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How neighborhoods influence child maltreatment: A review of the literature and alternative pathways

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Abstract

Objective: To review the literature on the relationships between neighborhoods and child maltreatment and identify future directions for research in this area.
Method: A search of electronic databases and a survey of experts yielded a list of 25 studies on the influence of geographically defined neighborhoods on child maltreatment. These studies were then critically reviewed by an interdisciplinary research team.
Results: Numerous studies demonstrate that child maltreatment cases are concentrated in disadvantaged areas. A number of socio-economic characteristics of neighborhoods have been shown to correlate with child maltreatment rates as measured by official reports to child protective service agencies. Only a few studies examine direct measures of parenting behaviors associated with maltreatment, and these show a weaker relationship with neighborhood disadvantage. Moreover, the processes that link neighborhood conditions to either maltreatment reports or parenting behaviors are not yet confirmed by the research literature. Selection bias, neighborhood definitions and spatial influences are largely uncontrolled in the existing research.
Conclusions: We propose a framework for pursuing further study of neighborhoods and child maltreatment that addresses the gaps in the current literature. Neighborhood-based strategies to prevent and reduce child maltreatment

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will be enhanced by research that provides a better understanding of how neighborhood conditions act as stressors or supports for families at risk of child maltreatment.

Keywords: Child maltreatment; Neighborhoods; Etiology

Introduction

Conceptualization of the etiology of child maltreatment has evolved from a focus on the individual characteristics of children or their parents to ecological models that highlight the interactions among individuals, families, neighborhoods, and larger communities. One aspect of the ecology, the neighborhood, has received increased research attention in recent years. Although the concentration of child maltreatment in particular neighborhoods is well established (Coulton, Korbin, Su, & Chow, 1995; Drake & Pandey, 1996; Ernst, 2001; Freisthler, 2004; Fromm, 2004; Garbarino & Crouter, 1978; Garbarino & Sherman, 1980; Hyde, 1999; Zuravin, 1986, 1989), studies have yet to confirm the processes that explain these patterns. Thus, how neighborhoods influence child maltreatment remains unclear and this lack of clarity limits the applicability of this line of research to the field.

As a first step toward addressing these ambiguities, this article critically reviews the extant literature on neighborhoods and child maltreatment. The review is guided by a framework that delineates several possible pathways for neighborhood influence. The proposed framework does not tackle the entire etiological question, but rather focuses on the ways in which where a family lives might influence the chances that a child will experience maltreatment and/or be the subject of a child maltreatment report. The review is based on studies that specifically include neighborhood as a measured and primary factor in child maltreatment. The article summarizes the main findings of the studies, identifies a number of conceptual and methodological challenges and points to a future research agenda that would examine alternative explanations for the apparent concentration of child maltreatment in disadvantaged neighborhoods.

Two major research traditions have influenced the thinking about the relationships between neighborhoods and child maltreatment: one focuses on social disorganization and the other on ecological-transactional development. The first tradition, led by sociologists and social workers, examines the relationship between geographic concentrations of social problems and social processes within neighborhoods thought to contribute to social control, such as network ties, shared norms, collective efficacy, institutional resources, and routines (Sampson, Morenoff, & Gannon-Rowley, 2002). Testa and Furstenberg (2002) note that social workers and sociologists as far back as the early 1900s have repeatedly documented "the tendency for delinquent and neglected children to concentrate geographically in a common set of Chicago neighborhoods" (p. 238). More recently, the focus has turned to the consequences of concentrated poverty in central city neighborhoods and the accompanying social isolation from the mainstream as a factor in a number of poor outcomes for children (e.g., Wilson, 1987; for a review see Small & Newman, 2001). In response to this concern, there is tremendous interest in how neighborhoods can be strengthened to support families and to reduce child maltreatment (Melton, 2005; US Advisory Board on Child Abuse and Neglect, 1993). The strength of the social disorganization tradition is that it describes some of the specific social structures and process within neighborhoods that may be related to child maltreatment and other problems and provides some explanation as to how social structure and

process are related. However, social disorganization theory provides little specificity about how these neighborhood characteristics might influence the behaviors and development of children and families.

The second tradition, led by developmental psychologists, examines how child development and parenting are influenced by the environment, including neighborhoods (Belsky, 1993; Belsky & Jaffee, 2006; Bronfenbrenner, Moen, & Garbarino, 1984; Cicchetti & Lynch, 1993; Garbarino, 1977). In 1991, the Commissioner for Children, Youth, and Families in the US Department of Health and Human Services asked the National Academy of Sciences to convene an expert panel on child maltreatment research (National Research Council, 1993). The panel selected a developmental/ecological/transactional model of the etiology of child maltreatment to review the existing research. The model views child maltreatment within a system of risk and protective factors interacting across four levels: the individual or ontogenic level, the family or microsystem level, the exosystem (which includes neighborhoods), and the social or macrosystem. More recently, this model has been used to demonstrate reciprocal relationships between children's exposure to community violence, child maltreatment, and child functioning over time (Cicchetti & Valentino, 2006). The strength of this approach is that it describes some of the specific ways the environment may influence the transactions between a parent and child and between a family and the neighborhood. However, the ecological-transactional model provides limited explanation about how neighborhood conditions and social processes influence these transactions and about how and why these neighborhood conditions and processes occur.

Framework for interpreting research on neighborhoods and child maltreatment

Although both of the above traditions are pertinent to a review of the research on neighborhoods and child maltreatment, a more concrete set of plausible paths of neighborhood influence is needed in order to interpret existing studies and assess the current state of understanding. We propose such a framework in Fig. 1, which sets forth hypothetical mechanisms drawn from social disorganization theory and the ecological-transactional model, but is also informed by literature on neighborhood selection (Duncan, Magnuson, & Ludwig, 2004) and neighborhood stigmatization (Sampson & Raudenbush, 2004).

Fig. 1 illustrates several pathways that may account for the correlation between child maltreatment and neighborhood characteristics. This framework is offered here as a way of organizing the literature and acknowledging the possibility of competing explanations for the observed patterns, not as an etiological model of child maltreatment. At the outset, it is important to note that on the far right of the diagram, outcomes are divided into maltreatment behaviors and maltreatment reports. This distinction is important in examining the research literature because study findings tend to differ depending on whether maltreatment is measured using records of child protective service (CPS) agencies or measures of parental behavior or self-reports of maltreatment victims. Moreover, these alternative outcome measures suggest that different causal mechanisms may be involved.

The first path in Fig. 1 is labeled *behavioral influences* and reflects the possibility that neighborhood structure fosters social processes within neighborhoods that are experienced by families and children in ways that result in maltreating behaviors and child victimization. The second path, *definition*, *recognition*, *and reporting*, postulates that neighborhood conditions are associated with neighborhood differences in how maltreatment is defined, recognized, and reported, leading to variation in child maltreatment reports, but not necessarily child maltreatment behaviors. The third path, *selection*, acknowledges that children and families are not randomly assigned to neighborhoods, and that their pre-existing (and unmeasured)

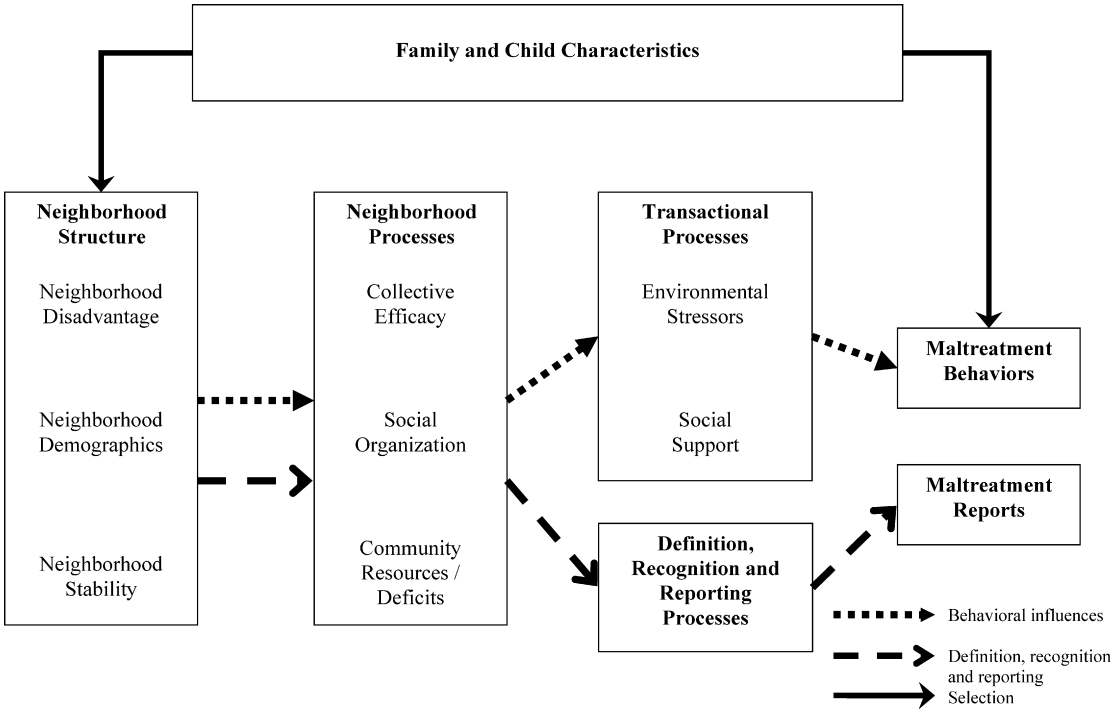

Fig. 1. Alternative pathways of neighborhood influences on child maltreatment.

characteristics may be correlated with neighborhoods and with either maltreatment behaviors or official reports of maltreatment. Each pathway is explained more fully below.

