The Mechanism(s) of Neighborhood Effects
Theory, Evidence, and Policy Implications

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ABSTRACT

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Although there has been a burgeoning literature on quantifying the relationship between various aspects of the residential environment and numerous outcomes for individual adults and children residing in that environment, comparably less attention has been given to uncovering empirically the causal mechanisms that yield these relationships. The paper first offers a comprehensive listing of 15 potential causal pathways between neighborhood context and individual behavioral and health outcomes, organized under four broad rubrics--social interactive; environmental; geographical; and institutional--which synthesizes both sociological and epidemiological perspectives. Second, it provides a new conceptualization of dimensions of neighborhood effect mechanisms that uses a pharmacological analogy ("dosage-response") to reveal 17 key questions guiding scholarship regarding the composition, administration, and response to the neighborhood dosage. Third, it provides an updated, international review of empirical studies related to neighborhood effect mechanisms, assesses the state of this scholarship, and offers some provisional conclusions about the dominant neighborhood effect mechanisms operating. Finally, it draws implications from this review for future scholarship and public policy.

I. Introduction

Although there has been a burgeoning literature on quantifying the relationship between various aspects of the residential environment and numerous outcomes for individual adults and children residing in that environment, comparably less attention has been given to uncovering empirically the causal mechanisms that yield these relationships. There have been many discussions of the potential causal connections between neighborhood context and individual behavioral and health outcomes; see especially Jencks and Mayer (1990), Duncan, Brooks-Gunn and Aber (1997), Gephart (1997), Ellen and Turner (1997), Wandersman and Nation (1998), Friedrichs (1998), Green and Ottoson (1999), Atkinson et al. (2001), Booth and Crouter (2001), Sampson (2001), Ellen, Mijanovich and Dillman (2001), Haurin, Dietz and Weinberg (2002), Sampson, Morenoff, and Gannon-Rowley (2002), Ellen and Turner (2003), Ioannides and Loury (2004), Pinkster (2008), and Phibbs (2009). Though often in these works the listings of potential mechanisms differ in labeling and categorizations, there is a broad consensus about how the underlying causal paths are thought to operate in theory. Unfortunately, there are few tentative conclusions, let alone any consensus, about which mechanisms demonstrate the strongest empirical support. The following quotes are illustrative. "In general research findings…are too scant to draw any firm conclusions about the potential pathways through which neighborhood effects may be transmitted…" (Leventhal and Brooks-Gunn, 2000: 322). "The causal pathways that underlie hypotheses about the effects of neighborhood social factors are often not explicit…This clearly is an important next step for understanding the relationship between neighborhood and health." (Pickett and Pearl, 2001: 117, 120). "One important question is *how* a less advantaged neighborhood increases the risk of low birth weight and of children developing behavioral problems…Understanding of the causal chains in both of these areas is…incomplete." (Sellström and Bremberg, 2006: 553).

Given this lack of scholarly consensus, my purposes in this paper are four-fold: (1) offer a comprehensive listing of 15 potential causal pathways between neighborhood context and individual behavioral and health outcomes, which synthesizes both sociological and epidemiological perspectives; (2) provide a new conceptualization of dimensions of neighborhood effect mechanisms that uses a pharmacological analogy to clarify the empirical challenges of this field of enquiry; (3) provide an updated, international review of empirical studies related to neighborhood effect mechanisms; and (4) draw provisional conclusions about the dominant neighborhood effect mechanisms operating and implications from this review for scholarship and public policy. The paper is organized as follows. I begin with an overview of the numerous possible neighborhood effect mechanisms that have been hypothesized, and group them into four categories. Next I will examine a variety of issues that render the identification of neighborhood causal mechanisms particularly challenging for social scientists, and the two methodological approaches that have been adopted thus far. These issues are brought into clear relief by use of a pharmacological metaphor: *dosage-response*. I will then synthesize the international evidence related to the four categories of mechanisms, each in its own subsection, in an effort to assess the state of empirical scholarship and offer some provisional conclusions. Finally, I close the paper by drawing implications for future scholarship and public policy.

II. How Might Neighborhood Effects Transpire?

Prior scholarly works addressing this question have been distinctly segregated, with social scientists focusing on behavioral outcomes and epidemiologists focusing on health outcomes. However, within each subset there is broad theoretical agreement about potential causal pathways of neighborhood effects. I therefore will list these mechanisms and describe them only briefly here. My synthesis of these disparate literatures suggests that fifteen (15) distinctive linkages have been advanced. I think it most

useful to group these 15 mechanisms of neighborhood effects under four broad rubrics: social interactive; environmental; geographical; and institutional.[1]

Social-Interactive Mechanisms

This set of mechanisms refers to social processes endogenous to neighborhoods. These processes include:

- *Social Contagion:* Behaviors, aspirations, and attitudes may be changed by contact with peers who are neighbors. Under certain conditions these changes can take on contagion dynamics that are akin to "epidemics."
- *Collective Socialization:* Individuals may be encouraged to conform to local social norms conveyed by neighborhood role models and other social pressures. This socialization effect is characterized by a minimum threshold or critical mass being achieved before a norm can produce noticeable consequences for others in the neighborhood.
- *Social Networks:* Individuals may be influenced by the interpersonal communication of information and resources of various kinds transmitted through neighbors. These networks can involve either "strong ties" and/or "weak ties."
- *Social cohesion and control:* The degree of neighborhood social disorder and its converse, "collective efficacy" (Sampson, Morenoff, and Earls, 1999), may influence a variety of behaviors and psychological reactions of residents.
- *Competition:* Under the premise that certain local resources are limited and not pure public goods, this mechanism posits that groups within the neighborhood will compete for these resources amongst themselves. Because the outcome is a zero-sum game, residents' access to these resources (and their resulting opportunities) may be influenced by the ultimate success of their group in "winning" this competition.
- *Relative Deprivation:* This mechanism suggests that residents who have achieved some socioeconomic success will be a source of disamenities for their less-well off neighbors. The latter, it is argued, will view the successful with envy and/or will make them perceive their own relative inferiority as a source of dissatisfaction.
- *Parental Mediation:* The neighborhood may affect (through any of the mechanisms listed under all categories here) parents' physical and mental health, stress, coping skills, sense of efficacy, behaviors, and material resources. All of these, in turn, may affect the home environment in which children are raised.

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Environmental Mechanisms

Environmental mechanisms refer to natural and human-made attributes of the local space that may affect directly the mental and/or physical health of residents without affecting their behaviors. As in the case of social-interactive mechanism, the environmental category can also assume distinct forms:

- *Exposure to Violence:* If people sense that their property or person is in danger they may suffer psychological and physical responses that may impair their functioning or sensed well-being. These consequences are likely to be even more pronounced if the person has been victimized.
- *Physical Surroundings:* Decayed physical conditions of the built environment (e.g., deteriorated structures and public infrastructure, litter, graffiti) may impart psychological effects on residents,

[1]By contrast, Manski (1995) groups them into "endogenous," "exogenous," and "correlated" categories. Ellen and Turner (1997) group them into five categories: concentration, location, socialization, physical, and services. Leventhal and Brooks-Gunn (2000) use the rubrics "institutional resources," "relationships," and "norms/collective efficacy."

such as a sense of powerlessness. Noise may create stress and inhibit decision-making through a process of "environmental overload" (Bell et al., 1996).
- *Toxic Exposure:* People may be exposed to unhealthy levels of air-, soil-, and/or water-borne pollutants because of the current and historical land uses and other ecological conditions in the neighborhood.

