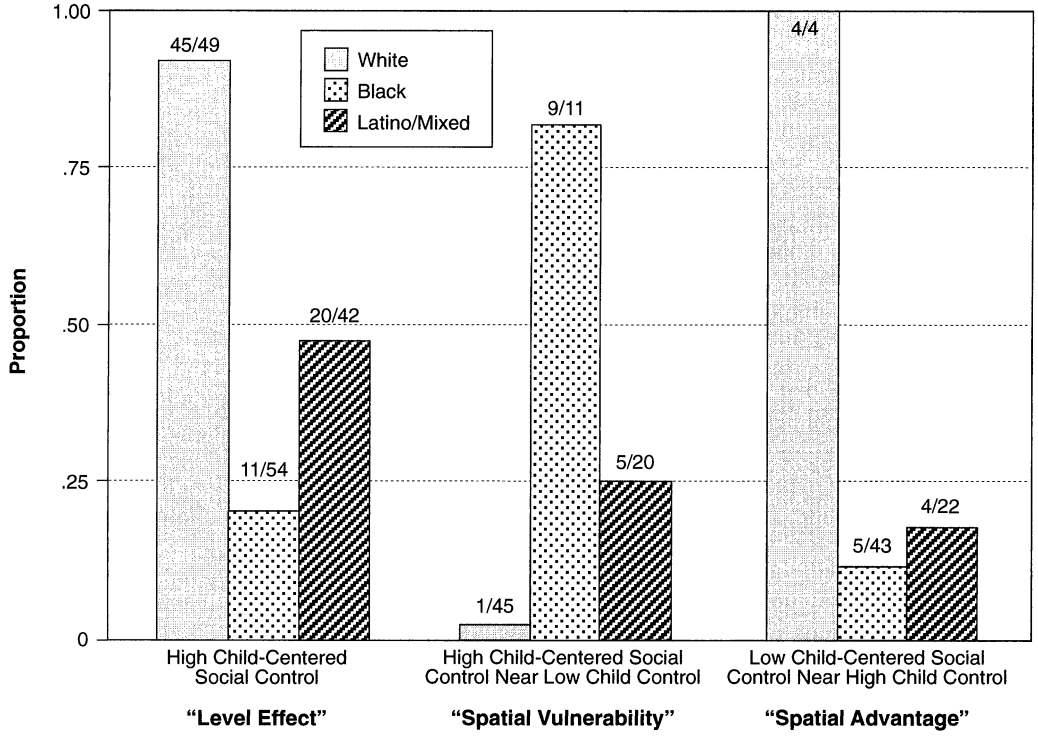

Figure 4. Proportion of Neighborhoods by Spatial Typology and Race/Ethnicity: Child-Centered Social Control, Chicago 1995

rounded by concentrated poverty and high crime. Indeed, neighborhood B is 99 percent black with pockets of prosperity surrounded by areas of high-level risk.

To understand how spatial externalities associated with off-diagonal neighborhoods are situated against a regime of racial and ethnic segregation, we extracted those neighborhoods that had statistically significant patterns of local spatial association and divided them into three categories: (1) at least 75 percent white, (2) at least 75 percent black, and (3) other, consisting mainly of Latino immigrant and mixed areas. Racial/ethnic patterns in the overall level and negative spatial association of adult-child exchange and child-centered control are displayed graphically in Figures 3 and 4. In Figure 3, the first set of bars shows that white neighborhoods are 2.6 times more likely than black neighborhoods (.86/.33) and more than twice as likely as Latino/mixed neighborhoods (.86/.42) to have above-average ("high") levels of adult-child exchange. Although this racial/ethnic gap in the level of adult-child exchange is substantial, the second set of bars reveals that if we restrict the comparison to areas with *high* levels of adult-child exchange, black neighborhoods and Latino/mixed neighborhoods exhibit "spatial vulnerability." That is, both sets of neighborhoods are five times more likely than white neighborhoods (.40/.08) to be near other neighborhoods with significantly *lower* levels. Moreover, the third set of bars shows that among neighborhoods with low levels of adult-child exchange, white neighborhoods nonetheless derive a "spatial advantage"—they are five times more likely than black neighborhoods (.50/.10) and 15 times more likely than mixed neighborhoods (.50/.04) to be surrounded by neighborhoods with *higher* levels. Thus, these forms of spatial advantage and disadvantage are not simply reducible to the "level effects" of race/ethnicity.