The *behavioral influences pathway* concerns the neighborhood effects that are of most interest to the field. An understanding of how neighborhood conditions influence behavior that leads to child maltreatment is needed to design neighborhood interventions that increase neighborhood protective factors and decrease risk factors that contribute to these child maltreatment behaviors. In this pathway, neighborhood structure, which is the aspect of neighborhood most commonly measured in the studies reviewed here, is viewed as potentially linked to levels of collective efficacy, social organization, and community resources and deficits. These in turn foster various social stressors and supports that can bolster or weaken transactions between parents and their children and, therefore, contribute to child maltreatment behaviors. The plausibility of this pathway is supported by a number of studies that demonstrate a relationship between measures of neighborhood disadvantage or stability and social processes, such as social disorder or collective efficacy (Sampson et al., 2002). Moreover, there is evidence that adverse neighborhood social conditions, such as social disorganization and instability, are associated with aspects of psychological and social distress (Ross, 2000; Ross, Reynolds, & Geis, 2000), which may in turn affect the transactions between parents and children (Leventhal & Brooks-Gunn, 2000; Lynch & Cicchetti, 2002), including child maltreatment.

The second pathway in Fig. 1 illustrates the possible influence of neighborhood characteristics on the *definition*, *recognition*, *and reporting* of child maltreatment, independent of child maltreatment behaviors. This path is very important in assessing the existing literature because the majority of the studies we review

used official maltreatment reports to child protective services as their measure of the dependent variable rather then either parental behaviors or self-reports of victimization. Although the literature on bias in child maltreatment reports generally does not find surveillance or reporting bias when the decision makers are professionals (Barth, 2005; Chaffin & Bard, 2006; Drake & Zuravin, 1998), there may be undiscovered neighborhood differentials in the reporting process. In particular, nonprofessionals (who made 44% of the reports in 2004) may be influenced by various aspects of the neighborhood in defining, recognizing, and reporting maltreatment (US Department of Health & Human Services, 2005). Indeed, studies suggest that neighborhoods and their residents may be stigmatized due to signs of disorder and high proportions of people of color in their areas, and this stigma can affect subsequent perceptions of events and occurrences by residents and nonresidents alike (Sampson & Raudenbush, 2004). Also, studies have shown that residents from neighborhoods that vary in perceptions of neighborhood disorder have different views of the etiology of child maltreatment and what to do about it (Garcia & Herrero, 2006; Korbin, Coulton, Lindstrom-Ufuti, & Spilsbury, 2000). Moreover, it is plausible that the process of defining and recognizing child maltreatment may differ in neighborhoods where extremely large proportions of the families have been investigated for maltreatment. For example, a longitudinal study in Cleveland estimated that 46.6% of the children who live in inner-city neighborhoods will be investigated for child maltreatment some time between their birth and 10th birthday compared to 19.0% of the children who live in the suburbs (Sabol, Coulton, & Polousky, 2004). Roberts (2002) acknowledges that little is known about the potential impact of high geographic concentration of child welfare system involvement, but she speculates that it may have similarities to the collateral consequences of mass incarceration. We are not suggesting that there is clear empirical evidence to support the existence of neighborhood effects on child maltreatment definition, recognition, and reporting, but the possibility of such effects compounds the challenges of understanding the relationship between neighborhoods and maltreatment and should be considered in future research.

An additional complication with using official child maltreatment reports to measure the relationship between neighborhoods and child maltreatment is that official CPS data do not necessarily correlate with self-report measures of maltreatment behaviors. For example, Coulton, Korbin, and Su (1999) found that parents' scores on the Child Abuse Potential (CAP) scale (Milner, 1986, 1994) differed only modestly across neighborhoods compared with official child maltreatment rates, which varied more widely. This finding raises the possibility that neighborhood processes affect the definition, recognition, and reporting of child maltreatment cases more than actual child maltreatment behaviors.

The third pathway, *selection*, recognizes that an alternative explanation for neighborhood patterns of child maltreatment may involve the kinds of families and children who end up in neighborhoods with particular characteristics. Sampson et al. (2002) note that selection bias is probably the biggest challenge facing neighborhood effects research in general. Selection bias refers to the possibility that neighborhood effects are due to residential mobility decisions. For example, residents in neighborhoods with high concentrations of social problems may have been constrained to live in disadvantaged areas because they lack sufficient resources to live elsewhere, or they may have been selected to live there because that is where public housing is located. This could mean parents are selected into neighborhoods based on individual attributes related to child maltreatment. This problem is referred to as endogeneity bias because the researcher cannot be sure whether neighborhood context is a causal factor in child maltreatment or whether parental characteristics, especially those that are unmeasured, are determining neighborhood choice (Duncan et al., 2004). Selection is likely to be important in the neighborhood child maltreatment literature as several studies have found that residential turnover and mobility are significant predictors of

child maltreatment (Coulton et al., 1995; Ernst, 2001; Fromm, 2004; Hyde, 1999). A recent study of the effect of early child maltreatment on later criminal behavior found that the effect was strongest for those individuals from the most disadvantaged and most stable neighborhoods, suggesting possible selection effects (Schuck & Widom, 2005). Given this potential evidence of selection, Fig. 1 includes pathways indicating that family and child characteristics, often unmeasured, may place them at high risk of living in disadvantaged neighborhoods and of engaging in behaviors that result in child maltreatment.

In order to identify the behavioral influences of neighborhoods, researchers must differentiate them from the effects of child maltreatment definition, recognition, and reporting as well as from selection effects. With this framework in mind, we review the existing research related to how neighborhood characteristics and processes are associated with child maltreatment, how studies have measured neighborhood effects, and how neighborhoods and maltreatment are defined in these studies. We conclude with suggestions for future research using the proposed framework to study the relationships between neighborhoods and child maltreatment.

Selection of studies under review

This review included studies that examined the effects of neighborhood characteristics on child maltreatment. We limited the review to studies that relied on geographically defined neighborhoods as the primary unit of analysis (including multilevel studies with individuals nested within neighborhoods). Neighborhoods definitions included census defined geography (block groups, census tracts, and census clusters), zip codes, and programmatic catchment areas. In all cases the authors articulated a rationale for why they considered the geographic area to resemble a neighborhood. We did not include studies that used larger geographic units of analysis, such as cities, counties, or states (e.g., Krishnan & Morrison, 1995; Weissman, Jogerst, & Dawson, 2003). These areas are too large to reasonably approximate a neighborhood and are more appropriately thought of as part of the community or macrosystem context in the ecological model (Bronfenbrenner et al., 1984; Garbarino, 1976). As others have noted, such large areas usually contain very heterogeneous populations and conditions that may be difficult to characterize in terms of predominant characteristics (Zuravin & Taylor, 1987).

The selection of studies included in this review entailed a search of relevant databases (*Psychinfo*, *Sociological Abstracts*, *Medline*) for articles published in the English language between 1975 and 2005. In addition, we searched *Dissertation Abstracts* for doctoral dissertations and master's theses that met our criteria. Search terms used to identify appropriate articles included: "child and (maltreat* or abuse or neglect)" in combination with, "neighbor*, communit*, spatial, geograph*." Additional relevant studies were identified through a review of the references cited in those articles. Lastly, we circulated the list to experts in the field and asked them to suggest additional studies that met our criteria.