Geographical Mechanisms

Geographic mechanisms refer to aspects of spaces that may affect residents' life courses yet do not arise within the neighborhood but rather purely because of the neighborhood's location relative to larger-scale political and economic forces such as:

- *Spatial Mismatch:* Certain neighborhoods may have little accessibility (in either spatial proximity or as mediated by transportation networks) to job opportunities appropriate to the skills of their residents, thereby restricting their employment opportunities.
- *Public Services:* Some neighborhoods may be located within local political jurisdictions that offer inferior public services and facilities because of their limited tax base resources, incompetence, corruption, or other operational challenges. These, in turn, may adversely affect the personal development and educational opportunities of residents.

Institutional Mechanisms

The last category of mechanisms involves actions by those typically not residing in the given neighborhood who control important institutional resources located there and/or points of interface between neighborhood residents and vital markets:

- *Stigmatization:* Neighborhoods may be stigmatized on the basis of public stereotypes held by powerful institutional or private actors about its current residents. In other cases this may occur regardless of the neighborhood's current population because of its history, environmental or topographical disamenities, style, scale and type of dwellings, or condition of their commercial districts and public spaces. Such stigma may reduce the opportunities and perceptions of residents of stigmatized areas in a variety of ways, such as job opportunities and self-esteem.
- *Local Institutional Resources:* Some neighborhoods may have access to few and/or high-quality private, non-profit, or public institutions and organizations, such as benevolent charities, day care facilities, schools, and medical clinics. The lack of same may adversely affect the personal development opportunities of residents.
- *Local Market Actors:* There may be substantial spatial variations in the prevalence of certain private market actors that may encourage or discourage certain behaviors by neighborhood residents, such as liquor stores, fresh food markets, fast food restaurants, and illegal drug markets.

III. Conceptual Issues in Uncovering and Measuring Mechanism(s) of Neighborhood Effects

I begin this discussion with the premise that the ultimate goal of social science is to not only identify which mechanisms are responsible for creating a designated effect on residents but to ascertain *quantitatively their relative contributions* to the outcome of interest. For the purposes of this discussion it is useful to employ a pharmacological metaphor: "dosage-response." There is substantial empirical evidence that several sorts of variables measuring neighborhood-level indicators are correlated with a variety of behavioral and health outcomes for children, youth, and adults; for reviews see: Haveman and Wolfe

(1994), Duncan, Brooks-Gunn and Aber (1997), Van Kempen (1997), Gephart (1997), Ellen and Turner (1997), Friedrichs (1998); Leventhal and Brooks-Gunn (2000), Booth and Crouter (2001), Atkinson et al. (2001), Ellen, Mijanovich and Dillman (2001), Pickett and Pearl (2001), Haurin, Dietz and Weinberg (2002), Dietz (2002), Sampson, Morenoff, and Gannon-Rowley (2002), Musterd (2002), Friedrichs, Galster and Musterd (2003), Kawachi and Berkman (2003), Galster (2005), Sellström and Bremberg (2006), and Schaefer-McDaniel et al. (2009). The question here is "Why?" I find it revealing to employ a pharmacological metaphor here and frame the questions as follows: What about this "dose of neighborhood" might be *causing* the observed individual "response?" The challenges in answering this deceptively simple question are legion, and my purpose here is to present some of the major ones.[2] If we are to deeply understand why aspects of the neighborhood context affect residents we ultimately must answer 17 questions arrayed under three overarching rubrics regarding the *composition, administration, and response to the neighborhood dosage*.

The Composition of the Neighborhood Dosage

- *What are the "active ingredients" that constitute the dosage?* What is it about this space in terms of internal social interactions, environmental conditions, geographic attributes, and reactions of external institutional drivers that is (are) the causal agent(s) and how can it (they) be measured precisely? If neighborhood is a multi-dimensional package of causal attributes, as is likely, each part of the package will need to be identified and measured directly.

The Administration of the Neighborhood Dosage

- *Frequency: How often is the dosage administered?* For example, does a particular form of social interaction occur only rarely or (as in the case of air pollution) is the exposure occurring during each inhalation?
- *Duration: How long does the dosage continue, once begun?* Certain social interactions can vary dramatically in their length, whereas the dosage of unresponsive public services and non-existent facilities can be omnipresent.
- *Intensity: What is the size of the dosage?* How concentrated are the toxins? How weak are the local services? In the case of social interactive causes, the answers to the frequency, duration and intensity questions will be related to the amount of time that the individual spends in the neighborhood and outside of the home in "routine activities."
- *Consistency: Is the same dosage being applied each time it is administered?* Do pollutants or the threat of victimization vary daily based on meteorological conditions or time of day?
- *Trajectory: Is the frequency, duration, and/or intensity of dosage growing, declining, or staying constant over time for the resident in question?* Do the individuals in a rising trajectory context evince fewer effects because they get more "immune" or evince more effects because their resistance is "weathered?"
- *Spatial Extent: Over what scale does the dosage remain constant?* How rapidly does the frequency, duration, intensity and/or consistency of dosage decay when the subject travels away from the residence? Do any of these gradients vary according to the direction of movement away from the residence?
- *Passivity: Does the dosage require any action by residents (cognitive or physical) to take effect?* I.e., do residents need to engage in any activities or behaviors, or even be cognizant of the forces operating upon them for the effect to transpire? In the case of endogenous local social interactions, the answer is probably yes, but not in the case of the other categories of mechanisms.

[2] Note that this discussion is related to but distinct from the question of how to accurately measure the magnitude of this dosage-response relationship, about which I wrote in Galster (2008).

- *Mediation: Is the dosage received directly or indirectly by the resident in question?* For example, neighborhood influences on children may be mediated by parents who are directly affected by the neighborhood.

The Neighborhood Dosage-Response Relationship

- *Thresholds: Is the relationship between variation in any dimension of dosage administration and the response nonlinear?* Are there critical points at which marginal changes in the dosage have non-marginal effects?
- *Timing: Does the response to the dosage occur immediately, after a substantial lag, or only after cumulative administration?* For example, you might become stigmatized as soon as you move into a certain neighborhood, but eroded health due to lack of local recreational facilities may not show up until an extended period has elapsed.
- *Durability: Does the response to the dosage persist indefinitely or decay over time slowly or quickly?* The developmental damage done by lead poisoning is, for illustration, indelible.
- *Generality: Are there many predictable responses to the given dosage administration, or only one?* Peers may influence a wide variety of adolescent behaviors, whereas certain environmental toxins may have rather narrowly defined health impacts.
- *Universality: Is the relationship between variation in any dimension of dosage administration and the particular response similar across children's developmental stages, demographic groups, or socioeconomic groups*? The same dosage of neighborhood may yield different responses depending on the developmental or socioeconomic status of those exposed.
- *Interactions: Are dosages of other intra- or extra-neighborhood treatments also being administered that intensify the given dosage's expected response?* Different dimensions of neighborhood may not be additive but multiplicative.
- *Antidotes: Are dosages of other intra- or extra-neighborhood treatments also being administered that counteract the given dosage's expected response?* For example, efforts to improve residents' health by building new clinics and outreach facilities in the neighborhood may apparently founder if environmental pollution in the area gets worse.
- *Buffers: Are people, their families, and/or their communities responding to the dosage in ways that counteract its expected response?* Because residents individually and collectively potentially have agency they may engage in compensatory behaviors that offset negative neighborhood effects, such as when parents keep their children in the home when certain violent youngsters are using the local playground.

Past Investigative Responses and their Limitations

There are two broad sorts of approaches that social scientists have employed in an attempt to answer the above questions and uncover the dominant neighborhood effect mechanisms at work: (1) field-interview studies of people's social relations and networks within neighborhoods and non-residents' opinions about neighborhoods, involving both quantitative and qualitative analyses of the data collected thereby; and (2) multivariate statistical studies estimating models of how various neighborhood indicators are correlated with a variety of individual outcomes for children, youth, and adults. Field-interview studies try directly to observe potential mechanisms. In this vein, there have been numerous sociological and anthropological investigations, but they are often limited in their ability to discern the relative contributions of alternative causes because of their qualitative nature and their typical focus on only one set of mechanisms to the exclusion of others. Nevertheless, several have been revealing and remarkably consistent in their findings that allow us to rule out certain potential causes. Moreover, this style of investigation is more appropriate for probing many of the questions noted above, such as active ingredients, passivity, mediation, and buffering of dosages.

