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The Long Arm of Poverty: Extended and Relational Geographies of Child Victimization and Neighborhood Violence Exposures

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Abstract

Current models of neighborhood effects on victimization predominantly assume that residential neighborhoods function independent of their surroundings. Yet, a surprising proportion of violence occurs outside of victims' residential neighborhoods. The current study extends on recent advances in spatial dynamics and neighborhood effects to explore the importance of different geographic scales and relational exposures to poverty for child violent victimization. We examine longitudinal data on over 4,400 low-income children from high poverty neighborhoods in five cities, who participated in the Moving to Opportunity randomized intervention. The results suggest that surrounding poverty matters for child victimization beyond the effect of residential poverty. Moreover, moving farther from extreme poverty also seems to buffer against victimization and to amplify the benefits of moving to improved extended (residential and surrounding) neighborhoods. All children in the study, but especially boys older than 10 years of age, seemed to be affected by the long arm of poverty.

Keywords

neighborhood poverty; extended geography; violent victimization; children and youth; Moving to Opportunity

Neighborhood effects studies have shown that neighborhood poverty and related problems increase individuals' risk of being victimized and of witnessing others' victimization (Burchfield & Silver, 2013; Sampson, Raudenbush, & Earls, 1997). Similar effects have been shown in studies focused specifically on children and youth (Bingenheimer, Brennan, & Earls, 2005; Sharkey & Sampson, 2010; Wiebe et al., 2016). Advancing our understanding of how neighborhood poverty affects child victimization is critical because poor children are more likely than poor adults to live in high-poverty areas. Moreover, the number of people in high-poverty (>40% poor) neighborhoods almost doubled since 2000, to nearly 14 million (Jargowsky, 2015).

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Across cities, studies have found that poverty rates and other structural disadvantages *within* a focal (i.e., residential) neighborhood but also in *nearby* neighborhoods are strongly associated with higher violence rates (Anselin et al., 2000; Graif & Sampson, 2009; Hipp & Boessen, 2013; Peterson & Krivo, 2010; Sampson, Morenoff, & Earls, 1999)[1]. Yet, most neighborhood effects research on victimization continues to assume that the relevant environment is the residential neighborhood (Browning & Soller 2014; Graif, Gladfelter, & Matthews, 2014). This is surprising because evidence suggests that a great deal of victimization occurs in neighborhoods outside a victim's residential neighborhood. Dugan's (1999) analysis of the National Crime Victimization Survey showed that the average number of violent victimizations more than a mile and within a mile from a victim's home was about the same. Similarly, other studies found that many crimes occur outside the residential neighborhood of the victims (Groff & McEwen, 2005; Tita & Griffiths, 2005), though not far away (Bernasco, 2010; Drawve, Walker, & Felson, 2015). There are important reasons to expect that the victimization of residents of a focal neighborhood will be affected by nearby poverty. Potential victims may routinely cross the invisible boundaries of nearby neighborhoods on their way to school, work, or to visit friends and kin. As they do so, their odds of being victimized may increase if nearby poverty weakens the social controls that would otherwise deter crime.

A few studies have shown that nearby poverty influences *individual* level non-victimization outcomes, such as residential mobility (Crowder & South, 2008). A recent study of delinquency (Graif, 2015) found that surrounding areas affected adolescent offending and they did so differently than victimization. These findings underscore the need for a closer look at victimization and further thinking on how neighborhood and spatial effects may overlap or differ from other outcomes, including offending. To date, conceptual thinking on the differential relevance of various geographic poverty scales for victimization has not been developed nor systematically tested. The current study seeks to addresses this gap.

While victimization and offending may be related, focusing on child victimization is important in its own right because many more children are exposed to violence than involved in it. Moreover, childhood exposure to violence has consequences independent of offending: life loss and medical bills; lower school performance; mental and behavioral problems, substance abuse, PTSD, and suicide; (Aisenberg & Herenkohl, 2008; Bingenheimer et al., 2005; Baskin & Sommers, 2015; Corso, et al., 2007; Killpatrick et al., 2003; Turner et al., 2012; Kirk & Hardy, 2014; Sharkey, Tirado-Strayer, & Papachristos, 2012).

Understanding the neighborhood context of children's victimization is important because U.S. children are exposed to high levels of violence and crime, and even more so than adults (Baum, 2005; Finkelhor Turner, Ormrod, & Hamby, 2009). A 2008 national study of children found that over 60% had been victimized directly or indirectly within the past year, 46% had been physically assaulted at least once in the past year and over 56% had been assaulted in their lifetime (Finkelhor et al., 2009). Moreover, between 1999 and 2013,

[1]In contrasting a focal neighborhood with surrounding areas, the literature uses terminology like residential vs. non-residential (Chaix et al., 2005), local vs. extra-local (Crowder & South, 2008), monadic vs. dyadic (Matthews & Yang, 2013); focal vs. egohoods (Hipp & Boessen, 2013); immediate vs. extended (Graif, 2015). Here we use "extended neighborhood" to refer to residential and nearby neighborhoods.

homicide was the second leading cause of death among children aged 5–19 of all races and the leading cause of death among African American children (Centers for Disease Control and Prevention [CDC], 2013). According to a CDC report, in 2012, nearly 600,000 youth aged 10–24 years were treated in emergency departments for nonfatal assault-related injuries (David-Ferdon & Simon, 2014).

The 'Uncertain Geographic Context Problem' and the Current Study

The current study builds on recent advances in criminology and criminal justice combined with calls within the sociological and geographic literature to revisit current conceptualizations of space and place (e.g., Boessen & Hipp, 2015; Browning & Soller, 2014; Graif et al., 2014; Graif, 2015; Hipp & Boessen, 2013; Krivo et al., 2013; Matthews, 2011; Mears & Bhati, 2006; Sampson, 2008). These authors identify core problems that remain to be addressed concerning the spatial and temporal uncertainty in understanding neighborhood effects, or more simply, the 'true causally relevant' geographic context (Diez Roux & Mair 2010). Kwan's (2012) "*uncertain geographic context problem*" posits that using one representation of place and paying little attention to temporal duration and residential history may result in an over-or an under-representation of exposures affecting individuals (see Basta, Richmond, & Weibe, 2010; Chaix, et al., 2005; Cummins, et al., 2007; Matthews, 2008).

We address spatial and temporal uncertainty issues in conceptualizing neighborhood exposures by investigating whether nearby poverty matters for socioeconomically vulnerable children's direct or indirect experience of violent victimization and whether such influences add to, or even modify, the effect of residential neighborhood poverty. We analyze restricted residential history information and survey responses from the Moving to Opportunity (MTO) randomized intervention (Orr et al., 2003) to understand the neighborhood context of violence exposure and victimization experience among participating children from five major U.S. cities. We apply a set of geographically calibrated *lenses* to address three related research questions:

- We apply an *extended view* to ask: Do areas surrounding residential neighborhoods matter for child victimization beyond residential neighborhood effects?
- We apply a *relational view* to assess: Does increased distance to extreme poverty protect children against direct and indirect victimization?
- We *combine* the extended and relational views to understand: To what extent the surrounding neighborhoods and distance to the nearest extreme poverty area interact with the residential neighborhoods in shaping child victimization?

To address these questions, we extend the methodology used in a recent delinquency study of MTO adolescents (Graif, 2015) in several key directions. First, we apply the spatial exposure lens on a different outcome (i.e., victimization exposure rather than delinquent behavior). This is an important distinction because more people are victimized than offend. While offending can increase the odds of later victimization, the opposite direction is less clear. Importantly, neighborhood and spatial effects may affect victimization risk differently

from offending, as detailed below. Second, by extending the age range of children covered we can differentiate effects by age; our analytical sample includes 4,446 children (ages 8–19), more than double the delinquency study's sample of adolescents (ages 15–19). Third, we link the victimization literature with a rapidly growing interdisciplinary literature in geography and health that examines the spatial context of exposure to risk. In doing so, we highlight the unique value of a spatial perspective in advancing research and theoretical thinking on victimization.

Finally, on a conceptual level, in contrast to the delinquency study's focus on mediators related to spatial differences in qualitative factors like delinquent peers, disorder, or strain, the conceptual framework in the current study focuses on a more structural category of spatial mediators, differences in the *geography of exposures* by *scale* (smaller vs. larger units) and *type* (the average poverty of multiple surrounding areas vs. distance to the nearest extreme poverty area). This is important because we expect that spatial effects on victimization will differ with age and gender as a function, for instance, of how far from home children are likely to travel on a routine basis (e.g., the distance traveled from home increases as a child ages through the school system from elementary, through middle, and into high-school). On a measurement level, this approach seeks to advance existing thinking on victimization risk by developing measures of relational spatial exposure (i.e. distance from home). This matters because evidence shows that a great deal of an individual's time is spent outside their home area and large proportions of victimization incidents are reported to have occurred outside of victims' residential area. Yet, the scale and type of geographic exposures have not been explored in prior studies of victimization. The structural and relational views of neighborhood exposure are important distinctions from the delinquency study and also more broadly, from the conventional spatial spillover (adjacency) approaches used in the ecological and neighborhood effects studies that pay attention to space. To our knowledge, this is the first study to explore the spatial context of neighborhood effects on child victimization.

