

THE NEIGHBORHOOD CONTEXT OF WELL-BEING

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ABSTRACT Health-related problems are strongly associated with the social characteristics of communities and neighborhoods. We need to treat community contexts as important units of analysis in their own right, which in turn calls for new measurement strategies as well as theoretical frameworks that do not simply treat the neighborhood as a “trait” of the individual. Recent findings from the Project on Human Development in Chicago Neighborhoods support this thesis. Two major themes merit special attention: (1) the importance of collective efficacy for understanding health disparities in the modern city; and (2) the salience of spatial dynamics that go beyond the confines of local neighborhoods. Further efforts to explain the causes of variation in collective processes associated with healthy communities may provide innovative opportunities for preventive intervention.

THE MOTIVATION TO UNDERSTAND the neighborhood social context of well-being is compelling. Social characteristics vary widely and systematically across communities along dimensions of socioeconomic status (e.g., poverty, wealth, occupational attainment), family structure and life cycle (female-headed households, child density), residential stability (home ownership and tenure), and racial/ethnic composition (racial segregation). Stratification by place is deep and pervasive (Massey 1996). Health-related problems also vary systematically by community, often in conjunction with socioeconomic characteristics. As far back as the 1920s, urban neighborhoods characterized by poverty, residential instabil-

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**FIGURE 1**

Hot spots of compromised health in Chicago. Left panel: Homicides, 1990–1996, 1 dot per homicide. Right panel: Low birth-weight, 1990–1996, 1 dot per 5 incidents.

ity, and dilapidated housing were found to suffer disproportionately high rates of infant mortality, crime, mental illness, low birth weight, tuberculosis, physical abuse, and other factors detrimental to health (Shaw and McKay 1942).

This general empirical finding continues to the present day, as illustrated by the ecological “co-morbidity” or spatial clustering of homicide, infant mortality, low birth weight, accidental injury, and suicide. Data from the city of Chicago in 1995 to 1996 reveal that census tracts with high homicide rates tend to be spatially contiguous to other tracts high in homicide. Perhaps more interesting, more than 75 percent of such tracts also contain a high level of clustering for low birth weight and infant mortality, and more than half for accidental injuries (Sampson 2001). Suicide is more distinct, although even here the spatial clustering is significant. The ecological concentration of homicide, low birth weight, infant mortality, and injury indicates that there may be geographic “hot spots” for unhealthy outcomes (Figure 1).

Not only do social characteristics vary systematically with health across communities, a growing body of contextually oriented research has linked community social characteristics with variations in individual-level health. Simply put, even when individual attributes and behaviors are taken into account, there is evidence of direct risk factors linked to environmental context (Robert 1999). Recent analyses of the longitudinal Alameda County Health study in Northern

California, for example, found that self-reported fair/poor health was 70 percent higher for residents of concentrated poverty areas than for residents of non-poverty areas, independent of age, sex, income, education, smoking status, body mass index, and alcohol consumption (Yen and Kaplan 1999a). The age and sex-adjusted odds for mortality were more than 50 percent higher (odds ratio = 1.58) for residents in areas characterized by poverty and deteriorated housing, after adjusting for income, race/ethnicity, smoking, body mass index, alcohol consumption, and perceived health status (Yen and Kaplan 1999b). Such patterns are not restricted to the United States. A multilevel study in Sweden found a similar elevated risk of poor health for residents of lower-socioeconomic-status communities, controlling for age, sex, education, body mass index, smoking, and physical activity (Malmstrom, Sundquist, and Johansson 1999).

Of course, observational studies suffer well-known weaknesses with respect to making causal inferences. It may be, for example, that individuals with poor health selectively migrate to, or are left behind in, poor neighborhoods. Under this interpretation, the patterns detected simply reflect the selective distribution of “unhealthy” people. In the case of individual selection, the correlation of health with community characteristics may be spurious.