Summary of key findings

The search yielded a total of 25 studies. Table 1 lists the studies in alphabetical order along with a description of their definition of neighborhood, sampling methods, measures, study design, and key findings. Collectively, these 25 studies indicate the following: (1) neighborhood structural factors, economic in particular, are most consistently linked to child maltreatment; (2) measures of neighborhood

Table 1
Summary of neighborhood child maltreatment research

Authors	Neighborhood unit	Sample/data source	Measures and design	Main findings
Coulton et al. (1999)	Block groups ($N = 20$)	Cleveland, OH	Structural factors (impoverishment, child care burden, residential instability)	Impoverishment, child care burden, instability → (small −) perceived resources and control
		1991–1993 CPS data	Process factors (perceptions of resources, social control)	Impoverishment, child care burden, instability → (−) CAP
		1990 Census	Outcome measures: maltreatment report (rate per child, substantiated and indicated, all types combined); maltreatment behavior (self-reported Child Abuse Potential (CAP))	Cross level interaction effects:
		Interview with parents ($N = 400$)	Design: Multilevel Model	Neighborhood impoverishment × violence in the family of origin Neighborhood child care burden × education (some evidence that adverse neighborhood conditions weaken the effects of individual risk and protective factors)
Coulton et al. (1995)	Census tracts ($N = 177$)	Cleveland, OH	Structural factors (impoverishment, child care burden, instability, geographic location contiguous to poverty)	Impoverishment → (+) child maltreatment rates
		1991 CPS data	Outcome measure: maltreatment report (rate per child, indicated and substantiated, all types combined)	Child care burden → (+) child maltreatment rates
		1990 Census	Design: Aggregate Level Study	Instability → (+) child maltreatment rates Contiguous to poverty → (+) child maltreatment rates Interaction effects: Impoverishment × instability → (−) child maltreatment rates (instability has a greater effect in areas with less impoverishment)
Deccio et al. (1994)	Census tracts ($N = 43$)	Spokane, WA	Structural factors (poverty, race, housing characteristics)	Neighborhood poverty → (+) child maltreatment rates
		1988 CPS data	Process factors (perceived neighborhood social support; perceived parenting support)	Comparison of high and low-risk neighborhoods:
		1980 Census	Outcome measure: maltreatment report (reported, all types combined)	Unemployment rate greater in high-risk neighborhood (20% vs. 7%)
		Parent interview ($N = 56$) in two selected neighborhoods – one with a high rate (241/1000), and one with a low rate (108/1000) – of CPS reports	Design: Aggregate Level Study	% of families living below poverty greater in high-risk neighborhood (26% vs. 17%) % of families in current home for >5 years greater in low-risk neighborhoods (52% vs. 35%) % of housing units that are vacant greater in high-risk neighborhoods (16% vs. 7%) % of families without telephones greater in high-risk neighborhoods (24% vs. 7%)

Table 1 (*Continued*)

Authors	Neighborhood unit	Sample/data source	Measures and design	Main findings
Drake and Pandey (1996)	Zip codes ($N = 185$)	Missouri	Structural factors (poverty, housing characteristics, dropout rate, family characteristics, race)	% of families in poverty → (+) maltreatment reports (sexual abuse, physical abuse, and neglect)
		1992 CPS data	Outcome measure: maltreatment report (rate per family, reported and substantiated, physical abuse, sexual abuse, and neglect)	Lower property values → (+) maltreatment reports (sexual abuse and physical abuse)
		1990 Census	Design: Aggregate Level Study	% 2-parent families → (+) maltreatment reports (physical abuse and neglect)
		Subgroup analysis: 7 low poverty zipcodes, 10 moderate poverty zipcodes, and 6 high poverty zipcodes		Drop out rate → (+) neglect reports Subgroup analysis: The substantiation rate for neglect and physical abuse is higher in higher poverty neighborhoods
Ernst (2000)	Census tracts ($N = 159$)	Montgomery County, MD	Structural factors (poverty, housing stress, housing factors, family characteristics, labor force participation, housing stability)	Higher poverty → (+) rates of physical abuse
		1995 CPS data	Outcome measure: maltreatment report (rate per family, investigated, physical abuse, neglect and sexual abuse)	Lower median property value → (+) rates of physical abuse
		1990 Census	Design: Aggregate Level Study	Lower female labor force participation → (+) rates of physical abuse Higher movement within 1 year → (+) rates of physical abuse Higher % of single family dwellings → (+) rates of sexual abuse Lower median property values → (+) rates of sexual abuse Lower % of female labor force participation → (+) rates of sexual abuse Lower % of new arrivals → (+) rates of sexual abuse
Ernst (2001) [*replication of Coulton et al. (1995)]	Census tracts ($N = 159$)	Montgomery County, MD	Structural factors (instability, economic disadvantage, family characteristics)	Economic disadvantage → (+) child maltreatment rates
		1995 CPS data	Outcome measure: maltreatment report (rate per family, investigated, all types combined)	Instability → (+) child maltreatment rates
		1990 Census	Design: Aggregate Level Study	Interaction effects: Impoverishment × instability → (−) child maltreatment rates (instability has a greater effect in areas with less impoverishment)
Freisthler (2004)	Census tracts ($N = 940$)	Alameda County, Sacramento County and Santa Clara County, CA	Structural factors (impoverishment, child care burden, residential instability, immigrant concentration, alcohol access, population density)	Population per square mile → (−) child maltreatment rates
		2000 CPS data	Outcome measure: maltreatment report (rates per children, substantiated, all types combined)	% female headed families → (+) child maltreatment rates

		2000 Census Focus groups in one county	Design: Spatial Pattern Analysis	% poverty → (+) child maltreatment rates, % of unemployment → (+) child maltreatment rates % Hispanic residents → (+) child maltreatment rates Population growth → (−) child maltreatment rates # of bars per 1000 population → (+) child maltreatment rates Focus groups: Three theories on why neighborhoods differ in terms of child maltreatment rates emerged (neighborhood stress, social isolation, and fear)
Freisthler, Midanik et al. (2004)	Census tracts ($N = 940$)	Alameda County, Sacramento County and Santa Clara County, CA 2000 CPS data 2000 Census	Structural factors (family characteristics, poverty, unemployment, vacant housing, residential stability, race/ethnicity, child to adult ratio, alcohol access, population density) Outcome measure: maltreatment report (rates per children, substantiated, physical abuse and neglect) Design: Spatial Pattern Analysis	% female headed households → (+) child physical abuse % living in poverty → (+) child physical abuse % Hispanic → (+) child physical abuse # off-premise outlets/1000 population → (+) child physical abuse % female headed households → (+) child neglect % living in poverty → (+) child neglect % unemployed → (+) child neglect # bars/1000 population → (+) child physical abuse Population per square mile → (−) child neglect
Fromm (2004)	Neighborhood clusters ($N = 290$)	Chicago, IL CPS data 1990 Census 1995/1996 Project on Human Development in Chicago Neighborhoods (PHDCN) Community Survey ($N = 8783$)	Structural factors (residential stability, adults per child, concentrated disadvantage, concentrated affluence, immigrant concentration, population density) Process factors (intergenerational closure, reciprocal exchange, child centered social control) Outcome measure: maltreatment report (not further specified) Design: Aggregate Level Study	Residential stability → (−) child maltreatment rates Adults per child → (+) child maltreatment rates Concentrated disadvantage → (+) child maltreatment rates Population density → (+) child maltreatment rates Interaction effects: Intergeneration closure × concentrated disadvantage (concentrated disadvantage has less of a negative effect in areas with greater intergenerational closure)

Table 1 (*Continued*)

Authors	Neighborhood unit	Sample/data source	Measures and design	Main findings
				Intergeneration closure × concentrated affluence (concentrated affluence has a greater positive effect in areas with greater intergenerational closure) Reciprocal exchange × concentrated disadvantage (concentrated disadvantage has less of a negative effect in areas with greater reciprocal exchange) Reciprocal exchange × concentrated affluence (concentrated affluence has a greater positive effect in areas with greater reciprocal exchange) Child centered social control × concentrated disadvantage (concentrated disadvantage has less of a negative effect in areas with greater child centered social control) Child centered social control × density (density has less of a negative effect in areas with greater child centered social control) Child centered social control × immigrant concentration (immigrant concentration had a greater effect in areas with greater child centered social control)
Garbarino and Crouter (1978)	County subareas ($N = 20$)	Douglas County, NB	Structural Factors (poverty, family characteristics, residential stability)	In areas experiencing economic stress, reports are more likely to be made by distant sources
	Census tracts ($N = 93$)	1976 CPS data	Process factors (feelings about neighborhood)	In higher income areas, reports are more likely to be made by close sources
		Census	Source of report (distant, close)	Cases of neglect were more likely to be substantiated if they occurred in low-income areas (only significant for subareas)
		Community survey ($N = 1992$)	Outcome measure: maltreatment report (rate per family, investigated and substantiated, all types combined and child abuse and neglect separately) Design: Aggregate Level Study	
Garbarino and Kostelny (1992)	Communities (city areas used by government for organizing with historical significance, well known names, and between 20 and 36 census tracts) ($N = 4$)	Chicago, IL	Structural factors (poverty, unemployed, family characteristics, housing characteristics, race/ethnicity, educational attainment, residential stability)	% female headed households in African American communities → (−) child maltreatment rates
	Census tracts within areas ($N = 113$)	1980–1986 CPS data	Outcome measure: maltreatment report (substantiated, all types combined)	% female headed households in Hispanic communities → (+) child maltreatment rates
		Community survey with leaders and social service clients	Design: Aggregate Level Study	% living in overcrowded housing → (+) child maltreatment rates (stronger association in Hispanic communities $r = .45$ vs. $r = .24$)