Extended Neighborhood Effects on Victimization

Residential neighborhood poverty, disadvantage and associated indicators of social disorganization have been shown to be strongly associated with individual victimization (Sampson et al., 1997) and witnessing of violence (e.g., Bingenheimer et al., 2005). Beyond the residential poverty, surrounding poverty may also matter because individuals cross residential boundaries routinely and spend a significant amount of time outside their home neighborhood. For instance, Basta et al.'s (2010) study of adolescents in Philadelphia showed that respondents' median greatest linear distance from home was about 1 mile, the proportion of time outside the home spent beyond the residential census tract averaged over 70%, and the number of census tracts intersected by subjects' one-day activity paths was 6 at the median and 8 on average. Wikström et al. (2010) in a UK study, similarly showed that adolescents' routine activities took them outside their home environment more than 50% of the time, that criminogenic exposures were associated with where respondents spend time during the day, and that 90% of crimes were committed outside respondents' home or neighborhood.

Across multiple US cities, nearby neighborhood poverty has been found to be significantly associated with increases in residential neighborhood violence rates above and beyond the effect of residential neighborhood poverty (Peterson & Krivo, 2010). Nearby poverty levels may contribute to residential neighborhood crime and victimization (Morenoff et al., 2001; Peterson & Krivo, 2010) in various ways. Nearby neighborhood poverty and associated nearby social disorganization may affect residential neighborhood victimization (Morenoff et al., 2001) by increasing residential poverty and social disorganization (Sampson et al., 1999). In turn, residential neighborhood poverty increases residents' exposure to crime and victimization in general (Sampson et al., 1997), and children's victimization in particular (Bingenheimer et al., 2005; Sharkey & Sampson, 2010). Consistent with this idea, Hipp, Tita and Boggess (2009) find that demographic change in nearby neighborhoods predicts increases in aggravated assault and robbery in the residential neighborhood in part through social disorganization mechanisms.

One can expect that the mechanisms through which nearby neighborhood poverty increases focal residents' offending will be to an extent similar to the mechanisms underlying effects on focal residents' victimization. For instance, increased nearby disorder may increase residential (focal) disorder, motivating focal offenders to commit crime and consequently increasing focal residents' odds of being victimized. Importantly, however, nearby neighborhood poverty may also increase focal residents' risk of victimization, independent of its effects on focal offending. One way in which this may happen is by decreasing the levels of formal and informal social control on nearby crime activity, which may increase focal residents' risk of victimization for several reasons. First, focal residents may travel to nearby areas to access bus stops, convenience stores, parks or on their way to jobs, schools, or friends' houses (Basta et al, 2010; Wikstrom et al. 2010). As they do so, nearby poverty's social dysfunctions increase the risk that the focal residents will be victimized or witness violence, independent of their effect on focal offenders. Offenders may be residents of the nearby area, frustrated by the lack of resources or feeling threatened by focal residents violating their turf but could also be people from other parts of the city who use the bus stops, parks, or institutions in the neighborhood.

Second, nearby crime activity may increase focal residents' risk of victimization as it spills over into the focal neighborhood, catching focal neighborhood's innocent bystanders in gun cross-fire. Due to ongoing conflicts related to gangs, violence has been shown to escalate into new retaliatory incidents in nearby areas (Tita & Cohen, 2004). Indeed, nearby violence has been linked to increases in neighborhood crime, net of focal disadvantage and prior crime (Graif & Sampson, 2009; Peterson & Krivo, 2010). Proximity to neighborhoods of high homicide rates has been found to be significantly associated with a higher homicide rate in a residential neighborhood. This was true for the location of incidents and of victims' residence, suggesting that "spatial proximity cannot be ignored in theories of violence" (Morenoff et al., 2001, p. 552).

Nearby neighborhood poverty may thus increase victimization risk above and beyond the residential neighborhood poverty effects for several reasons. First, nearby poverty decreases nearby social controls, cohesion, and collective efficacy, and increases peer delinquency and the strain-related motivation to offend. As nearby potential offenders cross boundaries, they

increase residents' victimization risk. Higher poverty and social disorganization nearby may increase residential neighborhood crime activity by increasing struggles for territorial control and status. Indeed, Drawve et al. (2015) found that in Little Rock, juvenile offenders travelled a median distance of about two miles to the location of an assault they committed. Additionally, as residents cross neighborhood boundaries during routine activities (e.g., to go to school, grocery shopping, or on dates) they may be assaulted if nearby poverty decreases guardianship and increases offenders' motivation (Cohen & Felson, 1979).

Crossing neighborhood boundaries routinely may increase the risk of children's victimization outside their home neighborhood. Recent work on the non-overlapping neighborhood locations of victims' residence and crime incidents (Tita & Griffiths, 2005) has advanced thinking on "mobility triangles" introduced by the early Chicago School (Burgess, 1925, p. 151–153). Outside their home areas, individuals may become victimized if perceived as intruders, as a threat, or as competitors for status, romantic partners, jobs, or customers in illegal transactions. Victimization may also occur outside residential neighborhoods when there are ongoing conflicts between adjacent or nearby neighborhoods. Such conflicts may be related to a long history of rivalries, some related to drug activity or gangs. Papachristos, Hureau, and Braga (2013) found that gang violence in Chicago and Boston was predicted by geographic proximity to gang turf and prior conflict between gangs, related to reciprocity and status seeking.

Tensions between neighborhoods can affect residents even if they do not participate in crime. Harding (2010) provides several examples, including a 16-year-old respondent's account, "I don't feel safe at all. Well, probably a little bit, like in my neighborhood, it's all right. But other places? Noooo, I don't really go out of my area that much… People, just from looks, get murdered... Because you're like an alien, you're not known over there. So, the first things you do when you walk through there all eyes is on you. [….] it's like "Where you from? And if you say the wrong area… If they got problems with that area… They just set it off with you right there" (p. 51). This problem can be so pronounced that "lying about one's own provenance is a known ploy for avoiding a fight with a kid from a rival neighborhood" --a practice known as "hood hopping" (Harding 2010, p. 38). In sum, the literature leads to the following expectations:

H1. The larger the scale and levels of geographically extended exposures to neighborhood poverty, the higher the prevalence of children's direct and indirect victimization.

Extreme Poverty: Surrounding and Distance Effects—A growing number of geographic and epidemiological studies have discussed the importance of distance-based or relative measures of exposure and geographically weighted, continuous measures of contextual conditions (Chaix et al., 2005; Graif and Sampson 2009; Merlo et al., 2005). An equally important line of work has focused on the disproportionate role of extreme poverty in increasing crime (e.g., Krivo & Peterson, 1996). A nearby neighborhood of extreme poverty may also increase one's victimization if close to home. Thus, following a distance decay function, the farther from extreme poverty, the lower one's victimization.

Relatedly, when extreme poverty is absent from *both* the residential and the nearby neighborhoods this may contribute more to decreasing victimization prevalence than when extreme poverty exists in *either* the residential neighborhood or the nearby neighborhoods, consistent with an interaction effect. If the residential neighborhood is poor, nearby poverty may amplify the residential poverty effect on crime and victimization. Proximity to poverty may increase residents' awareness of inequalities, injustices, or access to delinquent peers, possibly increasing the prevalence of within neighborhood offending. Indeed, a recent study of adolescent risk taking and delinquency (Graif, 2015) showed evidence of spatial interactions between focal and nearby neighborhoods. Similarly, it seems reasonable to expect victimization to decline more strongly in residential areas farther from extreme poverty –generating the following hypotheses:

H2. Escaping extended neighborhoods of extreme poverty lowers child victimization more

- **a.** when improvements are geographically extended (i.e., immediate and nearby neighborhood lack extreme poverty) rather than localized (i.e., only the immediate or the nearby area lack extreme poverty); and
- **b.** when the nearest neighborhoods of extreme poverty are farther away.

Mechanisms of Differential Spatial Exposures by Age and Gender— Neighborhood exposure mechanisms are likely differentiated by age and gender, contributing to corresponding differences in victimization. Indeed, journey-to-crime research (Groff & McEwen, 2005) found that male victims travelled farther to the location of their homicide than female victims. Males and older children are typically more likely to experience or witness violent victimization than females and younger children, respectively (Finkelhor, et al., 2009). Compared to girls, boys have been shown to spend more time outside, unsupervised by parents or adults, and in the company of delinquent peers (Block, 1983; Clampet-Lundquist et al., 2011; Graif, 2015; Zimmerman & Messner, 2010). Unstructured socializing has been linked to problem behavior and risk taking (Osgood & Anderson, 2004). When they date, boys may prefer romantic partners from outside their neighborhoods to avoid conflicts with peers. This, instead, might get them into trouble with boys in girlfriends' areas (Harding, 2010, p. 121).