To address this critique, experimental and quasi-experimental studies have begun to explore community-level effects on health outcomes. A major example is found in the “Moving to Opportunity” (MTO) program, a series of housing experiments in five cities that randomly assigned housing-project residents to one of three groups: an experimental group receiving housing subsidies to move into low-poverty neighborhoods; a group receiving conventional (Section 8) housing assistance; and a control group receiving no special assistance. A study from the Boston MTO site showed that children of mothers in the experimental group had a significantly lower prevalence of injuries, asthma attacks, and personal victimization during follow-up. The move to low-poverty neighborhoods was also linked to lower violent offending among juveniles and to significant improvements in the general health status and mental health of household heads (Katz, Kling, and Liebman 2001; Ludwig, Hirschfield, and Duncan 2001). This experiment suggests that an improvement in community socioeconomic environment has a causal impact on better health and behavioral outcomes related to violence.

In short, research in social and behavioral science has established a reasonably consistent set of findings relevant to the community context of health, especially for violence and a number of health outcomes among children (Earls and Carlson 2001; Sampson, Morenoff, and Gannon-Rowley 2002). First, there is considerable inequality between neighborhoods and local communities along multiple dimensions of socioeconomic status. Second, a number of health problems cluster together at the neighborhood and larger community level, including but not limited to violence, low birth weight, infant mortality, child maltreatment, and the risk of premature adult death. Third, these two phenomena are them-

selves related: community-level predictors common to many health-related outcomes include concentrated poverty and/or affluence, racial segregation, family disruption, residential instability, and poor quality housing. Fourth, the ecological differentiation of American society by factors such as social class, race, and health is a robust and apparently increasing occurrence that emerges at multiple levels of geography, whether neighborhoods, local community areas, or even states. And, finally, the relationship between concentrated poverty and many health outcomes, especially all-cause mortality, depression, and violence, remains when controls are introduced for individual-level risk factors. Thus, there appears to be a direct association between the social context and health, even in experimental studies.

ASSESSING SOCIAL MECHANISMS AND NEIGHBORHOOD PROCESSES

Taken together, these findings yield a potentially important clue in thinking about why it is that communities and larger collectivities might matter for health. If multiple and seemingly disparate health outcomes are linked together empirically across communities and are predicted by similar characteristics, there may be common underlying causes or mediating mechanisms. In particular, if “neighborhood effects” of concentrated poverty on health exist, presumably they stem from social processes that involve collective aspects of neighborhood life, such as social cohesion, spatial diffusion, local support networks, informal social control, and subcultures of violence. Yet we know little about these and other social mechanisms, especially how to measure them at the community level (Mayer and Jencks 1989; Sampson, Morenoff, and Gannon-Rowley 2002). Questions about collective properties and mediating social processes pertain equally to observational and experimental studies. For example, what accounts for the apparent improved health among public-housing residents in the MTO experimental studies—level of safety? housing quality? social support? Establishing an effect of the environment on health is not tantamount to explaining its biological pathways or its collective-level sources.

An emerging body of research has therefore begun to explore how social processes such as mutual trust among residents, shared expectations, density of acquaintanceship, reciprocated exchange of information, social control, institutional resources, and participation in voluntary associations bear on public health outcomes. A major challenge for this agenda is to build strategies for direct measurement of the social mechanisms and collective properties hypothesized to predict health. As interest in the behavioral sciences turns increasingly to an integrated scientific approach that emphasizes individual factors in social context, a mismatch has arisen in the quality of measures. Standing behind individual measurements are decades of psychometric and biological research, producing measures that often have excellent statistical properties.

In contrast, much less is known about measures of ecological settings. Neighborhood-level research is dominated by the study of poverty and other demographic characteristics drawn from census data or other government statistics that do not provide information on the collective properties of administrative units. I thus believe it is important to mount a concerted methodological effort to enhance the science of ecological assessment of social environments—what my colleague Stephen Raudenbush and I have labeled “ecometrics” (Raudenbush and Sampson 1999). A major component of ecometrics is the development of systematic procedures for directly measuring social processes, such as in population-based health surveys and systematic social observation of community environments. The basic idea is to take the measurement of ecological properties and social processes as seriously as we have always taken individual-level differences, as the long history of research in psychometrics shows. This is, in other words, a plea for equality in terms of the study of person and environment.