The multivariate statistical approach tries to draw inferences about neighborhood effect mechanisms from the statistical patterns observed. It has its own challenges, akin to a physician making a differential diagnosis on the basis of a patient's symptoms and only a partial, poorly measured medical history. One inferential notion that has been used is that if particular sorts of descriptors of a neighborhood prove more statistically and economically significant predictors of resident outcomes they may hint at which underlying process is dominant. For example, if the variable "percentage of poor residents in the neighborhood" was not to prove significant but the variable "percentage of affluent residents in the neighborhood" was to in a regression predicting outcomes for low-income residents, it would suggest that a positive social externality from the affluent group like role modeling, not a negative social externality from the poor group like peer effects, was present. Unfortunately, an overview of the research record typically does not produce such unambiguous results for coefficients. Moreover, most of this statistical literature is of little help to us here because it does not disaggregate findings by economic or demographic group (though see Galster, Andersson and Musterd, forthcoming). For example, how is one to interpret the finding from a regression model estimated over youth from all income groups that there is a negative correlation between the percentage of poor households in the neighborhood and an individual's chances of dropping out from high school? One cannot make the deduction that non-poor youth are positively influencing poor youth through role modeling. A second inferential notion often employed draws upon the assumption that different types of neighborhood social externalities yield distinctive functional forms for the relationship between the percentage of disadvantaged and/or advantaged residents in a neighborhood and the amount of externality being generated. For example, collective social norms and social control likely come into play only after a threshold scale of the population group thought to be generating this effect has been achieved in the neighborhood. This logic can be used to draw out implications for underlying mechanisms of neighborhood effects if the statistical procedures used to investigate the relationship between neighborhood indicator(s) and individual outcome permit the estimation of non-linear relationships. Unfortunately, few extant empirical studies test for non-linear relationships between neighborhood indicators and various individual outcomes. Moreover, even if thresholds and other distinctive non-linearities are observed, it need not uniquely identify only one causal mechanism.

In the review that follows I will organize the presentation in subsections corresponding to the foregoing mechanisms of neighborhood interaction,[3] bringing to bear evidence from the two approaches as relevant. Before turning to this empirical evidence, however, I note as preface that no definitive, comprehensive study of neighborhood effect mechanisms exists; none examines more than one or two of the above questions for an array of potential causal mechanisms. Indeed, most of the questions to my knowledge have not been addressed explicitly in the theoretical or empirical literature. Thus, most empirical conclusions regarding neighborhood effect mechanisms should be treated as provisional at best.

IV. Evidence on Social-Interactive Mechanisms of Neighborhood Effects

Social Contagion and Collective Socialization

There have been numerous studies that have examined in detail the social relationships of youth from disadvantaged neighborhoods. They have identified links between deviant peer group influences and adolescents' grade point average (Darling and Steinberg, 1997), mental health (Simons et al, 1996), anti-social behavior, school attainment, and substance abuse (Dubow, Edwards, and Ippolito, 1997; Gonzales, 1996). One of the most notable because of its sophisticated efforts to avoid statistical bias is Case and Katz's (1991) investigation of youth in low-income Boston neighborhoods. They find that neighborhood peer influences among low-income youth are strong predictors of a variety of negative behaviors, including crime, substance abuse, and lack of labor force participation. For more supportive evidence on the

[3] I combine the competition and relative deprivation mechanisms because, to my knowledge, there is little extant statistical evidence that can distinguish between them.

importance of role models and peer effects in disadvantaged neighborhoods, see Diehr et al. (1993), Sinclair et al. (1994); Briggs (1997a); South and Baumer (2000), Ginther, Haveman and Wolfe (2000), South (2001), and Oberwittler (2004). To me this body of U.S. work suggests that negative social externalities are often being generated through peer effects and role models among disadvantaged young neighbors.[4]

However, the extent to which such negative socialization would be diminished, or replaced by positive socialization, were more higher-income youth to be present is unclear. Rosenbaum (1991, 1995, et al. 2002) has provided a series of studies related to black families living in public housing in concentrated poverty neighborhoods who were assisted (with rental vouchers and counseling) in finding apartments in majority white-occupied neighborhoods of Chicago and its suburbs as part of a court-ordered remedy for the *Gautreaux* public housing discrimination suit. Though he provides one of the most optimistic portraits of the benefits that such moves can provide to black adults and their children, he does not find a great deal of social interchange or networking between these new in-movers and the original residents. Rosenbaum (1991) concludes by stressing instead the importance of role models and social norms in middle class suburban environments for generating positive outcomes for those participating in the *Gautreaux* Program. However, this optimistic conclusion has been challenged by recent qualitative case studies revealing limited role modeling between upper-income and lower-income blacks in gentrifying neighborhoods (Boyd, 2008; Freeman, 2005; Hyra, 2008).

The threshold notion embedded in both the social contagion and collective socialization (norm) mechanisms potentially allows them to be identified by regression-based studies that allow for non-linear relationships between the measure of neighborhood. My (Galster, 2002) review of the U.S. literature (Krivo and Peterson 1996, Vartanian 1999a, b, Weinberg, Reagan and Yankow 2004) suggests that the independent impacts of neighborhood poverty rates in encouraging negative outcomes for individuals like crime, school leaving, and duration of poverty spells appear to be nil unless the neighborhood exceeds about 20 percent poverty, whereupon the externality effects grow rapidly until the neighborhood reaches approximately 40 percent poverty; subsequent increases in the poverty population appear to have no marginal external effect. Analogously, the independent impacts of neighborhood poverty rates in discouraging positive behaviors like working appear to be nil unless the neighborhood exceeds about 15 percent poverty, whereupon the effects grow rapidly until the neighborhood reaches roughly 30 percent poverty; subsequent increases in poverty appear to have no marginal effect. This evidence supports the social contagion and/or collective socialization processes.

As far as non-linear relationships between individual outcomes and neighborhood percentages of affluent residents, the work of Crane (1991), Duncan et al. (1997), and Chase-Lansdale et al. (1997) is relevant. Unfortunately, though they all suggest the existence of a threshold of neighborhood affluence they differ on where this occurs. Crane's (1991) analysis finds strong evidence of epidemic-like effects on both secondary school leaving and teenage childbearing of the share of affluent (professional-managerial occupation) neighbors. For whites and blacks there is a threshold at five percent affluent neighbors, below which dropout rates skyrocket; for blacks not living in large cities there is another threshold at 20 percent, above which affluent neighbors cease having a positive impact. These thresholds are more dramatic for black males than females. A similar threshold at low percent affluent neighbors is observed for both black and white teen women's childbearing, especially in large cities. Crane (1991: 1234, 1241) interpreted these findings as consistent with intra-neighborhood social interactions, but was unable to distinguish whether the high-status neighbors created an endogenous effect (such as serving as positive role models)

[4] However, it is not definitive about the extent to which such negative socialization is general across races. Turley (2003) probes beyond her discovery of overall positive correlations between median family income of neighborhood and youths' behavioral and psychological test scores to see whether there were interaction effects with proxies for number of peer interactions and time spent in neighborhood. She found such strong interaction effects for white but not black youths in her sample, and concluded "differences in neighborhood socializing may explain why neighborhood income affects black and white children differently" (2003: 70).