		4 communities—2 predominantly African American, 2 predominantly Hispanic. For each—one high risk (actual rate higher than predicted) and one low risk (actual rate lower than predicted)		Comparison of neighborhoods: In area where child maltreatment rates were increasing over time, interviewees knew less about community services, demonstrated little evidence of formal or informal networks and supports, reported less positive feeling about political leaders, and had less of a sense of belonging or community Deaths due to maltreatment were twice as likely in North compared to West in the time period studied
Garbarino and Sherman (1980)	Neighborhoods (not defined—assume census tracts) ($N = 2$)	Chicago, IL 1976 CPS data Interviews with expert informants and with mothers ($N = 46$) Two neighborhoods—one high risk (actual maltreatment rate higher than predicted and one low risk (actual maltreatment rate lower than predicted)	Process factors (child social resources; demands for social readjustment, maternal rating of family stresses and supports) Outcome measure: maltreatment report (rate per family, all types not further specified) Design: Aggregate Level Study	Interviews with expert informants: Ratio of negative to positive comments about neighborhood higher in high-risk neighborhoods (1.7:1 in the low-risk neighborhood, 7:1 in the high-risk neighborhood) Interview with parents: In low-risk neighborhood: More likely to assume exclusive and direct responsibility for child care More likely to use the neighborhood as a resource Lower on the social readjustment "stress" scale More likely to include professionals in list of people to call on for help Included a greater number of people listed in child's social network - More likely to rate their neighborhood as a better place to raise children More likely to say their children are easy to raise Rated the availability of child care higher More likely to engage in neighborhood exchanges
Gillham et al. (1998)	Social work areas ($N = 22$)	Glasgow, Scotland 1991–1993 CPS data 1991 Census	Structural factors (unemployment, single parent density, child poverty) Outcome measure: maltreatment report (rate per child, referrals and registrations, physical abuse, sexual abuse and neglect) Design: Aggregate Level Study	Unemployment → (+) child maltreatment rates (association stronger with male unemployment) Single parent density → (+) child maltreatment rates Child poverty → (+) child maltreatment rates

Table 1 (*Continued*)

Authors	Neighborhood unit	Sample/data source	Measures and design	Main findings
		1991–1993 Unemployment data		Relationship strongest with physical abuse (less strong with neglect, uncertain with sexual abuse)
		1991–1993 child poverty data		
Hyde (1999) [*replication of Coulton et al. (1995)]	Census tracts ($N = 195$)	Baltimore, MD	Structural factors: (impoverishment, child care burden, residential instability)	Impoverishment → (+) child maltreatment rates
		1995 CPS data	Outcome measure: maltreatment report (rate per family, reports, all types combined)	Instability → (+) child maltreatment rates
		1990 Census	Design: Aggregate Level Study	
Kim (2004)	Block groups ($N =$ not specified)	United States	Structural factors (ethnicity, residential mobility, SES, single headed households, housing quality, violent crime)	Violent crime rate → (+) child maltreatment rates
		1990 Census	Process factors (social network, happiness with neighborhood, feeling of safety, neighborhood resources)	Cross level interaction effects:
		1994 and 1996 Add Health Survey ($N = 2960$ parents with at least one child at wave III data collection)	Geographical neighborhood characteristics (proportion urban, census region)	Birth weight × perceived neighborhood resources (birth weight had less of an effect in neighborhoods where respondents perceived more resources)
			Outcome measure: maltreatment behavior (self-reported physical abuse, neglect, and involvement with CPS-investigation or tried to remove child)	Developmental difficulties × violent crime rate (parents of a child with developmental difficulties are more likely to abuse their children when they live in an area with more violent crime)
			Design: Multilevel Model	Developmental difficulties × urbanity (parents of a child with developmental difficulties are less likely to abuse their children when they live in urban areas)
				Developmental difficulties × perceived neighborhood resources (parents of a child with developmental difficulties are less likely to abuse their children when they perceive more neighborhood resources)
				Physical abuse is more associated with family system variables
				Neglect is more associated with neighborhood variables
Korbin et al. (1998)	Census tracts ($N = 283$–94 of which were >75% African American tracts, and 189 of which were >75% European American)	Cleveland, OH	Structural factors: (impoverishment, child care burden, residential instability)	Impoverishment → (+) child maltreatment rates (effect weaker in African American communities)
		1991 CPS data	Outcome measure: maltreatment report (rate per child, substantiated and indicated, all types combined)	Child care burden → (+) child maltreatment rates (only significant in European American communities)
		1990 Census	Design: Aggregate Level Study	Residential instability → (+) child maltreatment rates (only significant in European American communities)

		Ethnographic observation and interviews in four tracts (two with low and two with high maltreatment rates. In each, one African American and one European American)		Ethnographic findings: Suggest that the differential effect of impoverishment may be mediated by the perceived quality and social connectedness found in different neighborhoods
Manabe (2004)	Census tracts ($N = 20$)	Cleveland, OH	Structural factors (poverty, residential stability)	Poverty → (+) child maltreatment rates (however, poverty is no longer significant in models that include interaction between residents, community disorganization, and residential stability)
		1991–1993 CPS data	Process factors (interaction between residents, community disorganization)	Use of public spaces (Interaction between residents) → (−) child maltreatment rates
		1991 Census	Outcome measure: maltreatment report (rate per child, substantiated and indicated, all types combined)	Community disorganization → (+) child maltreatment rates
		Survey of households with children under 18 ($N = 400$) conducted by Korbin and Coulton (1997)	Design: Aggregate Level Study	
Molnar et al. (2003)	Neighborhood clusters ($N = 343$)	Chicago, IL	Structural factors (concentrated disadvantage, immigrant concentration, residential stability, homicide rate)	Concentrated disadvantage → (+) PCPA
		1995 crime data	Process factors (social networks, collective efficacy, informal social control, social cohesion)	Community violence (homicide rate) → (+) PCPA **But both were not significant when family characteristics were entered in the model
		1990 Census	Outcome measure: maltreatment behavior (parent to child physical aggression (PCPA) measured using the conflict tactics scale)	Immigrant concentration → (−) PCPA
		1995 Project on Human Development in Chicago Neighborhoods (PHDCN) Community Survey ($N = 8872$)	Design: Multilevel Model	Social networks → (−) PCPA (for Hispanics only)
Paulsen (2003)	Census tracts ($N =$ not specified)	Charlotte, NC	Structural factors (poverty, family characteristics, neighborhood instability, race)	Neighborhood disadvantage → (+) child abuse rates
		2000 official police records	Outcome measure: maltreatment report (child abuse and child neglect victimizations per 1000 housing units, juvenile assault rate per 1000 juveniles)	Neighborhood disadvantage → (+) juvenile assault rates
		2000 Census	Design: Spatial Pattern Analysis	% black → (+) juvenile assault rates Hot spot analysis: Child neglect is more spatially compact compared to child abuse Low neighborhood instability in all three types of hot spots Child abuse and juvenile assault hot spots strongly associated with neighborhood disadvantage (child neglect less so) None associated with neighborhood instability

Table 1 (*Continued*)

Authors	Neighborhood unit	Sample/data source	Measures and design	Main findings
Testa and Furstenberg (2002)	Chicago neighborhoods ($N = 75$)	Chicago, IL	Structural factors (poverty, single parenthood, race, delinquency rates)	62% of the variance in 1989–1991 rates of child maltreatment is explained statistically by the community's 1962–1965 delinquency rates
		1962–1965 study of delinquency (Shaw & McKay)	Outcome measure: maltreatment report (substantiated, all types combined, physical abuse and neglect, sexual abuse, substance exposed infants, lack of supervision)	Weaker ecological correlations with physical and sexual abuse than with neglect (physical and sexual abuse more evenly distributed across neighborhoods while neglect tends to cluster in neighborhoods with high poverty and a higher percentage of single parent homes)
		1992 study of maltreatment (Garbarino & Kolinsky)	Design: Aggregate Level Study	More within community variance than between community variance in delinquency, abuse and neglect over time even as the inhabitants of the neighborhoods changed
Vinson et al. (1996)	Collector's districts (Australian census units) ($N = 2$)	West Sidney, Australia	Process factors: (social support)	Network structure (higher interaction between levels of home, acquaintance and neighbor networks) → (−) child abuse rates
		CPS data	Outcome measure: maltreatment report (confirmed, all types combined)	
		Interviews with caregivers of children under 16 ($N = 97$)	Design: Aggregate Level Study	
		Two Collector's districts (one with a high rate one with a low rate)		
Young and Gately (1988)	Block groups ($N = 155$)	El Paso, TX	Structural factors: (labor force participation, family characteristics, residential stability)	% of residents who moved to neighborhood within last 5 years → (+) child abuse rates
		1984 CPS data	Outcome measure: maltreatment report (rate per family, at least "reason to believe," all types combined)	Subgroup analysis by sex of perpetrator:
		1980 Census	Design: Aggregate Level Study	% unemployed households → (+) child abuse rates (only for males) % female headed households → (+) child abuse rates (stronger for males) % of females in labor force → (−) child abuse rates (stronger for females) % of residents who moved to neighborhood within last 5 years → (+) child abuse rates (only for females)
Zuravin (1986)	Census tracts ($N = 202$)	Baltimore, MD	Structural factors (race, class, labor force participation, poverty, housing density)	Race → (+) child abuse and neglect rates
		1983–1984 CPS data	Outcome measure: maltreatment report (rate per family, reports, physical and sexual abuse (together) and neglect separately)	Class → (+) child abuse and neglect rates
		1980 Census	Design: Aggregate Level Study	% housing units with 1.51 or more persons per room → (+) child abuse and neglect rates (more strongly associated with neglect)