Figure 4 presents the corresponding comparisons for child-centered social control. White neighborhoods are 4.5 times more likely than black neighborhoods (.92/.20) and 1.9 times more likely than mixed neighborhoods (.92/.48) to have high levels of child control. The spatial vulnerability of

black neighborhoods and Latino/mixed neighborhoods is much more pronounced, however—greater than that for adult-child exchange. Among neighborhoods with high expectations for child control, black neighborhoods are some 37 times more likely (.82/.02) and mixed neighborhoods 11 times more likely (.25/.02) than white neighborhoods to face the spatial vulnerability of proximity to neighborhoods with low levels of child control. The last set of bars reveals that among neighborhoods with low shared expectations for child-centered control, white neighborhoods are almost 9 times more likely than black neighborhoods (1.0/.12) and 5.5 times more likely than mixed neighborhoods (1.0/.18) to gain the spatial advantage of being near neighborhoods with high expectations for child control. The message here is clear: When Latino and (especially) African American neighborhoods generate collective expectations for social control, their residents often face the added challenge of being situated in a wider spatial environment characterized by low levels of collective expectations for child supervision (also see Pattillo 1998). Meanwhile, the case for white neighborhoods is nearly the opposite—even when they do not have high expectations for child control, their residents benefit from high levels of child control in nearby areas.

To illustrate the relative importance of spatial proximity, we constructed hypothetical simulations using the coefficients from Table 5 (details available upon request). We assigned the mean level of *Wy* in white neighborhoods to black neighborhoods, thus equalizing the spatial inequalities between the two groups. We then compared predicted mean values in adult-child exchange and child-centered control. The results suggest that, all else being equal, giving black neighborhoods the same mean spatial proximity scores as white neighborhoods would reduce the racial gap in child-centered social control by 38 percent and the gap in adult-child exchange by 64 percent. Performing the same exercise using concentrated disadvantage rather than spatial proximity reduces the racial gap in child control by 56 percent, but produces no change in the racial gap in adult-child exchange. Racial differences in concentrated affluence explain 13 percent of the racial gap in child control and 32 percent of that in adult-child exchange. Although exploratory, these simulations provide additional evidence that the differing spatial environments of black neighborhoods and white neighborhoods play a role equal to if not greater than that of internal structural characteristics in generating inequalities in collective efficacy for children.[19]

TOWARD A TYPOLOGY OF COLLECTIVE EFFICACY FOR CHILDREN

Figure 5 cross-classifies neighborhoods by whether they are above or below the mean on each of our two principal outcomes. Neighborhoods with low levels of adult-child exchange and low expectations for child control are isolated from crucial resources and therefore are "socially vulnerable" with respect to childrearing. The 122 neighborhoods in this category are unevenly distributed by race/ethnicity—45 percent of black neighborhoods and 40 percent of Latino/mixed neighborhoods are socially vulnerable compared with only 9 percent of white neighborhoods. A second category of neighborhoods has low levels of adult-child exchange but manages to engender high expectations for

[19] We also estimated whether the structural predictors of child control and adult-child exchange varied by spatial regimes defined in terms of racial composition. Using a multivariate framework that estimates parameters separately in each regime (Anselin 1988:9), we ran the same set of models reported in Table 5. The first difference we examined was the level of adult-child exchange and child-centered social control, which can be tested by comparing the intercepts (when all the predictors are centered on the grand mean) using a Chow test. African American neighborhoods, on average, were significantly lower on both measures, particularly on child control. The second type of regime effect is a difference in the pattern of association among structural predictors. Overall, the effects of structural predictors did not vary significantly by racial regimes. The main exception was that, in the fully specified models of Table 5, perceived violence had a larger negative association with both adult-child exchange and child control in African American neighborhoods. This interaction may reflect the greater salience of crime and fear in African American neighborhoods than in white or Latino American neighborhoods with respect to patterns of street behavior (Anderson 1990).