or a correlated effect (such as bringing resources that made local institutions and services better). Duncan et al. (1997) find a different sort of nonlinear neighborhood effect for educational attainment and the percentage of affluent neighbors. Here the threshold does not seem to occur at a small percentage of affluent, as in Crane's study.[5] The positive effect of the latter becomes dramatically stronger when the percentage exceeds the national mean for the neighborhood (for black men and women, and white women). Chase-Lansdale et al. (1997) examine how the percentage of affluent neighbors relates to a variety of intellectual and behavioral development test scores for youth. They find, controlling for family influences, that the percentage of affluent neighbors is positively associated with higher intellectual functioning scores for black children and female children only when the percentage exceeds the 25th percentile and is less than the 75th percentile; for other children the effect is linear. Both the Duncan et al. (1997) and Chase-Lansdale et al. (1997) findings support the notion of collective social norms taking hold only after a substantial share of the affluent group is present in the neighborhood.[6]

Most Western European evidence related to potential non-linear neighborhood effects focuses on labor market outcomes as they relate to percentages of disadvantaged neighbors. Here the findings are inconsistent in the extreme. Several studies did not observe any strong nonlinear relationships. Ostendorf, Musterd, and de Vos (2001) compared "income-mixed" neighborhoods in Amsterdam with "homogeneous" ones, to ascertain whether this aspect of neighborhood was related to an individual's chances of living in poverty. Bolster et al. (2004) compared one-, five- and ten-year income growth trajectories of British individuals living at the beginning of the period amid different degrees of disadvantage (measured by a composite index). Finally, McCulloch's (2001) multi-level analysis of British Household Panel Study data also failed to identify any strong non-linearities between a ward-level index of disadvantage and such outcomes as employment status, current financial situation, financial expectations, health status, or receipt of social support. Musterd, Ostendorf and de Vos (2003) related the proportion of neighboring households on social benefits to the chances of Dutch individuals' being employed consistently or not during the 1990s. Over a vast variation in neighborhoods they found no relationship. Though arguably some non-linearities were evinced at the extreme values of neighborhood conditions, they involved few neighborhoods.

Other studies detected non-linear relationships, but of highly inconsistent natures. Buck's (2001) analysis of British Household Panel Study data (but, unlike McCulloch, using unemployment rate as the neighborhood characteristic) identified substantial non-linearities with the probability of not starting work and the probability of not escaping from poverty, which suggested that the worst results for individuals occurred when the share of neighborhood residents unemployed exceeded 23-24 percent (i.e., the highest five percent of all wards). Diametrically opposed results were generated by Musterd and Andersson (2006), who analyzed the national register database for the three largest metropolitan areas in Sweden to ascertain the relationship between the odds that an individual remained unemployed in both 1995 and 1999 and the percentage of unemployed residents in their neighborhood in 1995. They (like Buck) found a strong positive relationship until the neighborhood percentage unemployed exceeded 16%; thereafter there appeared to be no further marginal impact (instead of increasing marginal impact, as per Buck). Van der Klaauw and van Ours (2003) found using data in Rotterdam administrative records that the neighborhood unemployment rate had no statistically significant negative impact on the probability of exiting welfare into work for Dutch job losers or school leavers until it surpassed 11 percent, though there were no neighborhood effect for non-Dutch job losers.

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[5] Duncan et al. (1997) did not explicitly test for a threshold at a below-average percentage of affluent, however.

[6] Turley (2003) analyzes behavioral and psychological test scores for youth as measured in a special supplement of the PSID. She relates these scores to the median family income of the census tract, so one cannot be certain whether the relationship is being generated by share of affluent or share of poor. She tests for non-linearities by employing a quadratic version of neighborhood income variable and finds that its coefficient is statistically significant and negative for the self-esteem outcome, implying that improving the economic environment of youth has a much greater psychological impact for those initially in disadvantaged neighborhood circumstances. Unfortunately, quadratic specifications are not precise in identifying thresholds.

Only two studies using Western European data have investigated the potential nonlinear effects of affluent neighbors. Kauppinen (2004) used categorical variables to delineate neighborhood affluence in Helsinki and, like Duncan et al. (1997), found that only in neighborhoods with above-average educational levels does neighborhood seem to make a difference in individuals' post-secondary level of educational attainment.

Galster et al. (2008) study the effects of both disadvantaged and advantaged neighbors on individual earnings of adults using Swedish urban data. In the case of men who were not employed full time, it was the neighborhood with the highest possible share of *middle-income neighbors* that was most conducive to their earning more. The fact that even a few low-income neighbors eroded these benefits suggested to the authors that a negative role modeling or peer effect was transpiring here. Replacing middle-income with high-income neighbors also had negative impacts on these less-advantaged males, implying that the former provided positive role models and/or resource rich networks but the latter did not, perhaps because the social distance between the groups was too great for social interactions. The collective socialization model of interaction was not supported by their findings, because no minimum threshold of low-income neighbors was observed past which their negative impacts began and because such would imply no distinctions between shares of middle- and high-income neighbors under the assumption that both provided comparable norms and social controls.

In sum, this Western European evidence on non-linear neighborhood effects is so inconsistent that no clear implications can be drawn regarding social contagion and collective socialization causal mechanisms. Nevertheless, it is fair to say that it does not appear to evince non-linear neighborhood effects similar to those more consistently appearing in the U.S.-based research.

Social Networks

Tiggs, Brown and Greene (1998) investigate the social networks of blacks in U.S. urban areas. They find that, controlling for personal income, those in areas of concentrated poverty typically are more isolated within their households; they have fewer close external ties, especially with those who are employed or well-educated. . These findings replicate those of Fernandez and Harris (1992), who also found that the volume, breadth and depth of social relationships in poor neighborhoods were especially attenuated for black females. Coupled with consistent evidence that job-seekers in U.S. high-poverty areas rely upon neighbors for potential employment information (e.g., Elliott, 1999), and the situation appears ripe for neighborhood effects in disadvantaged U.S. places working through resource-poor social networks.

Two statistical studies provide further support to the hypothesis that the "social network" mechanism of neighborhood effect has veracity when it comes to finding employment in the U.S. Bertrand, Luttmer and Mullainathan (2000) consider the impact of local social networks on welfare participation. They find welfare participation was enhanced not only by geographic proximity to others on welfare, but especially if these proximate others on welfare spoke the individual's language. Bayer, Ross and Topa (2004) examine the degree to which people who live on the same census block also tend to work on the same census block. They find that individuals indeed interact very locally when exchanging information about jobs, even when controlling for personal characteristics. However, given the typical high degree of class and race segregation in American neighborhoods it is not clear how much of the observed local social networks span across groups. Indeed, consistent with sociological field evidence above, Bayer, Ross and Topa (2004) find that interactions are stronger when pairs of individuals are more likely to interact because of common education.

Evidence also suggests that the social networks established in disadvantaged U.S. neighborhoods may be so influential that they are difficult to break even after moving away. Briggs (1998) examined the social networks of black and Hispanic youth who participated in a court-ordered, scattered-site public housing desegregation program in Yonkers (NY) during the 1990s. He found few differences in the network diversity or types of aid provided by networks comparing youth who moved to developments in white, middle-class neighborhoods in Yonkers compared to those who remained in traditional public

housing in poor, segregated neighborhoods. The former group did not leverage any benefits of living in more affluent and racially diverse areas, and their social ties typically remained within the common race-class confines of their scattered-site developments. Popkin, Harris and Cunningham (2002) and Rosenbaum, Harris and Denton (2003) found that families participating in the Moving To Opportunity demonstration in Chicago were likely to maintain close social ties with their former, poverty-stricken neighborhoods even after they moved a considerable distance away to low-poverty neighborhoods. More than half indicated that their social networks were located someplace other than their new neighborhood.