Zuravin (1989)	Census tracts ($N = 202$)	Baltimore, MD	Structural factors (poverty, family characteristics, labor force participation, residential stability, housing characteristics)	% families at <200% poverty level → (+) child abuse and neglect rates
		1983–1984 CPS data	Process factors (social support)	% of married women with children <6 in workforce → (−) child abuse and neglect rates
		1980 Census	Outcome measure: maltreatment report (rate per family, reports, physical and sexual abuse (together) and neglect separately)	% of families living in current residence <1 year → (+) child abuse and neglect rates (only for neglect)
			Design: Aggregate Level Study	% single family dwellings → (+) child abuse and neglect rates
				% vacant housing → (+) child abuse and neglect rates
Zuravin and Taylor (1987)	Census tracts ($N = 202$)	Baltimore, MD	Structural factors (poverty, teenage motherhood)	Low economic status and teen motherhood accounts for 38.5% of the variance in neighborhood rates of CAN
		1983–1984 CPS data	Outcome measure: maltreatment report (rate per family, reports, physical abuse, sexual abuse, and neglect)	Mapping:
		1980 Census	Design: Aggregate Level Study	Areas with different level of risk are generally located in different areas of the city
				Spot mapping reveals clustered distribution pattern

"processes" generally have weaker associations than structural factors (however they have been much less studied); and (3) some evidence exists indicating that neighborhood effects differ by type of maltreatment. The discussion of the studies that follows is organized around each of these points.

Links between neighborhood structural factors and maltreatment

The studies demonstrated consistent associations between neighborhood maltreatment rates and neighborhood characteristics, particularly structural characteristics. There is considerable agreement in these findings despite differences in study populations and measures. Coulton et al. (1995), found that neighborhood socio-economic factors correlated with rates of maltreatment in Cleveland, Ohio as did Ernst (2001) in Montgomery County, Maryland. Similarly, Drake and Pandey (1996) found neighborhood characteristics correlated with abuse and neglect rates in Missouri. Garbarino and Crouter (1978) determined that neighborhood social and economic deprivation was correlated with maltreatment rates in Douglas County (Omaha), Nebraska. Gillham et al. (1998) estimated high correlations between male unemployment rates and child maltreatment for neighborhoods in Glasgow, Scotland. Young and Gately (1988) found that residential turnover was predictive of child maltreatment in El Paso, TX neighborhoods. Zuravin (1989) showed that neighborhood economic conditions were associated with rates of child maltreatment in Baltimore, Maryland. The most consistent results across these studies have involved associations between rates of child maltreatment and indicators of the economic status or resources of the neighborhood including: income level (Deccio, Horner, & Wilson, 1994; Garbarino & Crouter, 1978), median residential housing/property value (Drake & Pandey, 1996; Ernst, 2000), unemployment rate (Deccio et al., 1994; Freisthler, 2004; Freisthler, Midanik, & Gruenewald, 2004; Freisthler, Needell, & Gruenewald, 2004; Gillham et al., 1998; Young & Gately, 1988), poverty rate (Deccio et al., 1994; Drake & Pandey, 1996; Ernst, 2000; Freisthler, 2004; Freisthler, Midanik et al., 2004; Gillham et al., 1998; Zuravin, 1989), and low economic status (Zuravin & Taylor, 1987).

A number of studies have used factor analysis to develop neighborhood measures of impoverishment or disadvantage (Coulton et al., 1995, 1999; Ernst, 2001; Fromm, 2004; Hyde, 1999; Korbin, Coulton, Chard, Platt-Houston, & Su, 1998; Paulsen, 2003; Zuravin, 1986). These factor analyses vary in their specific variables but generally show that increased economic distress or disadvantage is associated with elevated rates of child maltreatment. Other structural factors of neighborhoods that have been associated with increased child maltreatment rates include measures related to increased child-care burden, (Coulton et al., 1995, 1999; Korbin et al., 1998), residential instability (Coulton et al., 1995; Deccio et al., 1994; Ernst, 2000, 2001; Fromm, 2004; Garbarino & Crouter, 1978; Hyde, 1999; Young & Gately, 1988; Zuravin, 1989), vacant housing (Deccio et al., 1994; Zuravin, 1989), lower female labor force participation (Ernst, 2000), overcrowding (Garbarino & Kostelny, 1992), and per capita density of alcohol outlets (Freisthler, 2004; Freisthler, Midanik et al., 2004).

In the language of our proposed framework (Fig. 1), these studies provide considerable support for a link between neighborhood structure and the rates of reported child maltreatment. However, they provide little information about the processes illustrated in the middle of our framework, and in particular do not reveal how neighborhood influences parental maltreatment behaviors rather than official child maltreatment reports. Additionally, due to the possibility of selection bias, these studies are unable to sort out the influence of neighborhood conditions from those unmeasured family characteristics that may have predisposed them to live in particular neighborhoods.

Neighborhood structural characteristics versus neighborhood processes

In an effort to shed light on the processes through which neighborhoods affect child maltreatment, several studies have examined the perceptions of parents or other community members regarding what might account for differences in maltreatment rates between neighborhoods that are demographically similar. Garbarino and Sherman (1980) compared neighborhoods with high and low maltreatment rates and found that neighbors in areas with high maltreatment rates expressed less willingness to exchange child care with neighbors and reported more stress in their lives. In a similar study, Deccio et al. (1994) concluded that the difference between neighborhoods with high and low child maltreatment rates was more precisely related to social integration (or lack thereof) rather than social impoverishment. Likewise, Ernst's (2001) study suggested that it is not the poverty rates so much as the extent to which neighbors know and rely on each other that is related to child maltreatment rates. Korbin et al. (1998) used ethnography in selected neighborhoods to demonstrate that impoverishment had a weaker effect on maltreatment rates when neighbors were more connected and more likely to support each other's parenting.

A few researchers have attempted to uncover the specific mechanisms that contribute to or weaken social integration in neighborhoods. For example, in a re-analysis of the data from Coulton et al. (1999), Manabe (2004) found that use of public space was negatively correlated with maltreatment while keeping other factors constant. Work by Paulsen (2003) and Testa and Furstenberg (2002) suggested that high maltreatment neighborhoods are located near the center city or downtown rather than on the outer edges of the city, suggesting that specific processes that increase stress on families may be more prevalent in the concentric circles of poverty that surround the inner city.

While all of these neighborhood process studies provide some clues regarding the relationships between neighborhoods and child maltreatment, the field is still far from identifying the specific mechanisms that account for neighborhood differences in maltreatment rates. However, following the logic of the framework in Fig. 1, these studies help illustrate the possibility that the economic or demographic structure of the neighborhood influences social relationships and that these in turn play a role in maltreatment. Further research is necessary to show more specifically how those neighborhood processes are related to family stress or support, as well as how neighborhood experiences mitigate or aggravate the risk of maltreatment.

Associations between neighborhoods and maltreatment differ by type of maltreatment

Although the number of studies that differentiate the types of maltreatment is limited, a few studies suggest that neighborhoods may affect types of maltreatment differently. For example, Drake and Pandey (1996) found that the association with neighborhood poverty was strongest for neglect, somewhat less for physical abuse, and moderate for sexual abuse. Similarly, Kim (2004) found that two structural aspects of neighborhoods (low SES and high violent crime rate) were significantly associated with neglect, but not with physical abuse. Ernst (2000) found that while economic resource variables were associated with physical abuse, neglect and sexual abuse, social resource variables were associated with physical and sexual abuse, but not neglect. Freisthler, Midanik et al. (2004) found that the per capita number of off-premise alcohol outlets (e.g., liquor, grocery, and convenience stores) was positively associated with physical abuse rates, while density of bars was significantly associated with neglect. Zuravin's (1986) study indicated that household crowding was more strongly associated with neglect than abuse (physical and sexual abuse combined). In a later study, Zuravin (1989) found that residential instability

was associated with increased rates of neglect but not abuse. In terms of spatial dynamics, Paulsen (2003) found that child neglect is more spatially concentrated than physical abuse. A tentative conclusion from this limited research is that neglect, compared to other types, may be more strongly associated with structural characteristics of neighborhoods (Drake & Pandey, 1996; Kim, 2004; Zuravin, 1989).

Again referring to Fig. 1, these findings support the link between neighborhood structure and maltreatment reports. What is less clear from these studies is the extent to which neighborhood is related to maltreatment behavior. Because CPS reports of neglect are perhaps the most difficult to relate to specific parental behaviors, the concern remains that the effect of neighborhood disadvantage on reports of neglect may occur at least partially through the *definition*, *recognition*, *and reporting* pathway.

Methodological issues in studies of neighborhoods and child maltreatment

Several methodological issues related to measurement and analysis should be considered when reviewing this literature. First, we consider the measurement of maltreatment and neighborhood, followed by a discussion of each of the three distinguishable analytical approaches that have been taken in these studies: (1) neighborhood-level ecological analyses, (2) multilevel analyses, and (3) spatial pattern analyses.