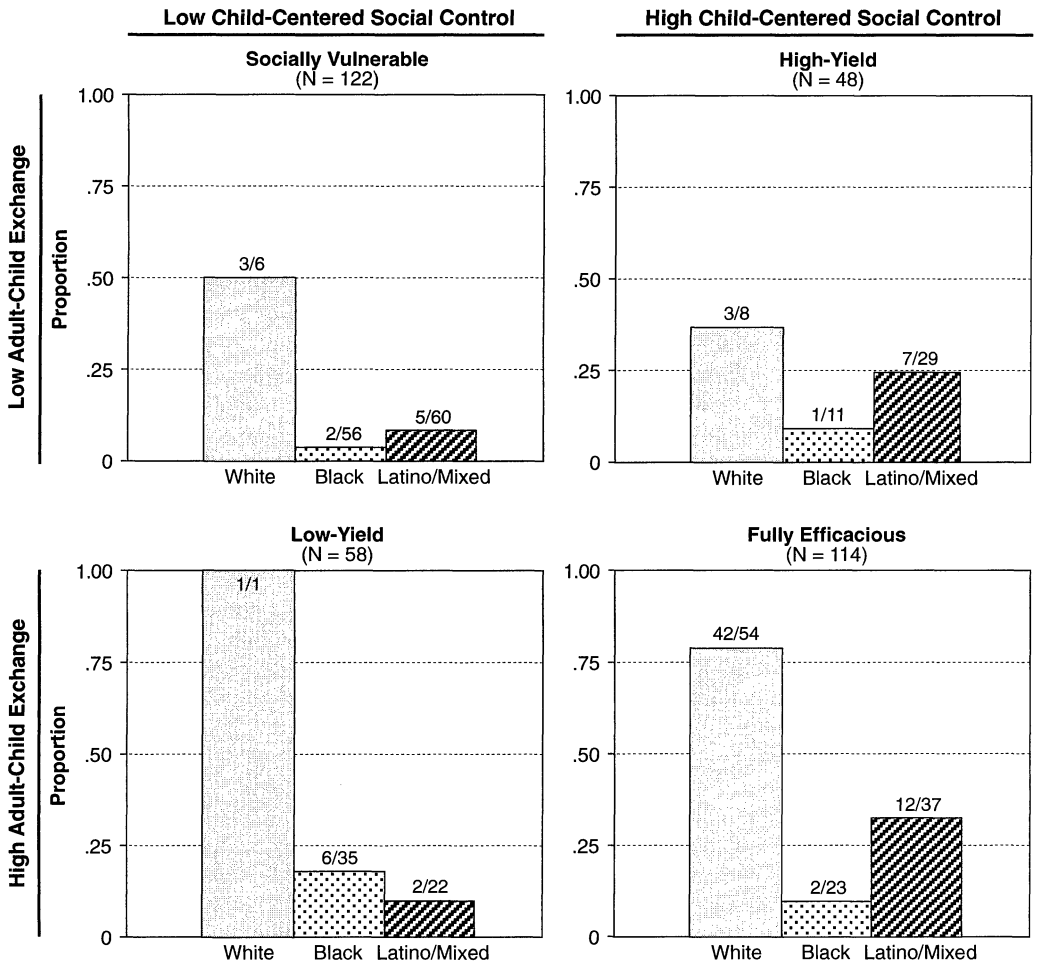

Figure 5. Proportion of Spatially Advantaged Neighborhoods by Typology of Collective Efficacy for Children and Race/Ethnicity: Chicago, 1995

Note: Spatially advantaged neighborhoods are those in which *Wy* for either child-centered social control or adult-child exchange is above the mean and for which the corresponding local Moran statistic is statistically significant. Numbers above the bars indicate the proportion of neighborhoods from each racial/ethnic group displaying spatial advantage. In the total sample there are 69 white neighborhoods, 125 black and 148 Latino/mixed.

social control; hence we label these neighborhoods "high yield." This is a relatively sparse category (14 percent of the neighborhoods), represented by 9 percent of black neighborhoods, 20 percent of Latino/mixed neighborhoods, and 12 percent of white neighborhoods. Despite the absence of frequent exchange and strong social ties, these areas realize common values promoting safe and mutually supportive childrearing. They recall the "community of limited liability" described by Janowitz (1975), in which attachment to neighborhood is contingent, voluntary, and based on instrumental values tied to rational investment rather than an "urban village" of dense personal ties. In such an environment of low adult-child exchange, white neighborhoods are still more than three times as likely as black neighborhoods to yield high expectations for child control (8 of 14 white neighborhoods compared to 11 of 67 black neighborhoods).