Project on Human Development in Chicago Neighborhoods

The example I focus on here is drawn from a large-scale, interdisciplinary project on which I have been fortunate to serve: the Project on Human Development in Chicago Neighborhoods. Our overall goal is to understand human development in its context. To assess theories of neighborhood context, we collected original data on social organizational processes across a large number of ecologically defined units. The extensive social class, racial, and ethnic diversity of the population was a major reason we selected Chicago. Grounding our work in a systemic theory of the local community in modern society, we defined neighborhoods ecologically. When formulated in this way, social organizational processes, attachment, and identity are variable and not confounded with 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. 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, density, and family structure.

Three major sources of data on community social processes were collected. First, to gain a complete picture of the city’s neighborhoods, 8,782 Chicago residents representing all 343 neighborhood clusters were interviewed in their homes. The study 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 second was systematic social observation of some 23,000 street segments in 80 neighborhood clusters selected to maximize variation in race/ethnicity and socioeconomic status. This approach has used videotaping techniques to capture aspects of micro-community environ-

ments (such as street-blocks) that bear on health risks (e.g., garbage in the streets, public intoxication, unsafe housing). The third method was key informant interviews with 2,800 leaders of organizations in six institutional domains—business, law enforcement, community organizations, education, politics, and religion—which were also sampled from the same 80 neighborhood clusters.

COLLECTIVE EFFICACY THEORY

A major feature of communities that we have closely examined is the capacity of residents to achieve social control over the environment and to engage in collective action for the common good. The motivation for this inquiry stems in part from the changed nature of cities and the modern meaning of community. Strong ties among neighbors are simply no longer the norm in many urban communities, because friends and social support networks are decreasingly organized in a parochial, local fashion (Fischer 1982; Wellman 1979). Moreover, as Granovetter (1973) has argued, “weak ties”—i.e., less intimate connections between people based on more infrequent social interaction—may be critical for establishing social resources, such as job referrals, because they integrate the community by bringing together otherwise disconnected subgroups. Relatedly, urbanites whose strong ties are tightly restricted geographically, especially in low-income communities, may actually produce an environment that discourages collective responses to local problems (Wilson 1987).

To address these changes in urban reality, my colleagues and I have proposed a focus on mechanisms that facilitate social control without requiring strong ties or associations (Sampson, Morenoff, and Earls 1999; Sampson, Raudenbush and Earls 1997). 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 relations which characterize all primary groups” (p. 50). Rejecting this outmoded assumption about the function of local communities, we have highlighted the combination of a working trust and shared willingness of residents to intervene in social control (Sampson, Raudenbush, and Earls 1997). Personal ties notwithstanding, it is the linkage of mutual trust and shared expectations for intervening on behalf of the common good that defines the neighborhood context of what they call “collective efficacy.” Just as self-efficacy is situated rather than global (one has self-efficacy relative to a particular task), a neighborhood’s efficacy exists relative to specific tasks such as maintaining public order.

Moving away from a focus on private ties, the term collective efficacy is meant to signify an emphasis on shared beliefs in a neighborhood’s conjoint capability for action to achieve an intended effect, and hence an active sense of engagement on the part of residents. 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 (or what some call “social capital”). This conception of collective efficacy is consistent with a redefinition of social capital in terms of expectations for action within a collectivity. Distinguishing between the resource potential represented by personal ties, on the one hand, and the shared expectations for action among neighbors represented by collective efficacy, on the other, helps clarify the dense ties paradox: social networks foster the conditions under which collective efficacy may flourish, but they are not sufficient for the exercise of control. The theoretical framework proposed here thus recognizes the transformed landscape of modern urban life, holding that while community efficacy may depend on a working trust, it does not require that my neighbor or the local beat cop be my friend. We do not need communities so much to satisfy our private and personal needs, which are best met elsewhere, nor even to meet our sustenance needs, which, for better or worse, appear to be irretrievably dispersed in space. Rather, local community remains essential as a site for the realization of public or social goods, such as public safety, clean environments, and education for children.