Osgood, Anderson, & Schaffer (2005, p. 56) show that parents allowed older children to spend a greater amount of time unsupervised, away from family, and at greater distance from home. Around 10–11 years of age, children were allowed on average to spend between one and two hours unsupervised at distances within a mile from home, whereas by age 16, they could spend more than five hours without adult supervision and more than 3 miles from home. Compared to younger children, those in middle school and high school widen their spatial exposures as they play more outside of home, build more spatially diffuse friendships, and work part-time. School transitions also coincide with changes in whether teens can legally be on their own (Osgood et al., 2005).

As children transition through the education system, they also increase the distances they travel to school. As increasingly larger schools draw on teens from different, and potentially

rival, neighborhoods, they may increase a child's victimization risk, as may riding public transportation when traveling to school --contexts in which "inter-neighborhood beefs can flare into open conflicts" (Harding, 2010, p. 49). Bunch, Clay-Warner, and Lei (2012) show evidence that indicates that gender and age differences in victimization are due to differences in routine activities. If activities occur within walking distance from home neighborhoods, differences by gender and age are expected in the effects of surrounding poverty.

For children and youth, certain types of violent victimization risks may be larger outside than inside their residential neighborhood. Harding's (2010, p. 38) in-depth interviews with boys in three Boston neighborhoods highlighted that "conflicts among neighbors are resolved quickly, though often with a physical fight. Third parties from the neighborhood take on a mediating role, attempting to resolve the dispute before it escalates into ongoing beef. There is often intense social pressure to resolve the dispute, shake hands, and 'leave it at that.' When conflicts between youth from different neighborhoods emerge however, much more is at stake. Each boy becomes a representative of his home space; the neighborhood's reputation is at stake. Others may become involved, either to seek retribution or redemption for the neighborhood or to protect its reputation" (also Suttles, 1972). Harding's findings suggest that violence like shooting and murder will more likely emerge between residents of different areas than cutting or stabbing. In sum, the following expectations emerge:

H3. The surrounding neighborhood poverty will matter more for:

- **a.** boys of middle school age and older than for girls and those of younger age; and
- **b.** for being shot more than for being cut or stabbed.

Data and Methods

The Moving to Opportunity Intervention

The current analyses examine residential exposures among children participating in the Moving to Opportunity for Fair Housing Demonstration. Low-income parents of children under 18 years of age living in publicly assisted housing in extremely poor neighborhoods (>40% poverty rate) volunteered to participate. Families responded to a baseline survey between 1994 and 1997. Responses to a follow up survey in 2002 were also included in the current study. Up to two children per household were randomly selected. The effective response rate at the second wave was over 89% (Orr et al., 2003). In total, the study includes data on 4,446 children (aged 8–19 at wave two) and 2,997 adult caregivers participating in the first and second wave, with valid scores on all baseline covariates. Participants were from Boston (n = 889 children), Chicago (1059), Los Angeles (800), New York (1025), and Baltimore (673).

A critical challenge in studies of neighborhood effects is the problem of selected residential sorting. For instance, reliance on local family and friendship ties for childcare may constrain a family's choices to move out of a poor neighborhood and may also increase ones' victimization risk if some kin and friends have a history of risk-taking --thus, confounding the association between neighborhood poverty and victimization. Compared to observational

studies, the MTO's randomization eliminates at least in part potential spuriousness in assessing spatial effects. MTO participants were randomly assigned to: (1) a low poverty group, who received a housing voucher to move to neighborhoods of less than 10 percent poverty (n = 1835 children); (2) a traditional voucher group, who received the voucher and could move freely (n = 1255); or (3) a control group, who received the same housing assistance as at baseline (n = 1356).

Responses on children's victimization and neighborhood exposures were complemented with responses from their adult caregivers. Among the child participants, 49% are male, 67% African American, 31% Hispanic, 9% required special medicine or equipment, and 5% had gotten help in school for behavioral or emotional problems. Of the adults, 98% were female, 61% had lived in the neighborhood for five or more years, 9% moved more than three times in the past five years, 47% were very dissatisfied with their neighborhood, 50% reported unsafe streets at night and 42% reported a household member having been victimized in the prior six months. About 77% reported gangs and drugs as a reason for moving.

Residential neighborhood location history was identified during the first two waves of the MTO program and at several points in between: at baseline, at the time of the core move, in 1997, 2000, and in 2002. Census tract data were derived from the 1990 and 2000 Decennial Census and the Neighborhood Change Data Base normalized to 2000 tract boundaries (Geolytics, 2003). Census tract measures were linearly interpolated between the two Decennial census years and extrapolated to 2002 to correspond to the year of residence at each location. The census measures were then matched to the location of each respondent.

Dependent Variables.—Gun shots, cuts and stabbings were among the top four causes of nonfatal injuries that were violence-related between 2001 and 2013 among U.S. boys aged 5–19 (CDC, 2015). The main outcomes of interest in this study are direct and indirect victimization experiences reported by children aged 8–19 in 2001. *The direct victimization scale* is the proportion of affirmative answers to all of the following questions, whether each occurred at least once in the past 12 months: someone *pulled a knife or gun on child*; someone *cut or stabbed child*; and someone *shot child*. Each item is assigned a value of one for children who reported it happening to them at least once in the past 12 months or zero for those who said it never happened to them during that time. The *indirect victimization scale* is calculated as the proportion of the following items that were answered positively: the child *saw someone shoot or stab another person* at least once in the past 12 months; and *heard gunshots in the neighborhood* at least once a week in the past 30 days. Each item is coded as one for children who reported that it had happened to them or zero if it did not. The response to each item is then averaged across all items included in each scale. Each measure is normalized relative to the control group distribution, by subtracting the control mean and dividing by the control's standard deviation.

About 19% of children in the study (21% of boys, 17% of girls, and 16% of those aged 10 and under, 20% of those aged 11 and older) report hearing gunshots at least once a week in the past month or having seen someone shoot or stab another person at least once in the past year. Over 13% of boys, 10% of girls, and 13% aged 11 and older and about 8% of the

younger subgroup, report having seen someone shoot or stab another person in the past year. Moreover, about 8% of all children participants, 4% of girls, 11% of boys, 4% of those aged 10 and under, and 10% of those aged 11 and older, report having been cut, shot, stabbed or someone having pulled a knife or gun on them at least once in the past year. The gender and age differences among the participants in victimization reports are significant for all items except someone shot a child (under 2% overall) and the child heard gunshots (about 10% overall).

Control Variables.—Analyses include control variables for a variety of demographic and socioeconomic characteristics of the individual participants (adult caregivers and children), households, and neighborhoods at baseline. Included are: age, gender, race/ethnicity, employment and education, household composition, neighborhood safety, mobility history and reasons for moving, victimization history, health issues, children's behavioral problems and prior advanced school work or suspension and expelling. Similar controls were used in prior MTO analyses (Kling et. al, 2007; Orr et al., 2003).

Spatial and Temporal Measures of Poverty Exposures

Measures of neighborhoods defined at different ecological scales (e.g. multiple contiguous tracts) have been shown to predict crime rates (Boessen & Hipp, 2015), risk taking and delinquency (Graif 2015), suggesting spillover and interaction processes. Building on existing work, we measured n*eighborhood poverty* exposure as the proportion of respondents' census tract residents in poverty according to the decennial census. *Extreme poverty* refers to duration weighted average neighborhood poverty rate exposure of 40 percent or more, consistent with prior work (Jargowsky, 2013, 2015; Krivo & Peterson, 1996) [2]. Residential neighborhoods refer to a respondent's census tract of residence, while extended neighborhoods refer to the combination of residential and nearby neighborhoods. We derived multiple surrounding neighborhood scales, calculated either as a function of the *s* nearest neighbors (where *s* varies from 2 to 25), or as a function of the distance (d = 2 through 5 miles) from respondents' residential neighborhoods. *Distance to the nearest extreme poverty* area[3] was derived based on straight line (Euclidian) distance from the geographic coordinates of the tract centroid of the residential tract and the closest tract with 40 percent poverty or more.

The temporal dimension of exposure.—Studies tend to assume that victimization is situational, that it depends on the neighborhood context where victims are at the time of the incident. However, past exposures to poverty can affect one's reputation and social circles in ways that can shape the likelihood of future victimization. Indeed, such a developmental perspective is supported by findings that past affiliation with a neighborhood keeps the risk of victimization high long after youth moved to another area (Harding, 2010, p. 48). We

[2]In supplementary analyses, alternative indices were included: a) concentrated disadvantage was based on poverty rate, unemployment rate, female-headed households with children, and families with public assistance income; and b) extreme disadvantage was based on the upper ninety-fifth percentile of all US tracts.