By contrast, the third category (17 percent of all neighborhoods) includes neighborhoods with high levels of adult-child exchange (in some ways typical of an urban

village) that nonetheless may be considered "low yield" with respect to the generation of child-centered social control. Only 1.4 percent (1 of 69) of white neighborhoods are low yield, compared to 28 percent of black neighborhoods and 15 percent of Latino/mixed neighborhoods. Perhaps the most interesting combination is the one that scores high on both dimensions and is thus "fully efficacious" according to our typology. One-third of the neighborhoods in Chicago fall in this category, but again there are large racial/ethnic differentials—18 percent of black, 25 percent of Latino/mixed, and 78 percent of white neighborhoods are classified as fully efficacious. Moreover, conditional on high adult-exchange, less than half of black neighborhoods (23 of 58) compared to fully 54 of 55 white neighborhoods (98 percent) have high levels of shared expectations for child control.[20]

The bar charts in Figure 5 reveal that a racial/ethnic regime of spatial advantage is superimposed on each category of neighborhood collective efficacy for children. In the socially vulnerable category, one-half the white neighborhoods are contiguous to neighborhoods with a *high* level of control or exchange. Less than 10 percent of black neighborhoods and Latino/mixed neighborhoods are so favored. The same general result holds for both the high-yield and low-yield categories, although the low sample sizes preclude definitive comparisons. Still, the pattern of spatial advantage for whites is maintained. The fully efficacious cell contains at least 20 neighborhoods for each racial/ethnic group and thus provides the most definitive comparison. The results reveal striking racial/ethnic differences in spatial advantage in addition to the large differences in internal levels of collective efficacy (noted above). Over 75 percent of white fully efficacious neighborhoods are adjacent to other similarly efficacious neighborhoods. Yet despite generating high internal levels of collective efficacy, less than 10 percent of black fully efficacious neighborhoods and only a third of such Latino neighborhoods are near other neighborhoods high in control or exchange. These data confirm that minority neighborhoods in Chicago face a double challenge in generating collective efficacy for children—spatial vulnerability layered over an internal vulnerability.

CONCLUSIONS AND IMPLICATIONS FOR FUTURE RESEARCH

Concentrated disadvantage is not the major barrier to intergenerational closure and adult neighborly exchange that much of the writing on the urban underclass implies. Rather, we found that the most consistent predictors are concentrated affluence, (low) population density, and residential stability. Regardless of concentrated poverty, racial/ethnic composition, and person-level covariates, stable neighborhoods exhibit considerably higher levels of reciprocated exchange and intergenerational closure than do unstable neighborhoods. Affluence also appears instrumental in allowing many neighborhoods to achieve an efficacious environment of child control and exchange/closure. Our results thus call for a new look at residential stability and the perquisites of concentrated affluence. On the other hand, shared expectations for the informal social control of children were considerably lower in neighborhoods of concentrated disadvantage, even when perceived violence and homicide were controlled. Apparently, the concentration of multiple forms of disadvantage depresses shared expectations for collective action regarding children.

[20] The multivariate results in Table 5 suggest the potential role of socioeconomic resources in moderating these differences. To address this issue, we ranked all neighborhoods on our scale of concentrated affluence and repeated the racial/ethnic comparisons on neighborhoods that fell within the top one-third of this distribution. Limited sample sizes prevent us from drawing definitive conclusions, but the results suggest a narrowing of black-white differences. Of affluent white neighborhoods with low levels of adult-child exchange (N = 8), 63 percent had high levels of child control, compared with 43 percent of affluent black neighborhoods with low adult-child exchange (N = 7). At the other end, all of the 36 affluent white neighborhoods with high levels of adult-child exchange were high in child control, but high levels of child control were also present among 74 percent of affluent black neighborhoods with high levels of adult-child exchange (N = 19). These exploratory data underscore the salience of economic and educational resources as a potential pathway to collective efficacy for children in segregated black neighborhoods.

Perhaps most important, the results point to how spatial inequality in a metropolis can translate into local inequalities for children. Above and beyond the internal characteristics of neighborhoods themselves—including both wealth and poverty—the potential benefits of social capital and collective efficacy for children are linked to a neighborhood's relative spatial position in the larger city. In particular, collective efficacy for children in surrounding neighborhoods has a direct positive relationship with a given neighborhood's internal collective efficacy, regardless of population composition and a strict set of controls. Some neighborhoods benefit simply by their proximity to neighborhoods with high levels of adult-child exchange and shared expectations for child social control. But white neighborhoods are much more likely than black neighborhoods to reap the advantages of such spatial proximity. White neighborhoods are also more likely to achieve social control for children without generating high levels of adult-child exchange, a pattern that is coupled with spatial advantage. Modern and apparently successful forms of the community of limited liability are easier to achieve, it seems, in particular socio-demographic and spatially embedded contexts.