A complementary view is provided by U.S.-based field studies, which consistently show that the social interaction among members of different economic groups is quite limited, even within the same neighborhood or housing complex. Members of the lower-status group often do not take advantage of propinquity to broaden their "weak ties" and enhance the resource-producing potential of their networks, instead often restricting their networks to nearby members of their own group. Schill (1997) investigated relationships between different classes of residents living in a newly modernized public housing complex in Chicago that intentionally tried to mix employed, moderate-income households amid unemployed, poor households. Few social ties developed between the groups in the development. Similar conclusions were reached by Clampet-Lundquist (2004) in her study of residents displaced from a revitalized Philadelphia public housing development and Kleit (2001a, 2001b, 2002, 2005, Kleit and Carnegie, 2009) in a series of mixed-income housing developments in Maryland and Washington. Several European-based studies have probed this topic as part of restructuring of social housing estates (Atkinson and Kintrea, 1998; Jupp, 1999; Kleinhans, 2000; Cole and Goodchild, 2001; Van Beckhoven and Van Kempen, 2003; Duyvendak, Kleinhans, and Veldboer, 2000) or post-war neighborhoods (Blokland-Potters, 1998; Pinkster, 2008) and reached similar conclusions.[7]

Several multivariate studies based on European data contribute as well to our understanding of neighborhood networks. Buck (2001) uses British Household Panel Study data to ascertain a positive relationship between the probability that individuals have no close friends employed and neighborhood unemployment rates or disadvantage index scores. When coupled with the aforementioned positive relationship Buck observed between these neighborhood indicators and an individual's probability of not starting work and remaining in poverty, the totality of results are supportive of the importance of local job information networks as a mechanism of transmitting a neighborhood effect. Farwick (2004) finds that Turkish individuals' contacts with native Germans declines rapidly once the percentage of Turks in the apartment complex exceeds 20 percent. In turn, this lack of contact increases Turks' chances of having an unstable employment history. Andersson et al. (2005) and Galster et al. (2008, 2009) show that Swedish individuals with a weaker labor market position apparently benefited more from middle-income than high-income neighbors, consistent with the view that the resource-enhanced job information networks provided by better-off neighbors was only influential if the class divide ("social distance") was not too extreme. Pinkster's (2008) study of networks in deprived neighborhoods in The Hague (NL) discovered that localized social ties helped low-income residents in the short-term find jobs but over the longer-term locked them in to these dead-end options and adversely affected their work ethic and expectations. Pinkster suggested that one possible explanation for these effects was that processes of social control limited residents' ability and willingness to interact with residents in the other groups and to look for opportunities outside of the neighborhood (Pinkster, 2008).

Social Cohesion and Control

The importance of the social control has been emphasized in a number of studies by Sampson and his colleagues (Sampson, 1992; Sampson and Groves, 1989; Sampson, Raudenbush and Earls, 1997; Morenoff, Sampson and Raudenbush 2001). To understand the effects of disadvantaged neighborhoods, they argue, one must understand their degree of social organization, which entails the context of community norms, values and structures enveloping residents' behaviors (what he has labeled "collective

[7] See the reviews in Kleinhans (2004) and Kleit (2008).

efficacy"). Sampson's work has empirically demonstrated that disorder and lack of social cohesion are associated with greater incidence of mental distress and criminality in neighborhoods (see the review in Sampson, Morenoff and Gannon-Rowley, 2002).

In this regard there is a good deal of trans-Atlantic commonality of findings related to crime outcomes. Hirshfield and Bowers (1997) identify a strong relationship between neighborhood social control and assault and robbery in their study using Merseyside (England) data. Veysey and Messner (1999) examine British Crime Survey data and find that unsupervised peer groups and weak organizational participation in the neighborhood was associated with greater victimization. Markowitz et al.'s (2001) analysis of British Crime Survey data showed that neighborhood cohesion mediated some, though not all, of the neighborhood socio-economic status effects on burglary.

There also has been suggestive work in both North American and Western European contexts demonstrating that social control and disorder potentially have affects on a wider array of outcomes. Aneshensel and Sucoff (1996) find that neighborhood social cohesion explains a large portion of the relationship between neighborhood socioeconomic status and adolescent depression. Kohen et al. (2002) find in Canada that neighborhood disorder is negatively related and neighborhood cohesion is positively related to children's verbal ability, and that neighborhood cohesion (though not disorder) is negatively associated with child behavioral problems. Steptoe and Feldman (2001) surveyed London adults and found that the effect of neighborhood socio-economic status on individual psychological distress was mediated by social cohesion and informal control. Blasius and Friedrichs (2004) also found in Koln (Germany) that collective efficacy was a valid construct that was correlated with several individual outcomes.

Finally, Galster and Santiago (2006) provide a unique perspective on the issue by asking low-income parents what they thought the main mechanisms of neighborhood effects upon their children were. The dominant plurality (24%) cited lack of norms and collective efficacy. By contrast, peers (12%), exposure to violence (11%), and institutional resources (3%) were cited much less often. Of interest, one-third reported that their neighborhoods had no effect either because their children were too young or that they were able to buffer the impacts.

Competition and Relative Deprivation

Though the U.S statistical evidence (already cited) overwhelmingly suggests that affluent residents convey positive externalities to their less-well of neighbors, there is at least one dissenting study: Ginther, Haveman and Wolfe's (2000) analysis of U.S. high school graduation probabilities and total years of education attained. For the white subsample (only) they found that a larger percentage of high-income neighbors was negatively related to graduation probabilities, while a larger percentage of low-income families was positively related to educational attainment. The qualitative evidence from the U.S. is less clear, with some case studies indicating that upper-income gentrifiers can sometimes mobilize and compete in ways that can work to the detriment of the original, lower-income residents; cf: Pattillo (2007), Hyra (2008), Boyd (2008) and Freeman (2005). The importance of these effects is, of course, impossible to quantify from these qualitative works.

The statistical evidence on the effect of affluent neighbors on less-fortunate ones is decidedly more mixed in Europe, with a non-trivial literature indicating that effects are negative. A hint of a social conflict-type of neighborhood mechanism is embodied in the finding by Sampson and Groves (1989) in Britain that neighborhood ethnic heterogeneity was associated with more unsupervised peer groups and lack of participation in local organizations. McCulloch's (2001) analysis of British data finds that disadvantaged women are more likely to experience a variety of negative outcomes if they live in affluent areas, indicative of relative deprivation or competition mechanisms. This is consistent with two other British studies that found that health issues for poor individuals were more problematic when they lived in more affluent areas (Duncan and Jones, 1995; Shouls et al., 1996). Finally, Oberwittler (2007) observed that German adolescents living in households receiving welfare recipients scored substantially higher on an index of relative deprivation when they resided in neighborhoods with the lowest overall welfare receipt rates.

Finally, I note the Atkinson and Kintrea (2004) qualitative study of key informant opinions in Glasgow, in which some espoused the relative deprivation consequence of extreme social mixing within neighborhoods.

It is less clear whether this potential relative deprivation effect in Europe extends to outcomes related to education. Kauppinen (2004) reports a strongly positive influence of affluent neighbors on educational achievement of individuals in Helsinki. Gibbons (2002) used the British National Child Development Study to examine the relationship between educational levels of neighborhood experienced during adolescence and educational attainments by age 33. He found that, controlling for parental and school characteristics, the neighborhood percentage of highly educated adults was strongly positively correlated with the probability that the children would be highly educated as young adults, and negatively correlated with the probability that they would fail to obtain any credentials, and that these relationships persisted similarly for various groups of children stratified by early childhood test scores. However, the marginal gains from more educated neighbors clearly attenuated within the highest quartile of neighborhoods. Indeed, for children living in social housing the probability of not gaining any credentials was slightly *greater* in the most-educated quartile of neighborhoods than in more modestly educated ones.