[3]The choice of the geographic scales on the lower end was guided by the literature on the spatial mobility of children and adolescents (Basta et al, 2010). From the perspective broad processes of structural disadvantage, we might expect poverty and disadvantage to concentrate in sub-regions that are larger than 25 tracts. We thus expanded the lens to 5 miles, consistent with Boessen and Hipp (2015).

calculated poverty exposure indices as an average of each neighborhood in which a respondent was recorded to have resided during the duration of the MTO study, weighted by the duration of residence in that neighborhood. These measures yielded slightly more conservative results than situational ones and are important because they encapsulate temporal dimensions of exposure that better approximate the 'true causally relevant' geographic contexts (Diez Roux & Mair, 2010) and address more fully the 'uncertain geographic context problem' (Kwan, 2012).

In exploring the interaction patterns between surrounding and residential neighborhoods, multicollinearity issues prevent the use of continuous poverty measures. One solution is to recode the highly correlated continuous poverty exposures into mutually exclusive categories. We extend Graif's (2015) approach to spatial indicators in distinguishing between three geographic configurations: 1) extended neighborhoods of extreme poverty, where both the residential and surrounding neighborhoods exhibit average poverty rates over 40%; 2) localized extreme poverty neighborhoods, where either the residential or the surrounding neighborhoods, but not both, exhibit extreme poverty; 3) extended neighborhoods without extreme poverty in either the residential or surrounding neighborhoods.

Analytical Approach

When moving from one neighborhood to another, families' choices are shaped in part by unmeasured preferences (e.g., proximity to friends and kin who can help with childcare) and in part constrained by biases against them by potential neighbors, landlords, and real estate agents. If unmeasured endogenous forces shape both the poverty level of the neighborhoods to which children are exposed and their likelihood to be victimized, the observed relationships between neighborhood poverty and victimization may be spurious. Using ordinary least square regression in such a case to estimate neighborhood effects on victimization may lead to biased results. Instead, we use a two-stage least square (TSLS) modeling approach, which helps estimate the variation in neighborhood poverty that can be treated as exogenous, a function of the randomized assignment into the control or experimental group. The first stage equation is:

$$Neighborhood\ Index = Site * Treatment * \pi 1 + Covariates * \beta 1 + \varepsilon 1 \quad (1)$$

where *Neighborhood Index* represents first, residential neighborhood poverty, and subsequently, surrounding or extended neighborhood poverty measured at as described above. *Site* represents indicators for each city included in the study, with New York as the reference. Treatment represents the random assignment group, with the control group as reference. Site by treatment interactions are used as instrumental variables to help isolate the experimentally-induced variation in the neighborhood index score from variation due to self-selection (Kling et al. 2007; Ludwig and Kling 2007). These interactions also capitalize on how treatment varies by site in shaping neighborhood exposures. Site direct effects are included among the covariates. *Covariates* represent a series of baseline measures included as control variables, including characteristics of the adult caregivers, household, and children. Estimated scores of *Neighborhood Index* resulting from the first equation are next used in the second stage equation:

$$Victimization\ Index = Neighborhood\ Index * \gamma 2 + Covariates * \beta 2 + \varepsilon 2 \quad (2)$$

where *Victimization Index* represents either the indirect or direct victimization measures, respectively. $\gamma 2$ represents the victimization effect of moving to a neighborhood or area with a lower poverty level and the set of associated neighborhood differences. This approach assumes that treatment assignment does not directly affect victimization, but instead, the effect is indirect, working through changing individual exposure to neighborhood quality as reflected in the neighborhood index, and not through omitted variables. The standard errors are adjusted for household clustering using svyset in Stata to account for the complex survey design of MTO, including the fact that children were selected from within households.

To assess the validity of the instruments and model specification, first stage statistics were examined. When predicting direct victimization as a function of duration-weighted residential poverty, the first-stage estimations indicated an F statistic for the instruments excluded in the second-stage equation of 28.08 and a partial R^2 of .132. In iterations at increasing geographic scales of surrounding poverty (s = 2 to 25 nearest neighbors and d = 2 to 5 miles), the lowest first stage F statistic was 12.66 (at d = 5 miles) and the highest was 21.69 (at s = 4 nearest neighbors), with partial R^2 statistics between .065 and .096. In the extreme poverty models, the F statistic for the instruments excluded in the second stage equation varied between 4.21 and 19.40. The partial R^2 varied between .022 and .092. These parallel previously reported F statistics between 6 and 29 and R^2 values between .028 and .118 (Ludwig & Kling, 2007).

TSLS relies on assumptions such as non-zero causal effect, non-interference, the exclusion restriction, and ignorability of assignment to treatment. The non-zero causal effect expectation is based on multiple theoretical grounds, as discussed above. Non-interference means that compliance or victimization outcomes were not affected by the treatment status of others. This seems reasonable to expect if families tended to move to neighborhoods that were different than where they started or where other participants moved. Meeting the exclusion restriction that the instruments are not correlated with the error term means that the offer of a voucher did not affect a child's victimization if it did not affect the level of neighborhood poverty. The study's random assignment goes a long way in meeting the ignorable assignment to treatment condition. Because the intervention focused on residential poverty, however, some selection may re-emerge at larger geographic scales. We deal with potential remaining selection by: a) using random assignment among the instrumental variables; b) controlling for baseline covariates; and c) including the number of moves during the program as an endogenous regressor. Still, the analyses are close to a natural experiment (e.g. Kirk, 2009) and exploratory with respect to the extended area effects.

Results

Children in this study moved on average more than twice over the study duration, with those in the low poverty voucher (LPV) and traditional voucher (TRV) groups experiencing an average of almost three moves. The duration weighted average poverty level of children's residential neighborhoods was 44% among those in the control group. The TRV group was

exposed on average to a residential poverty 9 percentage points lower than the control group during the time of the study, while the LPV group was exposed to about 11 percentage points lower poverty[4]. These differences from the control group means are statistically significant for both LPV and TRV. As the geographic view of poverty exposures is scaled up to include more neighborhoods, the average poverty levels decrease (due to more heterogeneity in poverty levels) but the differences between the control groups and the two treatment groups remain significant. On average, the control group's two, four, and 25 nearest neighborhoods exhibited about 35%, 34%, and 31% poverty, respectively, while the LPV group's corresponding rates were lower by between 6–7 percentage points. The controls' surrounding neighborhoods within 2, 3 and 5 miles had about 31%, 29%, and 27% poverty, respectively, while the LPV group's corresponding rates were lower by about 4–5 percentage points (*Table 1*).

On average about 60% of the children in the control group resided in residential neighborhoods of extreme poverty, compared to 35% and 33% of the TRV group and LPV group respectively. Moreover, 29% of the control group resided in extended neighborhoods of extreme poverty, compared to only 15% of the LPV group. Only 22% of all control group members lived on average more than half-a-mile from the nearest extreme poverty neighborhood, 14% lived over a mile, and 7% lived more than 2 miles away. In contrast, 49% of all LPV group members lived more than half-a-mile from the nearest extreme poverty neighborhood, 38% lived over a mile, and about 22% over 2 miles away. These numbers show that LPV children improved relative to the control group not only in their immediate poverty exposures but also in extended neighborhood exposures through both a nearest-neighbor and a distance-based view.

Multivariate Analyses

Results from the two-stage least square estimations that included the full set of controls, the number of moves as an endogenous regressor, and the site-by-treatment instrumental variables indicated that residential neighborhood poverty affected children's direct victimization significantly (Table 1). A decrease in residential poverty exposure of ten percentage points contributed to 13% of a standard deviation lower direct victimization score. The average poverty level of the two closest surrounding neighborhoods was also significantly associated with children's direct victimization experiences and larger in magnitude by 63% of a standard deviation compared to the effect of residential poverty. As the geographic scale increased further, the surrounding poverty rates continued to exhibit significant associations with direct victimization and remained larger than the residential poverty effect. Similarly, poverty averaged within a 2-mile radius also yielded significant and strong associations with direct victimization. At a 5-mile radius, the poverty coefficient was double the immediate poverty coefficient. These results support *Hypothesis 1*, which predicted surrounding effects.

[4]The LPV group was assigned to move to neighborhoods of less than 10% poverty, but as a group they had post assignment exposures to poverty rates larger than 10% because: first, less than half of the families complied with the program requirements; second, among those who complied, many eventually moved to neighborhoods of relatively higher poverty levels than their initial "treatment" neighborhoods; third, the poverty rates of the potential treatment neighborhoods were determined by the program officers at the time of random assignment based on 1990 decennial census data and some of those neighborhoods increased in poverty by the time of the 2000 census.