Measuring maltreatment

A major consideration when examining this literature is the measurement of child maltreatment. As seen in Table 1, 22 of the 25 studies reviewed relied solely upon child maltreatment report data from institutional sources (i.e., Child Protective Services). One study (Coulton et al., 1999) utilized both CPS data and the Child Abuse Potential Inventory (CAP), a parent-completed instrument that measures the propensity or potential for abuse (Milner, 1986, 1994). Two studies relied solely upon self-report data from parents. Molnar, Buka, Brennan, Holton, and Earls (2003) utilized a modified version of the Conflict Tactics Scale (CTS) (Straus, 1979) as a measure of latent potential for physical aggression. Kim (2004) utilized a series of four self-reported behavioral questions from the National Longitudinal Study of Adolescent Health (Udry, 2003). These studies that used measures of maltreatment other than official CPS reports found weaker neighborhood effects than those that used official maltreatment reports. These findings again raise the possibility that neighborhood may have a greater impact on the process of definition, recognition, and reporting of child maltreatment than on the behavior of parents, and suggest that researchers should consider combining and comparing different measures of maltreatment, such as official reports and self-reports (e.g., Coulton et al., 1999).

Measuring neighborhood

The measurement of neighborhoods presents another challenge. We found, as did Zuravin (1989) in her review of the ecology of child abuse and neglect, that the varying definitions of neighborhood were problematic because it is difficult to compare studies using different units of analysis. The optimal definition of neighborhood in a study begins with why the researchers think neighborhoods influence child maltreatment. If the researcher wants to test the influence of institutional resources on child maltreatment behavior or reporting, neighborhoods might be defined as fairly large areas with relatively high or low institutional resources that might support or hinder optimum child rearing or increase or

decrease the likelihood of families coming to the attention of a mandated reporter. On the other hand, if neighborhoods are thought of as a way to foster personal relationships, neighborhoods may be seen as a considerably smaller space. Given a specific theoretical framework, researchers can then turn to various measures of neighborhoods to explore whether they influence maltreatment in this hypothesized way.

Neighborhood level ecological analyses

The majority of the published studies carried out their analysis completely at the neighborhood level (19 of the 25). That is, both child maltreatment and the factors hypothesized to affect maltreatment were aggregated to neighborhood units. These studies typically used bi-variate correlations or OLS regression analysis to examine the relationship between maltreatment rates and socio-economic characteristics of the neighborhoods' population. An important limitation of these ecological analyses, related to the issue of neighborhood measurement, is that the strength of associations among the variables can be affected by the sizes and locations of the neighborhood units (Coulton, Cook, & Irwin, 2004; Heywood, Cornelius, & Carver, 1998). If the size or number of geographic units is changed, the relationships among variables measured on the area units may also change. An interesting example of this phenomenon comes from Australia. An initial study interviewed residents from two census units in Western Sydney that were relatively similar to each other except that one had a high maltreatment rate while the other was low. Survey results showed that residents' views of their neighborhoods were fairly similar in the two areas, suggesting little correlation between child maltreatment rates and residents' perceptions (Vinson, Baldry, & Hargreaves, 1996). However, after mapping the maltreatment reports in the areas, the researchers discovered a concentrated "hot spot" of maltreatment. Re-analysis of the survey data comparing the perceptions of residents from the hot spot with those outside it (Vinson & Baldry, 1999) revealed significant differences in residents' attachment to their neighborhoods. The degree of correlation between resident perceptions and maltreatment rates was stronger when smaller, more homogeneous neighborhood units were identified (Vinson & Baldry, 1999).

Multilevel models

In contrast to the aggregate level studies described above, only three studies have utilized multilevel modeling techniques, which simultaneously estimate effects on different ecological levels as well as interactions among levels: for example, individual, family, and neighborhood (Coulton et al., 1999; Kim, 2004; Molnar et al., 2003). In general, these multilevel studies have found smaller neighborhood effects than those aggregating to neighborhood units, with most outcome variance being explained at the individual and/or family level(s). For example, Molnar et al. estimated a three-level, hierarchical linear model of parent to child physical aggression (PCPA), and found that 44% of the variance was between individual children within the family, 54% between families within neighborhoods and 2% between neighborhoods. Coulton et al. studied Child Abuse Potential (CAP) scores of 400 families with children nested within 20 neighborhoods in Cleveland. Like Molnar et al., only 2–5% of the variance in CAP scores was found to be between neighborhoods. We caution against dismissing the importance of the small neighborhood effects in these multilevel studies for three reasons. First, there are only three multilevel studies, so more work is needed before reliable conclusions can be drawn. Second, selection bias may still be problematic in these studies. Third, as noted by Duncan and Raudenbush (1999), effect sizes

that program evaluators commonly view as important translate into small intraneighborhood correlations similar to those found in the three multilevel studies reviewed here.

Spatial patterns and dependence

A problem with most of the studies in the literature is that they do not account for the spatial processes implied by neighborhoods. Neighborhoods are not isolated social units but have a spatial location relative to one another. Moreover, even within the units defined as neighborhoods, differences exist in the proximity of people and events to one another. Such spatial dynamics may be missed by models that do not take space into account. Spatial processes are important to model for two reasons. First, they may reflect theoretically important mechanisms of social influence. Second, they may bias statistical estimates if they are ignored. Ecological studies that include a number of contiguous neighborhood units are particularly vulnerable to this statistical bias due to what is known as spatial autocorrelation (i.e., units close together in space may have correlated errors in statistical models due to unmeasured spatial processes). Only four of the studies in this review consider the spatial location of neighborhoods or maltreatment events.

Two of the studies treat spatial processes as a nuisance factor and control for them to eliminate statistical bias. Freisthler (2004) and Freisthler, Midanik et al. (2004) recognize that Ordinary Least Squares (OLS) regression assumes that errors are independent, and that this assumption may be violated in their study of factors affecting neighborhood child abuse rates. In order to correct for this possible spatial autocorrelation, these two studies estimate spatial regression models using Generalized Least Squares. The fact that spatial autocorrelation is significant in their models suggests that other studies of neighborhood child maltreatment rates that only estimate OLS models may be biased because they do not adjust for spatial dependence of the errors.

A third study covered in this review takes location into account by including a characteristic of contiguous neighborhoods as an explanatory factor in the statistical models. Coulton et al. (1995) model the spillover effects of concentrated poverty by including a variable indicating whether each neighborhood in their study shared a boundary with an extremely poor neighborhood. They find that this contiguity to concentrated poverty had a significant effect on neighborhood child maltreatment rates over and above the other explanatory factors within the neighborhoods. This finding further supports the contention that studies of neighborhoods and child maltreatment need to adjust for or explicitly model spatial influence.

A fourth study investigates the spatial clustering of child maltreatment cases. Paulsen (2003) examined the specific geographic locations of child maltreatment reports rather than aggregating child maltreatment into arbitrary neighborhood units. This is the only study in the existing literature that uncovers spatial patterns that do not comport with predetermined neighborhood boundaries. Indeed, the study finds that incidents of child neglect have a very compact spatial distribution, while child abuse incidents and juvenile assaults are more widely distributed. This finding could be indicative of a stronger neighborhood effect for child neglect than for the other types of incidents, or at least a stronger spatial autocorrelation that future studies should consider. The study illustrates the need for future research to examine spatial clustering and relationships at a finer level of detail using spatial statistics.

Discussion

Through this review we have demonstrated that there is fairly strong evidence of a relationship between neighborhood characteristics and the concentration of child maltreatment reports, but less evidence of

an impact of neighborhood on maltreating behavior. Moreover, the review shows that the processes that account for the relationship between maltreatment reports and neighborhood characteristics are not yet well understood. In this discussion, we return to the framework presented in Fig. 1 to consider how to distinguish between the three pathways (*behavioral influences*; *definition*, *recognition*, *and reporting*; and *selection*) that may account for the relationship between neighborhood characteristics and child maltreatment.

Behavioral influences

The behavioral pathway explicitly focuses on how neighborhood characteristics relate to experiences of parents and children, such as levels of perceived environmental stress and social support, and how such experiences influence behaviors of the parent that are neglectful or abusive. To investigate these connections, studies should attempt to distinguish between the structural characteristics of neighborhoods, which may be measured objectively by census, administrative or observational data, and the neighborhood as experienced by parents and children. As suggested by ecological-transactional theory, studies that link neighborhood to parent behaviors need to address the transactions between parents and their neighborhood, including their neighbors and neighborhood organizations. Due to the complexity of the ecological model, researchers have tended to isolate factors at one level in the model in order to understand the influence of that factor, but then lose sense of the integrated whole (Corse, Schmid, & Triskett, 1990). Many of the studies reviewed here attempted to study neighborhood effects by themselves even though we suspect neighborhood effects are best understood in terms of how they affect developmental transactions between parents and children (Zielinski & Bradshaw, 2006). Also, the influence of physical environment and the role of proximity need to be understood. For example, if violent crime interferes with visiting neighbors or going to the neighborhood center for social support, how close by must the violence be in order to hinder social support? Studies that combine quantitative and qualitative methods are an additional approach that can uncover transactions among neighborhoods, parents, and children (e.g., Korbin & Coulton, 1997; Korbin et al., 1998). Finally, since behavioral influences of neighborhoods are likely to operate through the experience of residents, it is necessary to improve the measurement of neighborhoods, including taking resident perceptions of neighborhood boundaries into account (Coulton, Korbin, Chan, & Su, 2001).