Parental Mediation

Few would argue that parents' mental and physical health, coping skills, sensed efficacy, irritability, parenting styles, and socio-psycho-economic resources loom large in how children develop. Thus, if any of the above elements are seriously affected by the neighborhood (by whatever causal path), child outcomes are likely to be affected, though in this case the neighborhood effect for children is indirect (Klebanov et al., 1997; Spencer, 2001). For example, as I will explore in the following section, certain neighborhoods generate much higher exposures to stress-generating events for parents that, in turn, has been shown to adversely affect children (Conger et al, 1994; Elder et al., 1995; Linares et al., 2001). Such neighborhoods may also vary, however, in their degrees of social support networks that might serve to defuse the negative effects of stress (Cook et al., 1997). As another example, parenting styles related to responsiveness/warmth and harshness/control have been observed to vary across aspects of neighborhood disadvantage (Furstenberg, 1993; Klebanov et al., 1994; Earls, McGuire and Shay, 1994; Simons et al., 1996; Briggs, 1997a). Such variations, in turn, have been related to, among other outcomes, adolescent boys' psychological distress (Simons et al., 1996). Finally, riskier neighborhoods have been linked to lower-quality home learning environments on many dimensions, resulting in lower reading abilities, verbal skills, and internalizing behavior scores (Greenberg et al., 1999).

V. Evidence on Environmental Mechanisms of Neighborhood Effects

Exposure to violence has been studied more extensively. In the U.S. it is clear that exposure to violence has reached epidemic proportions for low-income, minority youths (Martinez and Richter, 1993; Richter and Martinez, 1993; Aneshensel and Sucoff, 1996). The Yonkers (NY) Family and Community Survey and Moving To Opportunity demonstration have provided strong support for the perceived importance of this factor, since safety concerns were cited as a prime reason for participating in these programs by most public housing families (Briggs, 1997; Goering and Feins, 2003). One of the most significant results of the Moving To Opportunity demonstration was the substantial reductions in stress and other psychological benefits accrued by parents and children who moved from dangerous, high-poverty neighborhoods to safer ones (Katz, Kling and Liebman,2000; Goering and Feins, 2003). Other work also has demonstrated that youths and adults who have been exposed to violence as witnesses or victims suffer increased stress and declines in mental health (Aneshensel and Sucoff, 1996; Martinez and Richter, 1993; Ceballo et al., 2001; Hagan et al., 2001). Exacerbated stress, in turn, can produce a variety of unhealthy stress-reduction behaviors such as smoking (Fick and Thomas, 1995; Ganz, 2000) and over the long term can reduce the efficacy of the body's immune system (Geronimus, 1992). Exposure to violence

has also been linked to higher risks of pregnancy (Linares et al., 2001), poorer pregnancy outcomes and low birth weight (Zapata et al, 1992; Duncan and Laren, 1990), poorer educational outcomes (Hagan et al., 2001; Lord and Mahoney, 2007), more aggressive behaviors (Linares et al., 2001; Guerra, Huesmann and Spindler, 2003), and reduced social cognition (Guerra, Huesmann and Spindler, 2003), though some of these effects appear substantially mediated by the stress levels of parents (Linares et al, 2001).

Several aspects of the physical environment of the neighborhood have been probed for their potential health impacts. A major proponent of the physical decay dimension is Ross et al. (2001), whose work suggests that prolonged exposure to a badly deteriorated environment weakens residents' sense of efficacy. A variant on this approach is the "broken windows" hypothesis in criminology, which suggests that physical symbols are strongly correlated with deviant and criminal behaviors in the neighborhood (Kelling and Wilson, 1982). It is less clear whether it is the decay that creates an effect in its own right, however, or whether it merely serves as proxy for lack of collective efficacy. Clearer links to health have been identified for another physical aspect of the environment: noise (Stansfeld, Haynes and Brown, 2000; Schell and Denham, 2003; Van Os, 2004). Others have argued that the physical design of neighborhoods (presence of sidewalks, local land use mixes, cul-de-sacs, etc.) can affect the amount of exercise that residents get, which in turn affects obesity rates and other health outcomes (Lopez, Russell and Hynes, 2006), though the body of empirical evidence is small thus far. Results from the Moving To Opportunity demonstration found, however, that those moving from disadvantaged to low-poverty neighborhoods had reduced rates of obesity, which supports the view that some (unspecified) physical feature(s) of the neighborhood environment were at play (Goering and Feins, 2003).

As for toxic exposure to environmental pollutants, there is a large body of U.S.-based literature that documents a common pattern whereby lower-income and minority-occupied neighborhoods are exposed to higher concentrations of air-, water-, and soil-borne pollutants (Anderton et al., 1994; Bullard, 1994; Hamilton, 1995; Vrijheid, 2000; Perlin, Wong and Sexton, 2001; Kawachi and Berkman, 2003; Ash and Fetter (2004), Litt, Tran and Burke, 2009; Saha, 2009). In turn, air pollutants have been linked in many international epidemiological studies to lower life expectancy, higher infant and adult mortality risks, more hospital visits, poorer birth outcomes, and asthma (McConnochie et al., 1998; Brunekreef and Holgate, 2002; Ritz, et al., 2002; Clancy et al., 2002; McConnell et al., 2002; Kawachi and Berkman, 2003; Chay and Greenstone, 2003a, b; Neidell, 2004; Currie and Neidell, 2005; Brook, 2008; Hassing et al., 2009). Proximity to hazardous waste ("brownfield") sites has been linked to higher rates of mortality from cancer and other diseases (Litt, Tran and Burke, 2009). Potential physiological mechanisms by which pollution can create health risks have been elucidated by Holguin (2008) and Mills et al., (2009). All of these studies can be challenged on one or more methodological grounds, however (Vrijheid, 2000). These include failure to control for many confounding personal factors, lack of precision in the local-area estimates of pollution concentrations, high sampling variability due to the small number of toxic waste sites, and potential selection bias where unobserved personal characteristics affect both their exposure to pollutants and their health outcomes. For fuller critical review, discussion and evaluation of this vast research literature on pollution and health, see Bernstein et al. (2004), Stillerman et al. (2008), Ren and Tong (2008), Chen, Goldberg, and Villeneuve (2008), and Clougherty et al. (2009).

The one area where the health effects of exposure to environmental toxins seem incontrovertible is in the realm of lead poisoning. It has been shown that even small amounts of lead poisoning (typically produced by residue from deteriorated lead-based paint formerly used in homes) can produce harms to infants (Reyes, 2005). Lead poisoning also harms the mental development, IQ, and behaviors of older children (Needleman and Gastsonis, 1991; Pocock et al., 1994).

VI. Evidence on Geographical Mechanisms of Neighborhood Effects

Numerous rigorous empirical studies have investigated the issue of racial differentials in accessibility to work (the "spatial mismatch" hypothesis) in the U.S. context (for reviews see: Kain, 1992; Ihlanfeldt, 1999). This literature generally suggests that mismatch can be an important aspect of spatial

opportunity differentials in at least some metropolitan areas. Ethnographies (Sullivan, 1989; Newman, 1999) have shown that low-income youths can benefit greatly from part-time employment (by gaining resources, adult supervision, and routinized schedules), yet there neighborhoods typically have few such jobs (Newman, 1999; Wilson, 1997). Evaluations of the Gautreaux program in Chicago showed that low-income black youths moving to the suburbs were more likely to hold jobs and earn more than their counterparts who stayed within the city (Rosenbaum, 1995). Nevertheless, there is considerable statistical evidence that this spatial mismatch is of less importance to economic outcomes than the social-interactive dimensions of neighborhoods (Cutler and Glaeser, 1997; O'Regan and Quigley, 1996; Weinberg, Reagan and Yankow, 2004; Dawkins, Shen and Sanchez, 2005). Spatial mismatch typically is not seen as major issue in Europe, perhaps because of lower levels of ethnic and income segregation, less concentration of worksites, and more comprehensive public transportation systems (Gobillon, Selod and Zenou, 2007). Nevertheless, the few studies have come to divergent conclusions (cf. Dujardin and Gofette-Nagot, 2007; and Gobillon, Magnac and Selod, forthcoming).