The average poverty of the two closest nearby neighborhoods was similarly positively associated with indirect victimization, with a coefficient slightly larger in magnitude than the residential neighborhood coefficient. For the four nearest neighbors, the coefficient stayed significant but was lower than the residential poverty coefficient. At 3-and 5-mile radii scales the coefficients maintained significance and increased in magnitude at 5-miles. While more mixed than in predicting direct victimization, the results overall support *Hypothesis 1.*

Living in an immediate neighborhood of extreme poverty was associated with marginally higher direct victimization (Table 2 Model 1) after controlling for baseline characteristics and the number of times they moved during the program duration. Living in an extended neighborhood environment where both the residential and the surrounding neighborhood were extremely poor was significantly associated with higher levels of direct victimization (Model 2), indicating that the surrounding poverty adds to the effect of the residential poverty. The results of Model 3 indicate that, compared to living in extended extreme poverty, escaping extreme poverty only partially, either in the residential or the surrounding neighborhoods, is negatively associated with victimization but not significantly. In contrast, escaping extreme poverty on an extended scale is significantly associated with lower direct victimization. In other words, consistent with *Hypothesis 2a,* the MTO children seem to benefit less from localized declines in poverty and more when the immediate and surrounding areas are both without extreme poverty.

Furthermore, when adding a relational view of poverty (Model 4), results indicate that compared to living in extended neighborhoods of extreme poverty, living in a non-extreme extended neighborhood makes the most difference in decreasing direct victimization when the child is over half-a-mile from the nearest extreme poverty neighborhood. Exploring further the importance of proximity to the nearest extreme poverty area (Model 5), the results indicate that compared to living in an extended neighborhood of extreme poverty, living in an extended neighborhood without extreme poverty, even within a 1-mile proximity to a poverty hot spot, is associated with lower direct victimization scores. Moreover, living farther than 1 mile from the closest extreme poverty area is also significantly associated with lower direct victimization and the association has a slightly larger magnitude than within 1 mile. These results are consistent with the relational view of poverty effects in *Hypothesis 2b*.

The results from estimations of indirect victimization among the MTO children of all ages show similar patterns as with direct victimization. One difference is that, while the residential poverty effect was only statistically marginal in predicting direct victimization, it was fully significant in predicting indirect victimization (Table 2, Models 1 and 2). Overall, adding information on the distance to the nearest extreme poverty seems to amplify the benefit of living in extended non-extreme poverty in predicting direct and indirect victimization among children. In other words, the residential and surrounding areas seem to interact in ways consistent with the geographically extended and the distance-based (relational) views *of Hypotheses 2a* and *2b*.

Among girls and boys aged 10 and under, the residential and surrounding poverty levels are positively but largely non-significantly associated with direct and indirect victimization.

Instead, the overall results seem to be driven by the link between residential and extended poverty with direct and indirect victimization among boys 11 or older (Table 2). These age and gender differences are consistent with *Hypothesis 3a* of differences in neighborhood and spatial exposures around the transition between elementary and middle school, due to corresponding differences in parental monitoring, peer dynamics, and exposure to risks outside home.

Analyses that estimate direct victimization items separately (not included) in models otherwise equivalent to those in Tables 1 indicate that residential poverty significantly increases the likelihood that a child was cut or stabbed and shot. Both victimization items were associated with surrounding poverty at higher magnitudes than with residential poverty but the coefficients become marginal in predicting stabbing while maintaining full statistical significance for gunshot victimization. In models otherwise equivalent to those in Table 2, the results are similar to those estimating overall direct victimization in significantly predicting the prevalence of having been shot but not having been cut or stabbed. These patterns are consistent with *Hypothesis 3b* and prior findings (Harding 2010), suggesting that some conflicts are more likely to be settled with fights within one's neighborhood but with gun violence away from home.

Discussion

The Long Arm of Poverty: Extended and Relational Exposures

The results show that among children participating in the MTO, the program has by the second wave significantly decreased not only their residential neighborhood exposures to poverty but also their extended and relational exposures to poverty in nearby areas. The declines in surrounding poverty are spatially expansive, remaining significant and non-ignorable for as far as five miles from a child's residential neighborhood. The significant improvements in poverty are apparent not only through an extended view but also through a relational approach. For instance, the percentages of children in families assigned to the low-poverty area condition and who ended up living on average more than half-a-mile or one mile, respectively, from extreme poverty are double to triple those of their control counterparts. These results are consistent with prior findings of mobility related declines in residential poverty exposures (Chetty, Hendren, & Katz, 2016; Graif, 2016). Strong mobility constraints, no doubt, still operate. Without them, the observed extended poverty declines may have been even larger.

The surrounding neighborhood poverty was found to be strongly and significantly associated with direct and indirect victimization among children and adolescents participating in the MTO. While measures of the residential and surrounding neighborhood poverty cannot be easily included in the same model because of collinearity, the association of direct victimization with surrounding neighborhoods' poverty was consistently larger than with residential poverty. Moreover, the association of direct victimization with surrounding poverty increases in magnitude at larger geographic scales compared to the corresponding association with residential poverty—consistent with the "*long arm of poverty*" metaphor. These findings suggest that including surrounding poverty in estimating neighborhood effects improves our understanding of victimization beyond residential poverty. These

results are consistent with *Hypothesis 1* and prior findings that surrounding poverty increases neighborhood's violence rates, net of focal poverty (Peterson & Krivo, 2010; Graif & Sampson, 2009; Morenoff et al., 2001). This may be related to inter-neighborhood rivalries that victimize youth when crossing boundaries, whether they engage or not in illegal activities (Harding, 2010).

Escaping Extreme Poverty Exposures

The findings suggest that distance to the nearest extreme poverty area seems to buffer against direct and indirect victimization. Specifically, compared to an extended neighborhood where both the residential or surrounding subareas exhibit extreme poverty, it is not enough that just one of the subareas improves below the extreme poverty threshold. What matters for significantly lowering victimization is that both subareas improve. Furthermore, living more than half-a-mile from an extreme poverty hot spot provides added benefit compared to the absence of extreme poverty in both the residential and surrounding neighborhoods. This suggests that lower victimization scores are associated with both extended and relational exposures to neighborhood contexts. These findings are consistent with *Hypotheses 2a and 2b*. Additionally, they further expand the literature by highlighting the role of extended neighborhoods and relational exposures to extreme poverty at different distances in decreasing victimization. The results are also in line with growing evidence on spatial interactions from recent research on neighborhoods (Patillo, 1999), moving (Crowder & South, 2008), and gun shots (Tita & Cohen, 2004).

Compared to the residential poverty, the extended neighborhood poverty at larger geographic scales yields a coefficient stronger in magnitude and precision in estimating a boy's experience of having been shot. In contrast, the coefficients of the residential poverty and surrounding two neighborhoods' poverty are stronger than the wider extended scales when predicting being cut or stabbed. This is consistent with *Hypothesis 3b* and with Harding's (2010) findings that within-neighborhood tensions may be more likely to end in physical fights while between-neighborhoods in more serious violence. The association between poverty and victimization is larger at larger geographic scales, consistent with Harding's (2010) report of inter-neighborhood "beefs" that inner city youth navigate. Harding's findings also suggest that one does not have to be part of a gang or have an offending history to be a target. Residence in a specific neighborhood can get youth in such trouble that some have to lie about it to be safe.

The differences in extended neighborhood effects by gender are similarly related to the literature on differential parental monitoring, expectations and roles, and peer dynamics (Heimer & De Coster, 1999; Zahn & Browne, 2009). At older ages, boys in particular are less supervised by parents or adults and may be more likely to be exposed to risks outside their home in their daily activities (Graif, 2015; Zimmerman & Messner, 2010). We also observed age differences in how immediate and extended neighborhoods matter. In contrast to middle school and high school age children, those of elementary school age did not show an association between neighborhood poverty at different scales and victimization. These results are consistent with *Hypothesis 3a* and the fact that at younger ages, children are more dependent on parents and not allowed to be without adult supervision (Finkelhor et al., 2009;

Harding 2010). As children grow up, they tend to increase the distances they travel to school. Older children also have opportunities to work part-time, start to date, build more spatially diffused networks, and engage in unstructured socializing, increasing risk taking and spatial risk exposures (Osgood et al., 2005).

The extended neighborhood of residence at larger scales may be important for victimization because they may include non-home neighborhoods to which children and caregivers are exposed during their routine activities and daily lives. The observed role of surrounding poverty for victimization may be related to victims or offenders traveling outside their home neighborhood. The results point to the importance of approaches that map children and youth's activity patterns to examine age variations in violent assault (e.g., Wikström et al., 2010; Wiebe et al., 2016). The results also highlight the value of future research on crime diffusion (Tita & Cohen, 2004), inter-neighborhood conflicts (Papachristos et al., 2013), journey-to-crime (Bernasco, 2010) and "delinquency / mobility triangles" (Burgess, 1925; Crook, 1934; Groff & McEwen, 2005; Tita & Griffiths, 2005).

Several limitations should be noted. MTO aimed to improve low-income families' environments by *moving* them to new neighborhoods rather than by improving the neighborhoods in which they already lived. Such mobility may have disrupted families' social support networks, in turn perhaps undermining the ability to obtain or keep a job and to draw on extended family members to monitor, advise, and protect children against victimization risk. Perhaps anticipating such disruptions, many MTO families did not comply with the intervention, or moved out of their improved neighborhoods of treatment. As a result, the MTO program led to a "treatment dose" that some thought would not produce large effects. The current study adjusts in part for the effects of networks by controlling for ties to the old neighborhood.