Definition, recognition, and reporting

Most of the studies we reviewed used official child protective services data to measure child maltreatment. The neighborhood effects identified in these studies, therefore, may be due more to the effect of neighborhood on the process of defining, recognizing, and reporting child maltreatment rather than parental behavior. In order to differentiate neighborhood differences in reporting processes from behavioral influences, studies must include both official reports and other more direct measures of maltreatment. In addition, since there is some evidence that neighborhood effects vary by maltreatment type, studies should theorize how the transaction between families and neighborhoods work differently for different types of maltreatment reports and behaviors and then test these ideas empirically. It is possible that neighborhood effects on defining, recognizing, and reporting child maltreatment are embedded in the social relations between neighborhood residents, neighborhood institutions, and service providers. High concentrations of CPS investigations might actually undermine the social support that could help

prevent child maltreatment or stigmatize the neighborhood in the perceptions of both residents and outsiders.

Selection

A major complication in this research is that the impact of neighborhood on risk of maltreatment is difficult to distinguish from family factors due to the process of neighborhood selection. One potential remedy is to use experiments such as the Moving to Opportunity (MTO) experiment, which used random assignment of housing vouchers to enable experimental families to move from poor to middle class neighborhoods. Kling, Liebman, and Katz (2005) found that participant families reduced their fear of neighborhood violence, spent less time monitoring their children and worrying about them, and thus had less stress. The fact that the ability to move to a middle class neighborhood was randomly assigned rather than solely due to family resources and that the perceived neighborhood violence was a mediator between neighborhood and parent behavior served to isolate convincingly the neighborhood effect. These findings are consistent with the work of Lynch and Cicchetti (2002) that showed an association between community violence and parent-child interactions, and therefore MTO may have implications for child maltreatment research as well.

Implications for practice

The lack of understanding about why neighborhoods matter in child maltreatment means neighborhood-based prevention programs are set up without a clear sense of how neighborhood factors can help prevent child maltreatment and, therefore, may not be effective. How can neighborhood effects research contribute to improved practice? Belsky (1980) pointed out that one of the first efforts to use the ecological framework to design an intervention was organized by David Olds, who was a student of Urie Bronfenbrenner. Home visitors were trained to provide high-risk pregnant women with information about healthy development that they may not have experienced themselves as children (ontogenic development). The home visitors also encouraged immediate family members to support the new mother (microsystem) and worked with social services and extended family to support the mother (exosystem). The evaluation of the project included gathering data at all of these levels (Belsky, 1980). The research on neighborhood and child maltreatment suggests that by applying a framework that includes neighborhood characteristics identified in social disorganization theory and the transactions identified by ecological-transactional theory, practitioners may be able to design programs that use neighborhood context to prevent and reduce child abuse and neglect.

In addition to developing interventions that have a more explicit theory as to why neighborhoods may influence maltreatment, there are several promising methods that can be applied to evaluate interventions designed to reduce child maltreatment by strengthening neighborhoods. The US Advisory Board on Child Abuse and Neglect (1993) suggested creating "prevention zones" or geographically targeted neighborhood efforts to reduce maltreatment. These recommendations were used to design a broad-based neighborhood program to reduce child maltreatment in a South Carolina community (Melton, 2005). Methods using clusters of neighborhoods in experimental or quasi-experimental designs may provide useful tools for evaluating these efforts. Evaluators could randomly assign geographic areas to become targeted prevention zones or controls (Bloom, 2005; Cook, 2005). Contrasting maltreatment rates and behavioral and self-report measures of maltreatment over time in the prevention zones with comparison or

control neighborhoods could provide some evidence of the effectiveness of neighborhood-based strategy. Yet another research approach could be borrowed from hot spot policing experiments (Weisburd, 2005). In this scenario, child maltreatment hot spots could be randomly assigned to typical child welfare practice or typical practice plus neighborhood-partnership strategies, and then their differences could be compared over time. By trying to change neighborhood context, the field may gain a better understanding of how neighborhoods reduce or exacerbate risk of child abuse and neglect, independent of selection effects.

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References

Barth, R. P. (2005). Child welfare and race: Models of disproportionality. In D. M. Derezotes, J. Poertner, & M. F. Testa (Eds.), *Race matters in child welfare: The overrepresentation of African American children in the system* (pp. 25–46). Washington, DC: The Child Welfare League of America, Inc.

Belsky, J. (1980). Child maltreatment: An ecological integration. *American Psychologist*, *35*, 320–355.

Belsky, J. (1993). Etiology of child maltreatment: A developmental-ecological analysis. *Psychological Bulletin*, *114*, 413–434.

Belsky, J., & Jaffee, S. R. (2006). The multiple determinants of parenting. In D. Cicchetti & D. Cohen (Eds.), *Developmental psychopathology* (2nd ed., pp. 38–85). Hoboken, NJ: John Wiley & Sons.

Bloom, H. S. (2005). *Learning more from social experiments: Evolving analytic approaches*. New York, NY: The Russell Sage Foundation.

Bronfenbrenner, U., Moen, P., & Garbarino, J. (1984). Child, family, and community. In R. Park (Ed.), *Review of child development research* (pp. 283–328). Chicago, IL: University of Chicago Press.

Chaffin, M., & Bard, D. (2006). Impact of intervention surveillance bias on analyses of child welfare report outcomes. *Child Maltreatment*, *11*, 301–312.

Cicchetti, D., & Lynch, M. (1993). Toward and ecological/transactional model of community violence and child maltreatment: Consequences of children's development. *Psychiatry*, *56*, 96–118.

Cicchetti, D., & Valentino, K. (2006). An ecological-transactional perspective on child maltreatment: Failure of the average expectable environment and its influence on child development. In D. Cicchetti & D. Cohen (Eds.), *Developmental psychopathology* (2nd ed., pp. 129–201). Hoboken, NJ: John Wiley & Sons.

Cook, T. D. (2005). Emergent principles for the design, implementation, and analysis of cluster-based experiments in social science. *The Annals of the American Academy of Political and Social Science*, *599*(1), 176–198.

Corse, S. J., Schmid, K., & Triskett, P. K. (1990). Social network characteristics of mothers in abusing and nonabusing families and their relationship to parenting beliefs. *Journal of Community Psychology*, *18*, 44–59.

Coulton, C., Cook, T., & Irwin, M. (2004). *Aggregation issues in neighborhood research: A comparison of several levels of census geography and resident defined neighborhoods.* Cleveland, OH: Case Western Reserve University. Unpublished manuscript.

Coulton, C. J., Korbin, J., Chan, T., & Su, M. (2001). Mapping residents' perceptions of neighborhood boundaries: A methodological note. *American Journal of Community Psychology*, *29*, 371–383.

Coulton, C. J., Korbin, J. E., & Su, M. (1999). Neighborhoods and child maltreatment: A multi-level study. *Child Abuse & Neglect*, *23*, 1019–1040.

Coulton, C. J., Korbin, J. E., Su, M., & Chow, J. (1995). Community level factors and child maltreatment rates. *Child Development*, *66*, 1262–1276.

Deccio, G., Horner, W. C., & Wilson, D. (1994). High-risk neighborhoods and high-risk families: Replication research related to the human ecology of child maltreatment. *Journal of Social Services Research*, *18*, 123–137.

Drake, B., & Pandey, S. (1996). Understanding the relationship between neighborhood poverty and specific types of child maltreatment. *Child Abuse & Neglect*, *20*, 1003–1018.

Drake, B., & Zuravin, S. (1998). Bias in child maltreatment reporting: Revisiting the myth of classlessness. *American Journal of Orthopsychiatry*, *68*, 295–304.

Duncan, G. K, Magnuson, K, & Ludwig, J. (2004). The endogeneity problem in developmental studies. *Research in Human Development*, *1*(1–2), 59–80.

Duncan, G. J., & Raudenbush, S. W. (1999). Assessing the effects of context in studies of child and youth development. *Educational Psychologist*, *34*, 29–41.

Ernst, J. S. (2000). Mapping child maltreatment: Looking at neighborhoods in a suburban county. *Child Welfare*, *79*, 555–572.

Ernst, J. S. (2001). Community-level factors and child maltreatment in a suburban county. *Social Work Research*, *25*, 133–142.

Freisthler, B. (2004). A spatial analysis of social disorganization, alcohol access, and rates of child maltreatment in neighborhoods. *Children and Youth Services Review*, *26*, 803–819.

Freisthler, B., Midanik, L. T., & Gruenewald, P. J. (2004). Alcohol outlets and child physical abuse and neglect: Applying routine activities theory to the study of child maltreatment. *Journal of Studies on Alcohol*, *65*, 586–592.

Freisthler, B., Needell, B., & Gruenewald, P. J. (2004). Is the physical availability of alcohol and illicit drugs related to neighborhood rates of child maltreatment? *Child Abuse & Neglect*, *29*, 1049–1060.