By contrast, what little evidence exits on the mechanism of neighborhood stigmatization tends to be idiosyncratic, qualitative, and (with one exception) hard to evaluate or quantify. Nevertheless, considerable case study evidence suggests that place-based stigmatization is an oft-occurring process in Western Europe. The work of Wacquant (1993), Power (1997), Taylor (1998), Atkinson and Kintrea (1998), Forrest and Kearns (1999), Dean and Hastings (2000), Hastings and Dean (2003), Martin and Watkinson (2003) and Hastings (2004) is noteworthy. This body of work does not, of course, help us to quantify the degree to which neighborhood stigmatization diminishes the life-chances of residents or restricts the various public or private resources or institutions flowing into these areas. To my knowledge, only one study has attempted statistically to relate measured perceptions of key actors about neighborhoods to socioeconomic or demographic indicators measured in those places. Permentier, Bolt and van Ham (2007) asked households and real estate agents to evaluate on multiple grounds a variety of neighborhoods in their city of Utrecht in which they did not live. They found that neighborhood reputations were significantly correlated with their socio-economic characteristics, while their physical and functional features were of less importance. Unfortunately, these authors did not test for threshold points where the perceptions dramatically changed in response to neighborhood social mix. Perhaps even more crucially, it is unclear the degree to which the reputation of a long-stigmatized neighborhood can change as a consequence of more advantaged households being added to the social mix (Cole et al., 1997; Pawson et al., 2000; Beekman et al., 2001; Hellerman and Wassenberg, 2004).

VII. Evidence on Institutional Mechanisms of Neighborhood Effects

Many U.S.-based studies have documented the vast differences in both public and private institutional resources serving different neighborhoods (e.g., Kozol, 1991; Wolman et al., 1991; Card and Krueger, 1992, Condron and Roscigno, 2003; Lankford, Loeb and Wyckoff, 2002). Though there has been considerable debate on this subject, the current consensus seems to be that measurable educational resources are strongly correlated with several aspects of student performance in both the U.S. (Hedges, Laine and Greenwald, 1994; Jargowsky and Komi, 2010) and the U.K. (Bramley, Evans, and Noble, 2005). Shortages of high-quality child-care facilities are acute in many low-income American neighborhoods, despite their proven effectiveness in building a variety of intellectual and behavioral skills in young children (Fuller et al., 1997). Lower-income communities are also at a disadvantage in terms of access to medical facilities and practitioners (McKnight, 1995; Minkler, 1997). Still other studies have shown how the internal workings of institutions serving poor communities shape expectations and life chances of their clientele (Rasmussen, 1994, Bauder, 2001). Although the evidence linking these geographic differences to various outcomes for children has been subject to challenge (e.g., Burtless, 1996; Morenoff et al., 2001, Popkin et al., 2002), there is increasing evidentiary prominence of some institutions, such as the public schools, serving as important mediators of neighborhood context (Ennett et al., 1997; Teitler and Weiss, 1996). Moreover, it is clear that many parents believe that a paucity of local resources can adversely affect their

children (Galster and Santiago, 2006; Phibbs, 2009) and often try to compensate for this lack by seeking them from outside of their neighborhoods (Jarrett, 1997).

There is also substantial evidence from the U.S. regarding the large spatial variations in many sorts of market actors whose proximity may affect health-related behaviors of neighborhood residents. Several studies, for example, have documented distinctive race and class patterns in supermarket food store locations (Morland et al., 2002; Block, Scribner, and DeSalvo, 2004; Horowitz, 2004; Zenk et al., 2005) and others have done the same for dietary habits (Diez-Roux et al., 1999). As another illustration, in his study of Latino and Black youth moving from concentrated poverty neighborhoods in Yonkers, Briggs (1997b) finds that they had much less access to liquor stores in their non-poverty destinations and that their reported alcohol usage was lowered. Quantifying a convincing causal link between such contextual variations and individual's diets and consumption patterns and, ultimately, health, has proven more challenging, however; see Gallagher (2006, 2007) and Morland, Wing, and Diez-Roux (2002).

In the Western European context the effect of institutional and public service differentials across space are probably less severe, given that these welfare states have a more centralized funding mechanism and often try to provide compensatory services to disadvantaged neighborhoods (Powell and Boyne, 2001). However, Atkinson and Kintrea (2001), Buck (2001), and Hastings (2007, 2009b) offer several more subtle mechanisms about how such effects may be imparted nevertheless: (1) low expectations by residents of disadvantaged places create self-fulfilling prophecies; (2) inter-neighborhood competition for scarce public services, skilled employees, and facilities; (3) "rationing" of public services in ways that are insufficient to equally meet needs in different locales; and (4) direct place-based discrimination by institutional actors controlling allocations of resources. Hastings (2009a) provides a comprehensive conceptual framework of a variety of endogenous relationships of relevance here.

The Western European evidence on these points is suggestive but hardly definitive. Lupton (2004) finds that schools in disadvantaged UK districts have a more difficult time attracting highly qualified, experienced teachers, though Matthews, Airy and Tacon (1998) found no relationship between neighborhood disadvantage and overall teacher quality. Some studies have found that teachers in disadvantaged UK neighborhoods expect less from their students (Atkinson and Kintrea, 2001; Gilborn and Youdell, 2000). Hastings' (2009a) case studies of 12 UK neighborhoods suggest qualitatively that environmental service provision fails to compensate for higher levels of need in certain neighborhoods, thereby setting in motion a mutually-reinforcing downward spiral of reactions by residents and service providers alike.

VIII. A Provisional Synthesis Regarding Evidence on Neighborhood Effect Mechanisms

What does the foregoing evidence suggest about the importance of various neighborhood effect mechanisms in the U.S and Western Europe, when all is said and done? With the mandatory caveat that firm conclusions are elusive here given the state of scholarship and the complexity of the topic, my evaluation provisionally suggests the following.[8]

First, in both the U.S. and Western Europe high concentrations of poverty or socially disadvantaged households (which typically are heavily Hispanic- and especially black-occupied neighborhoods in the U.S. and immigrant-occupied neighborhoods in Western Europe) have been consistently empirically linked to weaker cohesion and structures of informal social controls in their neighborhoods. This situation produces, in turn, negative consequences like increased youth delinquency, criminality, and mental distress, although this mechanism has not yet been linked to other important outcomes like labor market performance. However, in both U.S. and Western European research the aforementioned concentrations of poverty or disadvantage retain their relationship with a variety of child and adult outcomes even after intra-

[8] I recognize that practitioners who deal directly with deprived neighborhoods hold divergent and conflicting opinions about which neighborhood effect mechanisms are most important (Atkinson and Kintrea, 2004). The same can be said of low-income minority parents (Galster and Santiago, 2006).

neighborhood levels of social control and cohesion are taken into account. Clearly, more than this mechanism is at work.

Second, the fact that neighborhood poverty rates in the U.S. appear consistently related to a range of outcomes in a non-linear, threshold-like fashion further suggests that the social contagion (peers) and/or the collective socialization (roles models, norms) forms of causal linkages are transpiring. There may also be some selectivity involved, as some socially weaker groups in the U.S. seem more vulnerable to these contexts than stronger ones. I do not believe that the evidence can clearly distinguish the respective contributions made by the latter two alternatives.[9] Unfortunately, with highly inconsistent evidence regarding non-linearities of neighborhood impacts in the Western European evidence, there is no certainty about the relative importance of such processes there.

Third, in the U.S. the presence of affluent neighbors appears to provide positive externalities to their less-well off neighbors, seemingly working social controls and collective socialization. Social networks and peer influences between the affluent and the poor, by contrast, do not appear as important in this vein. The outcomes for individuals that are most strongly related to affluent neighbors seem to be different that those most strongly related to disadvantaged neighbors. There is consistent U.S. empirical evidence to suggest thresholds here as well, though the precise threshold is unclear and likely varies by outcome being considered. The Western European evidence is much less definitive, and indeed inconsistent, in all these aforementioned regards. Finally, most U.S. and Western European evidence indicates that the influence on vulnerable individuals of advantaged neighbors is smaller in absolute value than the influence of disadvantaged neighbors, whatever the mechanism(s) at play.