Empirical Evidence

These ideas have been examined in our survey of 8,782 residents of 343 Chicago neighborhoods. To measure the social control aspect of collective efficacy, residents were asked about the likelihood that their neighbors could be counted on to take action if: (1) children were skipping school and hanging out on a street corner; (2) children were spray-painting graffiti on a local building; (3) children were showing disrespect to an adult; (4) a fight broke out in front of their house; and (5) the fire station closest to home was threatened with budget cuts. The cohesion and working trust dimension was measured by items that captured the extent of local trust, willingness to help neighbors, a close-knit fabric, lack of conflict, and shared values. Social cohesion and informal social control were strongly related across neighborhoods ($r = 0.80$), and were combined into a global scale of neighborhood collective efficacy.

Published results show that collective efficacy is associated with lower rates of both current and future violence, controlling for concentrated disadvantage, residential stability, immigrant concentration, and a set of individual-level characteristics (e.g., age, sex, socioeconomic status, race/ ethnicity, home ownership). Neighborhoods high in collective efficacy manifest significantly lower rates of violence, as measured by official homicide events or as violent victimization reported by residents, even adjusting for prior neighborhood violence that may have depressed collective efficacy (e.g., because of fear). Overall, one standard deviation elevation in collective efficacy is associated with about a 13 percent reduction in the expected homicide rate. Concentrated disadvantage and residential instability also predict lower levels of later collective efficacy, and the association of disadvantage and stability with violence is significantly reduced

when collective efficacy was controlled. These patterns are consistent with the inference that neighborhood characteristics influence violence in part through the construct of neighborhood collective efficacy.

Our results also underscore the fact that collective efficacy is separate and more important as a proximate mechanism for understanding health than are dense social ties. We examined this issue by simultaneously examining collective efficacy and a measure of the number of friends and family that live in the neighborhood—the traditional indicator of close or dense ties. Homicide rates are lowest in neighborhoods that possess high levels of both social ties and collective efficacy. Indeed, 41 of the 93 homicide “cold spots” (44 percent) examined by us were located in areas that are high in both ties and efficacy (Morenoff, Sampson, and Raudenbush 2001). However, 31 of the cold spots (36 percent) are located in neighborhoods that are low in ties but high in collective efficacy. Most of the neighborhoods where low homicide rates are clustered despite the absence of strong social ties are on the north side of the city. By contrast, traditional perspectives on social disorganization predict that homicide “hot spots” should be found predominantly in neighborhoods that are low in both ties and efficacy. Yet the data show that hot spots are divided almost evenly between neighborhoods that are low in both ties and efficacy (40 out of 103) and those that are high in ties and low in efficacy (38 out of 103). Dense networks thus do not appear to be necessary or sufficient for explaining homicide. Our work suggests instead that social ties create the capacity for informal social control, but it is the act of exercising control, rather than the existence of social networks *per se*, that is related to crime.

A final theme of our research that I would like to note is that violence and health in general are bound up in spatially interdependent processes. The traditional perspective in urban research is premised on the notion that networks of personal ties and associations map neatly onto the geographic boundaries of spatially defined neighborhoods (e.g., census tracts), such that neighborhoods can be analyzed as independent social entities. By contrast, modern neighborhoods are less distinctly defined and have permeable borders. Social networks in this setting are more likely to traverse traditional ecological boundaries, implying that social processes are not neatly contained in geographic enclaves. Social behavior is also potentially contagious and can have diffusion effects represented in spatial interdependence. For example, the diffusion perspective focuses on the consequences of crime itself as they are played out over time and space—crime in one neighborhood may be the cause of future crime in another neighborhood.

In short, although the internal processes and population composition of a neighborhood make a difference, they are constrained by the spatial context of adjacent neighborhoods. Our data show that spatial proximity to neighborhoods high in collective efficacy is the one of the strongest predictors of lower homicide in focal neighborhoods, regardless of their own socioeconomic resources and levels of collective efficacy (Morenoff, Sampson, and Raudenbush 2001).