Moreover, caution is needed in interpreting the poverty effects as causal or direct. For instance, crime in the neighborhoods can contribute to increasing poverty levels by motivating residents with resources to move out. Because the randomized treatment in this study was defined with respect to the residential neighborhood, some potential selection bias might not be fully ruled out with respect to the extended neighborhood. However, the instrumental variable approach and the numerous set of baseline covariates included as controls were used to minimize such issues. Additionally, neighborhood poverty effects likely operate through a series of intermediary mechanisms, such as weakened formal and informal local social controls, insufficient parental or adult supervision, the presence of gangs, policing practices, or poorly funded schools. Future work will be valuable in understanding the specific mechanisms through which non-home environmental exposures to poverty affect children and youth's victimization and exposures to violence (Wiebe et al., 2016). Mechanisms related to school attendance, the neighborhood that the school is located in, or the neighborhoods that peer students come from are not measured here but could also be important for violence exposure.

The results are useful in building a knowledge base about what to explore in future research on more representative data but may not be generalizable to larger groups of the population. The focus of the study was on low-income families, and the sample was not randomly

selected. Instead, respondents volunteered their participation and were motivated to move. Future research on different samples would be invaluable. It is also important not to overgeneralize our findings given the limitations of our violence victimization measures, which are not specific about who the offender was or where the incident occurred. Importantly, the measures may not capture exposures to sexual violence well.

A key challenge in advancing the research on neighborhood effects on victimization and crime is geospatial data availability. Victimization surveys may collect information on victims' residence yet, rarely is additional information available on the location of the incident or the residence of the offender. It would be valuable if future research systematically combined data from different sources, such as surveys, employment records, and police reports, to link geographic data on incident location with the location of offenders and victims' neighborhood of residence and of their routine activity pathways. In this context, research on activity spaces has been valuable in showing that children and teenagers are likely to be exposed during a regular day to multiple neighborhoods outside their home area. Empirical work has started to link crime locations to the non-home environments of offenders' routine activities (Wikström et al., 2010).

Conclusions and Implications

Overall, the results showed that low-income children in this study were less victimized when living in extended neighborhoods with lower levels of poverty. Moreover, the wider the extended scale of poverty decline and the farther away families moved from areas of extreme disadvantage, the better off the children were. These results indicate that improving children's neighborhoods at a larger geographic scale than typically measured may help reduce victimization more than when focusing just on residential neighborhood contexts.

The results suggest that extended neighborhoods matter for victimization and violent risk exposures among low-income children and youth. The results are consistent with research on neighborhood effects on crime and extend the typical understanding of exposures by suggesting that victimization may be influenced not just by one's residential neighborhood but also by large geographic clusters of poverty (Jargowsky, 2013). This is important because, since 2000, children have been surrounded by extreme poverty in growing numbers (Jargowsky, 2015).

These findings respond to important calls for research on the 'uncertain geographic context problem' (Kwan, 2012) and on 'true causally relevant' neighborhood contexts (Diez-Roux & Mair, 2010). They extend recent advances in research on the role of different geographic scales (Boessen & Hipp, 2015), suggesting possible spillovers (Peterson & Krivo, 2010; Graif, 2015) between residential and surrounding neighborhoods. The results also extend this work and contribute to the literature by highlighting a) the importance of the spatial context of neighborhoods for individual victimization (rather than offending or crime rates); b) the role of extended and relational exposures to poverty over time, at different scales and distances from extreme poverty, and c) differences by age and gender in the role of space on violence exposures. The findings suggest that alleviating poverty on a broader geographic scale will help reduce victimization among low income families. Caution is needed,

however, in generalizing the findings too broadly because, despite recent national increases in poverty, violent victimization has been falling[5]. This highlights the importance of identifying the specific local policies and programs with the most impact in decreasing violence, from reducing gang activity, increasing family and parenting interventions, or youth training, and other prevention programs.

The findings underscore the need for further research on the social processes underlying the extended and relational neighborhood effects. Integrating the social disorganization (Bursik, 1988) and routine activity perspectives (Cohen & Felson, 1979) will be helpful in thinking about how social cohesion, trust, and collective efficacy can increase guardianship and reduce motivation for crime within neighborhoods and surrounding areas. In doing so, paying attention to recent advances in environmental criminology (Boessen & Hipp, 2015; Kim, LaGrange, & Willis, 2013), research on activity spaces (Krivo et al., 2013; Matthews, 2008, 2011, 2012; Matthews & Yang 2013), on the “mobility triangle” of crime (Tita & Griffiths, 2005; Groff & McEwen, 2005) and on the journey-to-crime (Bernasco, 2010) will be fruitful. Especially important will be to: a) evaluate the social, physical, and institutional environments of criminal events and of offenders’ and victims’ activity locations; b) investigate the mechanisms underlying the spatial patterning of criminal motivation, victim reachability, low guardianship, informal control processes, and disorder (Graif et al., 2014); c) bring in historical context of preexisting inter-neighborhood rivalries (Harding, 2010); d) understand victim-offender links such as shared residential history and overlapping spatial circles of routine activities; and e) explore the importance of inter-neighborhood ties for public control (Hunter, 1985).

The results suggest that housing interventions and criminal justice research would benefit from closer attention to the broader geographic context of poverty and to the *relational* context of proximity to hotspots of risk. If nearby neighborhoods influence each other, a neighborhood’s improvements will benefit nearby neighborhoods as well. Alternatively, poverty in nearby areas may prevent a neighborhood from fully translating its own improvements into lower risk of violence. For this reason, scholarship would benefit from identifying neighborhoods with more outside influence than others --perhaps areas with large schools, employer hubs, or youth and health services that attract residents from many other areas.

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[5]Data for 1993–2014. U. S. Bureau of Justice Statistics. NCVS victimization analysis tool (NVAT) Report: http://www.bjs.gov/index.cfm?ty=nvat (last accessed 08/02/2016)

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References

Aisenberg E, & Herrenkohl T. (2008). Community violence in context: Risk and resilience in children and families. Journal of Interpersonal Violence, 23(3), 296–315. [PubMed: 18245570]

Anselin L, Cohen J, Cook D, Gorr W, & Tita G. (2000). Spatial analyses of crime. Criminal Justice, 4(2), 213–262.

Basta LA, Richmond TS, & Wiebe DJ (2010). Neighborhoods, daily activities, and measuring health in urban environments. Social Science & Medicine, 71, 1943–1950. [PubMed: 20980088]

Baum K. (2005). Juvenile victimization and offending, 1993–2003. Bureau of Justice Statistics.

Baskin D, & Sommers I. (2015). Trajectories of exposure to community violence and mental health symptoms among serious offenders. Criminal Justice and Behavior, 42, 587–609.

Bernasco W. (2010). A sentimental journey to crime: Effects of residential history on crime location choice. Criminology, 48(2), 389–416.

Bingenheimer JB, Brennan RT, & Earls FJ (2005). Firearm violence exposure and serious violent behavior. Science, 308(5726), 1323–1326. [PubMed: 15919997]

Block JH (1983). Differential premises arising from differential socialization of the sexes: Some conjectures. Child Development, 54(6), 1335–1354. [PubMed: 6661940]

Boessen A, & Hipp JR (2015). Close-ups and the scale of ecology: Land uses and the geography of social context and crime. Criminology, 53(3), 399–426.

Browning CR, & Soller B. (2014). Moving beyond neighborhood: Activity spaces and ecological networks as contexts for youth development. Cityscape, 16(1), 165–196. [PubMed: 25105172]

Bunch J, Clay-Warner J, & Lei M-K (2012). Demographic characteristics and victimization: Testing the mediating effects of routine activities. Crime and Delinquency, 61, 1181–205.

Burchfield KB & Silver E. (2013). Collective efficacy and crime in Los Angeles neighborhoods: Implications for the Latino paradox. Sociological Inquiry, 83, 154–176.

Burgess EW (1925). Can neighborhood work have a scientific basis? In The City (pp. 142–155). Chicago, IL: The University of Chicago Press.

Bursik RJ (1988). Social disorganization and theories of crime and delinquency: Problems and prospects. Criminology, 26(4), 519–552.

Centers for Disease Control and Prevention. (2013). Leading causes of death reports, national and regional, 1999–2013. National Center for Injury Prevention and Control.

Centers for Disease Control and Prevention. (2015). Leading causes of nonfatal injury reports, United States 2001–2013. National Center for Injury Prevention and Control.

Chaix B, Merlo J, Subramanian SV, Lynch J, Chauvin P. (2005). Comparison of a spatial perspective with the multilevel analytical approach in neighborhood studies 2001. American Journal of Epidemiology, 162(2), 171–182. [PubMed: 15972939]

Chetty R, Hendren N, & Katz LF (2016). The effects of exposure to better neighborhoods on children: New evidence from the Moving to Opportunity experiment. American Economic Review. doi:10.3386/w21156.