Fromm, S. J. (2004). The processes that moderate the effect of community structural factors on neighborhood child maltreatment rates. *Dissertation Abstracts International, 65*(04), 2080B (UMI No. 3128757).

Garbarino, J. (1976). A preliminary study of some ecological correlates of child abuse: The impact of socioeconomic stress on mothers. *Child Development*, *47*, 178–185.

Garbarino, J. (1977). The human ecology of child maltreatment: A conceptual model for research. *Journal of Marriage and the Family*, *39*, 721–735.

Garbarino, J., & Crouter, A. (1978). Defining the community context for parent-child relations: The correlates of child maltreatment. *Child Development*, *49*, 604–616.

Garbarino, J., & Kostelny, K. (1992). Child maltreatment as a community problem. *Child Abuse & Neglect*, *16*, 455–464.

Garbarino, J., & Sherman, D. (1980). High-risk neighborhoods and high-risk families: The human ecology of child maltreatment. *Child Development*, *51*, 188–198.

Garcia, E., & Herrero, J. (2006). Perceived neighborhood social disorder and residents attitudes toward reporting child physical abuse. *Child Abuse & Neglect*, *30*, 357–365.

Gillham, B., Tanner, G., Cheyne, B., Freeman, I., Rooney, M., & Lambie, A. (1998). Unemployment rates, single parent density, and indices of child poverty: Their relationship to different categories of child abuse and neglect. *Child Abuse & Neglect*, *22*, 79–90.

Heywood, I., Cornelius, S., & Carver, S. (1998). *An introduction to geographical information systems*. Upper Saddle River, NJ: Prentice Hall.

Hyde, K. L. (1999). Urban neighborhood characteristics and child maltreatment. In D. Harrington, S. J. Zuravin, R. Fletcher, K. L. Hyde, & D. Pinetello (Eds.), *Child maltreatment: Correlates and outcomes* (pp. 108–136). Baltimore, MD: National Center on Child Abuse and Neglect sponsored study available from the University of Maryland School of Social work.

Kim, J. S. (2004). Neighborhood effects on the etiology of child maltreatment: A multilevel study. *Dissertation Abstracts International, 65*(08), 3157B (UMI No. 3143286).

Kling, J. R., Liebman, J. B., & Katz, L. F. (2005). Bullets don't got no name: Consequences of fear in the ghetto. In T. S. Weisner (Ed.), *Discovering successful pathways in child development: New methods in the study of childhood and family life* (pp. 243–281). Chicago: University of Chicago Press.

Korbin, J., & Coulton, C. (1997). Understanding the neighborhood context for children and families: Epidemiological and ethnographic approaches. In J. Brooks-Gunn, G. Duncan, & L. Aber (Eds.), *Neighborhood poverty: Context and consequences for children* (pp. 77–91). New York: Russell Sage Foundation.

Korbin, J. E., Coulton, C. J., Chard, S., Platt-Houston, C., & Su, M. (1998). Impoverishment and child maltreatment in African American and European American neighborhoods. *Development and Psychopathology*, *10*, 215–233.

Korbin, J. E., Coulton, C. J., Lindstrom-Ufuti, H., & Spilsbury, J. (2000). Neighborhood views of the definition and etiology of child maltreatment. *Child Abuse & Neglect*, *24*, 1509–1527.

Krishnan, V., & Morrison, K. B. (1995). An ecological model of child maltreatment in a Canadian province. *Child Abuse & Neglect*, *19*, 101–113.

Leventhal, T., & Brooks-Gunn, J. (2000). The neighborhoods they live in: The effects of neighborhood residence on child and adolescent outcomes. *Psychological Bulletin*, *12*, 309–337.

Lynch, M., & Cicchetti, D. (2002). Links between community violence and the family system: Evidence from children's feelings of relatedness and perceptions of parent behavior. *Family Process*, *41*, 519–532.

Manabe, Y. (2004). Neighborhoods, residents, and child maltreatment. *Masters Abstracts International*, *43*, 115. (UMI No. 1421281).

Melton, G. (2005). Invited commentary: Mandated reporting: A policy without a reason. *Child Abuse & Neglect*, *29*, 9–18.

Milner, J. (1986). *The child abuse potential inventory manual* (2nd ed.). DeKalb, IL: Psytec, Inc.

Milner, J. (1994). Assessing physical child abuse risk: The Child Abuse Potential Inventory. *Child Psychology Review*, *14*, 547–583.

Molnar, B. E., Buka, S. L., Brennan, R. T., Holton, J. K., & Earls, F. (2003). A multi-level study of neighborhoods and parent-to-child physical aggression: Results from the project on human development in Chicago neighborhoods. *Child Maltreatment*, *8*, 84–97.

National Research Council. (1993). *Understanding child abuse and neglect*. Washington, DC: National Academy Press.

Paulsen, D. J. (2003). No safe place: Assessing spatial patterns of child maltreatment victimization. *Journal of Aggression, Maltreatment & Trauma*, *8*, 63–85.

Roberts, D. (2002). *Shattered bonds: The color of child welfare.* New York: Basic Books.

Ross, C. E. (2000). Neighborhood disadvantage and adult depression. *Journal of Health and Social Behavior*, *41*, 117–187.

Ross, C. E., Reynolds, J. R., & Geis, K. J. (2000). The contingent meaning of neighborhood stability for residents' psychological well-being. *American Sociological Review*, *65*, 581–597.

Sabol, W., Coulton, C. J., & Polousky, E. (2004). Measuring child maltreatment risk: A life table approach. *Child Abuse & Neglect*, *28*, 967–983.

Sampson, R. J., Morenoff, J. D., & Gannon-Rowley, T. (2002). Assessing neighborhood effects: Social processes and new directions in research. *Annual Review of Sociology*, *28*, 443–478.

Sampson, R. J., & Raudenbush, S. W. (2004). Seeing disorder: Neighborhood stigma and the social construction of "broken windows". *Social Psychology Quarterly*, *67*, 319–342.

Schuck, A. M., & Widom, C. S. (2005). Understanding the role of neighborhood context in the long-term criminal consequences of child maltreatment. *American Journal of Community Psychology*, *36*, 207–222.

Small, M. L., & Newman, K. (2001). Urban poverty after the truly disadvantaged: The rediscovery of the family, the neighborhood, and culture. *Annual Review of Sociology*, *27*, 23–45.

Straus, M. A. (1979). Measuring intrafamily conflict and violence: The Conflict Tactics (CT) Scale. *Journal of Marriage and the Family*, *41*, 75–88.

Testa, M., & Furstenberg, F. F. (2002). The social ecology of child endangerment. In M. K. Rosenheim, F. E. Zimring, D. S. Tanenhaus, & B. Dohrn (Eds.), *A century of juvenile justice* (pp. 237–263). Chicago, IL: The University of Chicago Press.

Udry, J. R. (2003). *The National Longitudinal Study of Adolescent Health (Add Health), Waves I & II, 1994–1996; Wave III, 2001–2002* [machine-readable data file and documentation]. Chapel Hill, NC: Carolina Population Center, University of North Carolina at Chapel Hill.

US Advisory Board on Child Abuse and Neglect. (1993). *Neighbors helping neighbors: Foundations for a new national strategy.* Washington, DC: US Government Printing Office.

US Department of Health and Human Services, Administration on Children Youth Families. (2005). *Child Maltreatment 2003*. Washington, DC: US Government Printing Office.

Vinson, T., & Baldry, E. (1999). *The spatial clustering of child maltreatment: Are micro-social environments involved? Trends and Issues in Crime and Criminal Justice* Canberra: Australian Institute of Criminology.

Vinson, T., Baldry, E., & Hargreaves, J. (1996). Neighbourhoods, network and child abuse. *British Journal of Social Work*, *26*, 523–543.

Weisburd, D. (2005). Hot spots policing experiments and criminal justice research: Lessons from the field. *The Annals of the American Academy of Political and Social Science*, *599*, 220–245.

Weissman, A. M., Jogerst, G. J., & Dawson, J. D. (2003). Community characteristics associated with child abuse in Iowa. *Child Abuse & Neglect*, *27*, 1145–1159.

Wilson, W. J. (1987). *The truly disadvantaged*. Chicago, IL: The University of Chicago Press.

Young, G., & Gately, T. (1988). Neighborhood impoverishment and child maltreatment. *Journal of Family Issues*, *9*, 240–254.

Zielinski, D. S., & Bradshaw, C. P. (2006). Ecological influences on the sequelae of child maltreatment: A review of the literature. *Child Maltreatment*, *11*, 49–62.

Zuravin, S. J. (1986). Residential density and urban child maltreatment: An aggregate analysis. *Journal of Family Violence*, *1*, 307–323.

Zuravin, S. J. (1989). The ecology of child abuse and neglect: Review of the literature and presentation of data. *Violence and Victims*, *4*, 101–120.

Zuravin, S. J., & Taylor, R. (1987). The ecology of child maltreatment: Identifying and characterizing high-risk neighborhoods. *Child Welfare*, *66*, 497–506.