Such findings underscore that internal characteristics of neighborhoods are not enough to account fully for health outcomes. Moreover, work in progress shows a similar pattern of spatial proximity for child-related outcomes such as infant mortality and low birth weight (Morenoff, in press). It follows that the differential spatial distribution of white and black neighborhoods goes a long way in explaining racial disparities in health outcomes, especially homicide and low birth weight (see Sampson et al. 2002).

IMPLICATIONS AND DIRECTIONS

In conclusion, consideration of the collective properties of social environments promises a deeper understanding of the etiology of health outcomes. Because community contexts are important units of analysis in their own right, I have argued the need for community-level theory and “ecometric” measurement strategies that have been neglected in the health field. Although beyond the scope of this paper, I also believe that the health field can capitalize on social science by thinking creatively about the implications of extant research for community-based prevention strategies. Community-level prevention that attempts to change places and social environments rather than people may yield payoffs that complement the traditional individual-specific approach of the NIH. Some concrete initiatives include the following:

1. *Coordinated development of a “benchmark” assessment of the collective health of communities.* The goal would be to develop a standardized approach to the collection and dissemination of data that individual communities could use to evaluate where they stand in regard to national and/or regional norms. Similar to school report cards that are used to track the progress of educational reform, a standardized approach to assessing collective properties would eventually allow cities and local communities to gauge how well or poorly they are doing on a variety of health-related dimensions.
2. *Strategic investment in methodologies central to building an infrastructure capable of supporting the assessment and analysis of collective properties on a systematic and flexible scale.* One practical move is to invest in Geographical Information Systems and support the geographical linkage of ongoing data collection efforts in the health sciences. Such “geo-coding” would support the ability to use existing health records to construct community health profiles, thereby aiding in the development of benchmark standards. Support for the statistical development of methods that can integrate hierarchically structured data with spatial models and dynamic longitudinal analysis is also needed.
3. *Systematic efforts to measure the social mechanisms and dynamic processes of collective properties that appear to be important for health.* We noted preliminary

evidence that contextual factors such as cohesion, informal social control, physical disorder, and local support networks may be mediators of positive health and/or disease outcomes at the community level. Just as it is important to understand stress mediators at the individual level, so too is it important to assess the social mechanisms and processes that mediate community socioeconomic environments. New econometric efforts are needed to properly measure and validate collective social processes, using strategies such as resident surveys and systematic social observation of the physical environment.

4. *Priority longitudinal studies that might be targeted for data augmentation and multi-level analysis, especially person-environment interactions.* Adding contextual information to ongoing studies of individuals is relatively economical with respect to administrative data bases (e.g., U.S. census, mortality rates). The design of new studies should pay attention to possibilities for collecting and integrating contextual data. Consider the advances in knowledge that might have emerged had the Framingham study taken seriously the collection of information on the participants' social and physical environments.
5. *Prevention strategies grounded in research on collective properties.* Traditional thinking about disease has emphasized behavioral change among individuals as a means to reduce disease risk: for example, smoking interventions that have targeted smokers have included hypnosis, smoking cessation programs, and nicotine patches. Environmental approaches look instead to macro-level factors such as taxation policies, regulation of smoking in public places, and restriction of advertising in places frequented by adolescents. Such approaches appear to have had notable successes in reducing the aggregate level of cigarette consumption in the United States (Singer and Ryff 2001). Likewise, a recent randomized experiment on HIV revealed that large reductions in risky sexual behavior were obtained through a community intervention that induced local opinion leaders to initiate workshops on safe sex practices in low-income housing projects (Sikkema et al. 2000).

In sum, community-level efforts to change places and social environments rather than people may yield payoffs that complement the traditional individual and disease-specific approaches typical of the National Institutes of Health. A recent report of the National Academy of Sciences recommends exactly this sort of community-level augmentation (Singer and Ryff 2001). Basic research in science also appears to be moving in a direction that integrates the rigorous study of community contexts with individual development (Shonkoff and Phillips 2000). Such integrated study of health in neighborhood context promises a greater payoff than the conceptual separation that has dominated past thinking on research and intervention.