Clampet-Lundquist S, Kling JR, Edin K, & Duncan GJ (2011). Moving teenagers out of high-risk neighborhoods. American Journal of Sociology, 116, 1154–1189.

Cohen LE, & Felson M. (1979). Social change and crime rate trends: A routine activity approach. American Sociological Review, 44(4), 588–608.

Corso PS, Mercy JA, Simon TR, Finkelstein EA, & Miller TR (2007). Medical costs and productivity losses due to interpersonal and self-directed violence in the United States. American Journal of Preventive Medicine, 32(6), 474–482.e2.

Crook EB (1934). Cultural marginality in sexual delinquency. American Journal of Sociology, 39(4), 493–500.

Crowder KD, & South SJ (2008). Spatial dynamics of white flight: The effects of local and extralocal racial conditions on neighborhood out-migration. American Sociological Review, 73(5), 792–812. [PubMed: 20221414]

Cummins S, Curtis S, Diez-Roux AV, & Macintyre S. (2007). Understanding and representing ‘place’ in health research: A relational approach. Social Science & Medicine, 65(9), 1825–38. [PubMed: 17706331]

David-Ferdon C, & Simon TR (2014). Preventing youth violence: Opportunities for action. Atlanta, GA: National Center for Injury Prevention and Control, CDC.

Diez Roux AV, & Mair C. (2010). Neighborhoods and health. Annals of the New York Academy of Sciences, 1186(1), 125–145. [PubMed: 20201871]

Drawve G, Walker JT, & Felson M. (2015). Juvenile offenders: An examination of distance-to-crime and crime clusters. Cartography Geographic Information Science, 42,122–33.

Dugan L. (1999). The effect of criminal victimization on a household’s moving decision. Criminology, 37(4), 903–930.

Finkelhor D, Turner H, Ormrod R, Hamby SL, & Kracke K. (2009). Children’s exposure to violence: A comprehensive national survey. U.S. Department of Justice.

Finkelhor D, Turner H, Ormrod R, & Hamby SL (2009). Violence, abuse, and crime exposure in a national sample of children and youth. Pediatrics, 124(5), 1411–1423. [PubMed: 19805459]

GeoLytics. (2003). Neighborhood change database tract data from 1970–2010. NJ: GeoLytics.

Graif C. (2016). “(Un)natural Disaster: Vulnerability, Long-Distance Displacement, and the Extended Geography of Neighborhood Distress and Attainment after Katrina” Population and Environment. 37(3): 288–318.

Graif C. (2015). Delinquency and gender moderation in the Moving to Opportunity intervention: The role of extended neighborhoods. Criminology, 53(3), 366–398.

Graif C, Gladfelter AS, & Matthews SA (2014). Urban poverty and neighborhood effects on crime: Incorporating spatial and network perspectives. Sociology Compass,8, 1140–55. [PubMed: 27375773]

Graif C, & Sampson RJ (2009). Spatial heterogeneity in the effects of immigration and diversity on neighborhood homicide rates. Homicide Studies, 13(3), 242–260. [PubMed: 20671811]

Groff ER, & McEwen T. (2005). Disaggregating the journey to homicide In Wang F. (Ed.), Geographic Information Systems and Crime Analysis (pp. 60–83). Hershey, PA: IDEA

Harding DJ (2010). Living the drama: Community, conflict, and culture among inner-city boys. Chicago, IL: University of Chicago Press.

Heimer K, & De Coster S. (1999). The gendering of delinquency. Criminology,37, 277–318.

Hipp JR, & Boessen A. (2013). Egohoods as waves washing across the city: A new measure of neighborhoods. Criminology, 51(2), 287–327.

Hipp JR, Tita GE, & Boggess LN (2009). Intergroup and intragroup violence: Is violent crime an expression of group conflict or social disorganization? Criminology, 47, 521–64.

Hunter AJ (1985). Private, parochial, and public social orders In Suttles GD, & Zald MN (Eds.), The challenge of social control (pp. 230–242). Norwood, NJ: Ablex.

Jargowsky PA (2013). Concentration of poverty in the new millennium. Century Foundation.

Jargowsky PA (2015). Architecture of segregation: Civil unrest, the concentration of poverty, and public policy. New York, NY: The Century Foundation.

Jones M, & Pebley AR (2014). Redefining neighborhoods using common destinations: Social characteristics of activity spaces and home census tracts compared. Demography, 51, 727–52. [PubMed: 24719273]

Kilpatrick DG, Ruggiero KJ, Acierno R, Saunders BE, Resnick HS, & Best CL (2003). Violence and risk of PTSD, major depression, substance abuse/dependence, and comorbidity: Journal of Consulting and Clinical Psychology, 71(4), 692–700. [PubMed: 12924674]

Kim S, LaGrange RL, & Willis CL (2013). Place and crime: Integrating sociology of place and environmental criminology. Urban Affairs Review, 49(1), 141–155.

Kirk DS (2009). A natural experiment on residential change and recidivism: Lessons from Hurricane Katrina. American Sociological Review, 73(3), 484–505.

Kirk DS, & Hardy M. (2014). The acute and enduring consequences of exposure to violence on youth mental health and aggression. Justice Quarterly, 31(3), 539–567.

Kling JR, Liebman JB, & Katz LF (2007). Experimental analysis of neighborhood effects. Econometrica, 75(1), 83–119.

Krivo LJ, Washington HM, Peterson RD, Browning CR, Calder CA, & Kwan M. (2013). Social isolation of disadvantage and advantage: The reproduction of inequality in urban space. Social Forces, 92(1), 141–164.

Krivo LJ, & Peterson RD (1996). Extremely disadvantaged neighborhoods and urban crime. Social Forces, 75(2), 619–648.

Kwan M-P (2012). The uncertain geographic context problem. Annals of the Association of American Geographers, 102(5), 958–968.

Leventhal T, & Brooks-Gunn J. (2000). The neighborhoods they live in: The effects of neighborhood residence on adolescent outcomes. Psychological Bulletin,126, 309–37. [PubMed: 10748645]

Ludwig J, & Kling J. (2007). Is crime contagious? Journal of Law & Economics, 50, 491–518.

Matthews SA (2008). The salience of neighborhood: Some lessons from sociology. American Journal of Preventive Medicine, 34(3), 257–259. [PubMed: 18312814]

Matthews SA (2011). Spatial polygamy and the heterogeneity of place: Studying people and place via egocentric methods In Burton LM, Matthews SA, Leung MC, Kemp SP, & Takeuchi DT (Eds.), Communities, neighborhoods, and health, social disparities in health and health care (pp. 35–55). New York, NY: Springer.

Matthews SA (2012). Thinking about place, spatial behavior, and spatial processes in childhood obesity. American Journal of Preventive Medicine, 42(5), 516–520. [PubMed: 22516493]

Matthews SA, & Yang T. (2013). Spatial polygamy and contextual exposures (SPACEs): Promoting activity space approaches in research on place and health. American Behavioral Scientist, 57(8), 1057–1081. [PubMed: 24707055]

Mears DP, & Bhati AS (2006). No community is an island: The effects of resource deprivation on urban violence in spatially and socially proximate communities. Criminology, 44, 509–47.

Merlo J, Chaix B, Yang M, Lynch J, Råstam L. (2005). A brief conceptual tutorial of multilevel analysis in social epidemiology. Journal of Epidemiology and Community Health, 59(6), 443–449. [PubMed: 15911637]

Morenoff JD, Sampson RJ, & Raudenbush SW (2001). Neighborhood inequality, collective efficacy, and spatial dynamics of urban violence. Criminology, 39(3), 517–558.

Orr L, Feins JD, Jacobs R, Beecroft E, Sanbonmatsu L, Katz LF, Liebman JB, & Kling JR (2003). Moving to Opportunity: Interim impacts evaluation. Washington, DC: U.S. Department of Housing and Urban Development, OPDR.

Orr L. 2011 Moving to Opportunity (MTO) for Fair Housing Demonstration: Interim Impacts Evaluation, Tier 1 Restricted Access Data, 1994–2001 [United States]: Version 1. ICPSR

Osgood DW, & Anderson AL (2004). Unstructured socializing and rates of delinquency. Criminology, 42(3), 519–549.

Osgood DW, Anderson AL, & Shaffer JN (2005). Unstructured leisure in the after-school hours In Mahoney JL, Larson RW, & Eccles JS (Eds.), Organized activities as contexts of development (pp. 45–64). Mahwah, NJ: Lawrence Erlbaum.

Papachristos AV, Hureau DM, & Braga AA (2013). The corner and the crew: The influence of geography & social networks on gang violence. American Sociological Review,78, 417–47.

Pattillo-McCoy M. (1999). Black picket fences. Chicago, IL: University of Chicago Press.

Peterson RD, & Krivo LJ (2010). Divergent social worlds: Neighborhood crime and the racial-spatial divide. New York, NY: Russell Sage.