Spatial externalities have been largely overlooked in prior research, but our analysis indicates that social capital and collective efficacy for children are relational in character at a higher level of analysis than the individual or the local neighborhood. Our results suggest that the concept of neighborhood disadvantage (or advantage) should be expanded beyond the simple notion of rates of poverty (such as in the "underclass"), as race-based spatial dynamics appear largely beyond the control of any one neighborhood (also see Massey and Denton 1993; Jargowsky 1996, 1997). Study of spatial externalities in social mechanisms, along with racial differences in spatial advantage and disadvantage, should thus be a central agenda for future research. For example, do spatial externalities of child-centered social control protect children from violence? What mechanisms of the "prosperous" community influence children's health, and how are they distributed spatially (Sampson forthcoming)? Are the "returns" for whites on spatial resources greater than those for blacks?

Future research should also explore the meaning and sources of variation *within* neighborhoods in survey respondents' perceptions and behaviors. Although our results demonstrate that key social processes can be measured reliably at the neighborhood level using a clustered survey design, considerable variations remained in responses from informants within the same neighborhood. Our research strategy controlled for person-level covariates such as age, race, sex, and socioeconomic status (also see Lee and Campbell 1997; Raudenbush and Sampson forthcoming), but very little of the variation was explained. What is the source of this unexplained variation? Recall that random error in hierarchical linear models is apportioned to within-neighborhood variation (Bryk and Raudenbush 1992:94). Thus, it is unlikely that the majority of within-neighborhood variation is explainable. Second, patterned variation that exists in reports of a given neighborhood probably arises in part from within-neighborhood differences in systemic factors such as local friend/kinship ties and organizational affiliations. Linking variation within and between neighborhoods in such social affiliations is a tractable research agenda that we plan to pursue.[21] A third possibility is that adults may not be the best informants on certain aspects of child-centered social control. After all, who knows better about the proclivities of adults to engage in children's collective socialization than the children themselves? Hence research strategies that include children and adolescents in data collection should be explored (Earls and Carlson 1998). Fourth, neighborhoods are much less homogeneous than commonly portrayed in the literature (Cook et al. 1997; Furstenberg et al. 1999). It may be that adults and children are located in distinct ecological niches within larger neighborhoods, suggesting the need to disaggregate analyses and study smaller ecological units such as block groups, housing projects, and tertiary communities (Grannis 1998).

[21] A methodological challenge is to avoid potential biases that might arise from having the same respondent report on both systemic factors and mechanisms like control.

There is also a need to further disentangle the multiple and overlapping dimensions of social capital for children. In the final analysis, there may be only one or two important "global" processes at the neighborhood level (Cook et al. 1997). High correlations among neighborhood-level indicators suggest that this is an issue worth investigating. On the other hand, the construction of neighborhood measures depends on strong theory and the substantive phenomenon of interest. Social capital also has a valence, and even highly correlated measures at the aggregate level may generate different consequences depending on the goal. Moreover, it is important to maintain theoretical distinctions among measures even if they are empirically correlated in a particular analysis: Correlations are sample-specific and depend on level of aggregation. For example, there is some evidence in our data of aggregation effects—even when corrected for measurement error the correlations among many of our variables drop when calculated at the census tract level (data not shown). The most prudent strategy, it seems, is to retain theoretically specified distinctions until they can be validated on multiple data sets and levels of aggregation.

Finally, we urge caution when relying on multiple (or nested) survey reports of neighborhood context. Pure structuralists would argue that such reports are prone to errors in perception despite statistical power, and that the aggregation of individual responses does not reveal patterns of social structure (Blau 1994). And though it would be difficult and expensive to implement for a large sample, pure network theorists would want to saturate social networks outward without regard to neighborhood boundaries. Although we examined the interdependence among neighborhoods in a spatial network sense, we concur that structural measures independent of survey responses are necessary to further our knowledge of the sources and consequences of collective efficacy for children. For example, our future work seeks to examine institutional data on youth organizations and formal network data on the structure of neighborhood associations. Saturated networks of personal ties, even if for a small number of areas, could augment ecological assessments. Incorporating the systematic *social observation* of neighborhoods (Raudenbush and Sampson 1999) is yet another and perhaps more promising strategy for comparing neighborhood dimensions of social process (e.g., interaction patterns on the sidewalk, social disorder, congregation of peer groups on street corners). What people actually do as opposed to what they say they do may reveal a different picture, suggesting that our spatially embedded, multilevel survey approach is only a beginning.

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