REFERENCES

- Earls, F., and M. Carlson. 2001. The social ecology of child health and well-being. *Annu. Rev. Public Health* 22:143–66.
- Fischer, C. 1982. *To dwell among friends: Personal networks in town and city*. Chicago: Univ. of Chicago Press.
- Granovetter, M. S. 1973. The strength of weak ties. *Am. J. Sociol.* 78(6):1360–80.
- Katz, L. F., J. Kling, and J. B. Liebman. 2001. Moving to opportunity in Boston: Early results of a randomized mobility experiment. *Q. J. Econ.* 116(2):607–54.
- Ludwig, J., P. Hirschfield, and G. J. Duncan. 2001. Urban poverty and juvenile crime: Evidence from a randomized housing-mobility experiment. *Q. J. Econ.* 116(2):665–79.
- Malmstrom, M., J. Sundquist, and S.-E. Johansson. 1999. Neighborhood environment and self-reported health status. *Am. J. Public Health* 89:1181–86.
- Massey, D. S. 1996. The age of extremes: Concentrated affluence and poverty in the twenty-first century. *Demography* 33:395–412.
- Mayer, S., and C. Jencks. 1989. Growing up in poor neighborhoods: How much does it matter? *Science* 243:1441–45.
- Morenoff, J. D. In press. Neighborhood mechanisms and the spatial dynamics of birth-weight. *Am. J. Sociol.*
- Morenoff, J. D., R. J. Sampson, and S. W. Raudenbush. 2001. Neighborhood inequality, collective efficacy, and the spatial dynamics of homicide. *Criminology* 39(3):517–60.
- Raudenbush, S. W., and R. J. Sampson. 1999. “Ecometrics”: Toward a science of assessing ecological settings, with application to the systematic social observation of neighborhoods. *Sociol. Methodology* 29:1–41.
- Robert, S. A. 1999. Socioeconomic position and health: The independent contribution of community socioeconomic context. *Annu. Rev. Sociol.* 25:489–516.
- Sampson, R. J. 2001. How do communities undergird or undermine human development? Relevant contexts and social mechanisms. In *Does it take a village? Community effects on children, adolescents, and families*, ed. A. Booth and N. Crouter, 3–30. Mahwah, NJ: Lawrence Erlbaum.
- Sampson, R. J., J. D. Morenoff, and F. Earls. 1999. Beyond social capital: Spatial dynamics of collective efficacy for children. *Am. Sociol. Rev.* 64:633–60.
- Sampson, R. J., J. D. Morenoff, and T. Gannon-Rowley. 2002. Assessing neighborhood effects: Social processes and new directions in research. *Annu. Rev. Soc.* 28:443–78.
- Sampson, R. J., S. W. Raudenbush, and F. Earls. 1997. Neighborhoods and violent crime: A multilevel study of collective efficacy. *Science* 277:918–24.
- Shaw, C., and H. McKay. 1942. *Juvenile delinquency and urban areas*. Chicago: Univ. of Chicago Press.
- Shonkoff, J. P., and D. A. Phillips, eds. 2000. *From neurons to neighborhoods: The science of early childhood development*. Washington, DC: National Academy Press.
- Sikkema, K., et al. 2000. Outcomes of a randomized community-level HIV prevention intervention for women living in 18 low-income housing developments. *Am. J. Public Health* 90:57–63.
- Singer, B., and C. Ryff, eds. 2001. *New horizons in health*. Washington, DC: National Academy of Sciences.
- Warren, D. 1975. *Black neighborhoods: An assessment of community power*. Ann Arbor: Univ. of Michigan Press.

- Wellman, B. 1979. The community question: The intimate networks of East Yorkers. *Am. J. Sociol.* 84: 1201–31.
- Wilson, W. J. 1987. *The truly disadvantaged: The inner city, the underclass, and public policy*. Chicago: Univ. of Chicago Press.
- Yen, I. H., and G. Kaplan. 1999a. Poverty area residence and changes in depression and perceived health status: Evidence from the Alameda County study. *Intl. J. Epidemiol.* 28:90–94.
- Yen, I. H., and G. Kaplan. 1999b. Neighborhood social environment and risk of death: Multilevel evidence from the Alameda County study. *Am. J. Epidemiol.* 14:898–907.