Fourth, in U.S. neighborhood contexts there is little evidence suggesting that the competition or relative deprivation mechanisms are operating in a meaningful way. The same cannot be said of Western European evidence, however, where the preponderance suggests that mixing of low- and high-income groups results in little benefit or even harms for those who are most disadvantaged.

Fifth, a large number of U.S. studies have consistently found that there is relatively little social networking between lower-income and higher-income households or children in the same neighborhood, and this lack is compounded if there are also racial differences involved. Thus, there is little to support the version of neighborhood effects that advantaged neighbors create valuable "weak ties" for disadvantaged ones. I could identify no Western European evidence on this point.

Sixth, local environmental differences appear substantial and likely produce important differentials in mental and physical and mental health on both sides of the Atlantic. There are huge differences in exposure to violence across U.S. neighborhoods and this undoubtedly produces important and durable psychological consequences for children and adults that, in turn, likely have numerous bit hard-to-quantify other effects. Exposure to environmental pollutants and (especially in the U.S.) to violence undoubtedly produces significant consequences for the health of children, youths and adults, though evidence on the links for many toxins besides lead is often sketchy. The longer-term consequences of these health impacts on subsequent educational outcomes, behaviors, and economic outcomes have not been adequately explored, however.

Seventh, geographic disparities related to differential accessibility to work and quality public services (especially education) are likely more severe in the U.S. than in Western Europe. At least in the U.S context, these mechanisms likely play a non-trivial role in explaining labor force and educational outcomes.

Eighth, institutional processes involving place-based stigmatization, local institutional quality and behavior, and local market actors likely exist but quantification of their spatial variations have not been accomplished in a way that permits generalizations in either the U.S. or Western Europe. Moreover, convincing statistical models of the relationship between measured variations in these potential causal mechanisms and a wide range of behavioral or health outcomes have not been completed.

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[9] After their review, Leventhal and Brooks-Gunn (2000) similarly concluded that the strongest support seems to be for the combined role of norms, collective efficacy (informal social controls), and peers as major neighborhood influences on adolescent behaviors.

Finally, there is probably a substantial, indirect effect on children and youth than transpires through the combined effects of the social-interactive, environmental, geographic, and institutional dimensions of the neighborhood context on their parents. This mediation of neighborhood effects through parents is likely to affect a broad range of outcomes for their offspring, though there have been no attempts to measure comprehensively such effects.

IX. Implications for Scholarship and Policy

Advancing Scholarship on Neighborhood Effect Mechanisms

I return once again to a theme that introduced this paper and that echoed throughout: given the complexity of the topic there is simply far too little scholarship to make many claims about which causal links dominate for which outcomes for which people in which national contexts. I recognize that calling for "additional research" is a shop-worn conclusion for an academic paper; nevertheless, it remains unusually valid and significant in this case.

How might such additional research proceed? Given that both qualitative and quantitative approaches have different inherent strengths and limitations here, I would argue for mixed-methods strategies, ideally embedded within the same study design so the same populations, local neighborhoods and overarching contexts can be held constant. Given the likelihood that many causal mechanisms may act cumulatively and with some durability of impact, there is a need for studies that explore residential histories and patterns of exposure to a wide variety of community conditions, not just current exposure to a narrow palette of neighborhood measures (Rauh, Andrews, and Garfinkel, 2001). Because there is such a wide range of potential mechanisms, quantitative studies should not satisfy themselves with easily accessed census indicators for neighborhoods, but should strive to obtain: (1) administrative data about neighborhood conditions (e.g., crime, low birth weight rates, child maltreatment rates); (2) data about local institutions, facilities, and schools (both their existence and quality); (3) pollution measures at a fine-grained spatial scale. In addition, I urge moving beyond distal proxies for causal processes and more efforts to collect social process data from community surveys and systematic social observations (Leventhal and Brooks-Gunn, 2000; Sampson, Morenoff and Gannon-Rowley, 2002). Finally, there is a need for datasets that measure the amount of time spent and routines of activity in the neighborhood and the degree to which social interaction patterns are concentrated in the neighborhood (South, 2001; Sampson, 2001). Of course, these studies must also collect detailed information about family circumstances to accurate develop controls or, possibly, measures of parental mediation of neighborhood impacts on children.

Though these data requirements represent an intimidating menu, there is one emerging study that offers unprecedented breadth in this realm. My Wayne State University School of Social Work colleague, Professor Anna Santiago, and I are now completing final data cleaning procedures on information gathered from a natural experiment in Denver, CO. The research aims to quantify how and why a variety of outcomes (health, education, employment, behavioral and demographic) for low-income, black and Latino children and youth residing in Denver public housing for a substantial period are statistically related to conditions in the neighborhoods in which they were raised. Data analyzed come from surveys we conducted with 765 current and former residents of the Denver (CO) Housing Authority (DHA) whose 1,995 children met study eligibility criteria. For decades, DHA has operated public housing located units throughout the City and County of Denver. Because the initial allocation of households on the DHA waiting list to units mimics a random assignment to a wide range of neighborhood environments, this program represents a natural experiment for overcoming parental location selection bias in estimating neighborhood effects. We have gathered life histories for all participating children and their families, relating a wide range of outcomes to individual developmental stages. To this residential history we have merged time-coincident data from: (1) census tract indicators of socioeconomic, demographic and housing characteristics; (2) administrative data on crime, low birth weight rates, and school quality; (3) survey-based, parental-identified measures of local institutions and facilities; (4) survey-based, parental-assessed

social disorder, collective efficacy, and social networks. We hope to soon add information on air quality and location of hazardous waste sites. In addition, we will return to the field in the future with follow-up interviews with children in our sample who have become young adults, to query them about their perceptions of neighborhood effect mechanisms, parental buffering attempts at same, etc.

Implications for Public Policy

Obtaining a clearer understanding of the pathways through which neighborhoods exert their effects is crucial for public policy formulations in at least three major domains: health, employment, and housing. Put bluntly, it is risky for policy-makers to naively observe a correlation between neighborhood indicators and individual outcomes of interest and design programmatic strategies as if neighborhood were a "black box." At best, inefficiencies and, at worse, negative unforeseen consequences, are all-too-likely to follow in these circumstances.

In the health domain, it is obvious from an epidemiological perspective that understanding causal pathways is of "critical importance in determining how [public health] interventions should be designed" (Sellström and Bremberg, 2006:553). In the employment domain, distinctive programmatic implications follow from alternative conclusions about why some able-bodied are not employed. Perhaps they: (1) lack information networks about job opportunities; (2) try to apply for work but are turned away by employers who stigmatize their neighborhoods; (3) try to find work but cannot access jobs due to local transport inadequacies; (4) do not try to work because of negative neighborhood peer influences; or (5) are too sick to work because of sever local pollution levels. In the housing domain, the current Western European fascination with "social mix" strategies (Galster, 2007a, 2007b) could be helpfully guided by definitive explorations about what processes are thought to follow from social mix: social-interactive, geographic, and/or institutional (Joseph, Chaskin, and Webber, 2006; Joseph, 2006)? If it were to prove the case that, for instance, social networks among the various neighboring classes were the dominant mechanism of positive influence, urban design strategies designed to maximize interpersonal contacts and "community-building" activities within the mixed estates would be recommended. On the other hand, if mixing served only to remove the former external stigmatization of residents, such micro-level social processes could well be ignored by policy-makers. Finally, there are some implications that overarch particular policy domains. For example, if it were to prove the case that the vast portion of neighborhood impacts on children occurred indirectly through mediation of parents, then it would follow that interventions designed to minimize negative neighborhood effects should target parents, even if the ultimate goal is child development.

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