Sampson RJ (2008). Moving to inequality: Neighborhood effects and experiments meet social structure. American Journal of Sociology, 114(1), 189–231.

Sampson RJ, Morenoff JD, & Earls FJ (1999). Beyond social capital: Spatial dynamics of collective efficacy for children. American Sociological Review, 64(5), 633–660.

Sampson RJ, Raudenbush SW, & Earls FJ (1997). Neighborhoods and violent crime: A multilevel study of collective efficacy. Science, 277(5328), 918–924. [PubMed: 9252316]

Sharkey P, & Sampson RJ (2010). Destination effects: Residential mobility and trajectories of adolescent violence in a stratified metropolis. Criminology, 48(3), 639–681. [PubMed: 21339847]

Sharkey P, Tirado-Strayer N, Papachristos AV, & Raver CC (2012). The effect of local violence on children's attention and impulse control. American Journal of Public Health, 102, 2287–2293. [PubMed: 23078491]

Shaw CR, & McKay HD (1942). Juvenile delinquency and urban areas. Univ. of Chicago.

Suttles G. (1972). The social construction of communities. University of Chicago Press.

Tita GE, & Cohen J. (2004). Measuring spatial diffusion of shots fired activity across city neighborhoods In Goodchild MF, & Janelle DG (Eds.), Spatially integrated social science (pp. 171–204). New York, NY: Oxford University Press.

Tita G. & Griffiths E. (2005). Traveling to violence: The case for mobility-based spatial typology of homicide. Journal of Research in Crime & Delinquency, 42(3), 275–308.

Turner HA, Finkelhor D, Hamby S, & Shattuck A. (2012). Recent victimization exposure and suicidal ideation. Archives of Pediatrics & Adolescent Medicine,166, 1149–54. [PubMed: 23090641]

Wiebe DJ, Richmond TS, Guo W, Allison PD, Hollander JE, Nance ML, & Branas CC (2016). Mapping activity patterns to quantify risk of violent assault in urban environments. Epidemiology, 27(1), 32–41. [PubMed: 26414941]

Wikström P-OH, Ceccato V, Hardie B, & Treiber K. (2010). Activity fields and the dynamics of crime. Journal of Quantitative Criminology, 26(1), 55–87.

Zahn MA, & Browne A. (2009). Gender differences in neighborhood effects and delinquency In Zahn MA (Ed.), The delinquent girl (pp. 1–32). Temple University Press.

Zimmerman GM, & Messner SF (2010). Neighborhood context and the gender gap in adolescent violent crime. American Sociological Review, 75(6), 958–980. [PubMed: 21709751]

Table 1.

Descriptive statistics of geographically extended exposures to neighborhood poverty among children in the MTO study (1994/1997–2002)

	Control Group		Traditional Voucher	Low Poverty Voucher
Immediate neighborhood poverty exposure	.438	(.143)	.349 ***	.328 ***
Surrounding poverty exposure by geographic scale				
2 nearest neighbors (a)	.351	(.123)	.309 ***	.281 ***
4 nearest neighbors (a)	.344	(.101)	.305 ***	.275 ***
25 nearest neighbors (a)	.314	(.083)	.286 ***	.257 ***
2 mile radius (b)	.305	(.078)	.280 ***	.252 ***
3 mile radius (b)	.290	(.071)	.270 ***	.244 ***
5 mile radius (b)	.270	(.061)	.254 ***	.235 ***
Immediate neighborhood of extreme poverty	.595	(.492)	.345 ***	.334 ***
Extended neighborhood of extreme poverty	.286	(.453)	.169 ***	.153 ***
Localized extreme poverty	.334	(.473)	.208 ***	.198 ***
Extended neighborhood without extreme poverty	.381	(.487)	.623 ***	.650 ***
Extended neighborhood without extreme poverty				
≤.5 mile to nearest extreme poverty	.164	(.371)	.203 *	.159
>.5 mile to nearest extreme poverty	.217	(.413)	.420 ***	.491 ***
≤1 mile to nearest extreme poverty	.241	(.429)	.355 ***	.269
>1 mile to nearest extreme poverty	.140	(.348)	.268 ***	.381 ***
Number of moves	2.282	(1.279)	2.832 ***	2.705 ***

Note: Data are weighted and adjusted for household clustering. Standard deviations in parentheses. All poverty indices are duration weighted.

(a) Equal distance weighted;

(b) Inverse distance weighted. Tests of significant difference from the control mean:

** p ≤ .01,

* p ≤ .05,

€ p ≤ .10.

Table 2.

Two-stage least square estimation of direct and indirect victimization among MTO children and youth at wave two, as a function of residential and surrounding neighborhood poverty (1994/1997–2002) [(a)]

	Direct Victimization	Indirect Victimization
Immediate neighborhood poverty [(b)]	1.297 *	1.417 **
	(.552)	(.454)
Number of moves	.134 €	.123
	(.079)	(.079)
Surrounding poverty scales [(b)]		
2 nearest neighborhoods	1.924 *	1.700 **
	(.759)	(.580)
4 nearest neighborhoods	1.575 *	1.182 *
	(.711)	(.559)
25 nearest neighborhoods	1.569 *	1.337 *
	(.742)	(.663)
2 mile radius [(c)]	1.725 *	1.462 *
	(.793)	(.704)
3 mile radius [(c)]	1.873 *	1.641 *
	(.884)	(.795)
5 mile radius [(c)]	2.635 *	2.353 *
	(1.197)	(1.048)
N	*4439*	*4436*

Notes:

(a) Each poverty exposure coefficient results from a separate TSLS estimation that includes neighborhood moves as an endogenous regressor and all baseline control measures. Standard errors adjusted for household clustering in parentheses.

(b) Duration weighted.

(c) Inverse-distance weighted.

** $p \leq .01$,

* $p \leq .05$,

€ $p \leq .10$.

Table 3.

Two-stage least square estimations of indirect and direct victimization among children and youth in the MTO study (1994/1997 – 2002) by different geographic configurations of poverty and by age and gender

	All Children		Boys ≤10 years old		Boys >10 years old	
	Direct Victimization	**Indirect Victimization**	**Direct Victimization**	**Indirect Victimization**	**Direct Victimization**	**Indirect Victimization**
Immediate geographic view						
Model 1						
Residential neighborhood in extreme poverty	.422 ℰ (.247)	.693 ** (.241)	−.016 (.437)	−.298 (.449)	.850 * (.416)	.640 * (.306)
Extended geographic view						
Model 2						
Extended neighborhood in extreme poverty	.639 * (.306)	.625 * (.275)	.636 (.575)	.426 (.493)	1.366 * (.565)	.986 * (.409)
Model 3 *(a)*						
Localized extreme poverty	−.727 (.459)	−.236 (.413)	−.706 (.631)	−.706 (.586)	−1.864 (1.392)	−.899 (.950)
Extended neigh. w/out extreme poverty	−.648 * (.309)	−.589 * (.276)	−.573 (.620)	−.174 (.575)	−1.486 * (.662)	−.966 * (.451)
Extended and relational view						
Model 4 *(a)*						
Localized extreme poverty	−.902 (.670)	−.373 (.588)	−.725 (.618)	−.692 (.580)	−1.613 (1.434)	−1.212 (1.008)
Extended neigh. w/out extreme poverty						
≤ half mile to extreme poverty	−.568 (.382)	−.528 (.332)	−.148 (.896)	−.471 (.841)	−1.786 * (.768)	−.552 (.548)
> half mile to extreme poverty	−.699 * (.344)	−.629 * (.302)	−.523 (.611)	−.209 (.573)	−1.441 * (.668)	−1.014 * (.468)
Model 5 *(a)*						
Localized extreme poverty	−1.011 (.638)	−.330 (.556)	−.738 (.641)	−.719 (.635)	−1.567 (1.446)	−1.240 (1.045)

	All Children		Boys ≤10 years old		Boys >10 years old	
	Direct Victimization	**Indirect Victimization**	**Direct Victimization**	**Indirect Victimization**	**Direct Victimization**	**Indirect Victimization**
Extended neigh. w/out extreme poverty						
≤ 1 mile to extreme	−.631 *	−.583 *	.342	.212	−1.550 *	−.875 €
poverty	(.319)	(.276)	(.947)	(.938)	(.656)	(.477)
> 1 mile to extreme	−.768 *	−.628 *	−.308	−.062	−1.364 *	−1.102 *
poverty	(.366)	(.317)	(.662)	(.656)	(.678)	(.488)
N	*4439*	*4436*	*596*	*596*	*1545*	*1543*

Notes: All models include mobility as an endogenous variable. Standard errors are in parentheses. Extended neighborhood refers to immediate and surrounding neighrbohoods. Localized extreme poverty refers to extreme poverty nearby non-extreme poverty within an extended neighrbohood.

(a) The reference category is extended neighborhood of extreme poverty.

** p ≤ .01,

* p ≤ .05,

€ p ≤ .10.