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Pathways of risk and resilience between neighborhood socioeconomic conditions and parenting

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ABSTRACT

This study examined pathways between neighborhood socioeconomic conditions (concentrated affluence and poverty), neighborhood resources and collective efficacy, and three parenting behaviors: warmth, harshness, and physical aggression. Data were drawn from the 3-year-old cohort of the Project on Human Development in Chicago Neighborhoods, a neighborhood-based study (N = 999). Multilevel path models revealed that greater neighborhood affluence was indirectly associated with mothers' lower reports of physical aggression with their children via more neighborhood services for children, as reported by an independent sample of neighborhood residents. However, analyses using propensity score weights suggest the association between neighborhood affluence and parental aggression may be due to selection. Results are discussed with respect to implications for preventing child maltreatment.

1. Introduction

Ample research suggests that the risk for child maltreatment is tied to neighborhood conditions, yet few studies address the potential pathways by which neighborhoods support or hinder parents' use of specific child-rearing strategies (Coulton, Crampton, Irwin, Spilsbury, & Korbin, 2007; Freisthler, Merritt, & LaScala, 2006; Korbin, 2002). Understanding the contexts of parents' behavior is of particular importance as mounting evidence indicates that harsh and physically aggressive parenting, as well as fewer positive interactions within families, act as precursors for child maltreatment (Gershoff, 2013; Tolan, Gorman-Smith, & Henry, 2006; Wekerle & Wolfe, 2003). Moreover, harsh parenting behaviors compromise children's development (e.g., Riina, Martin, & Brooks-Gunn, 2014), making these behaviors critical to understand even when they do not cross over to maltreatment.

This study aims to extend the literature on this topic by investigating the pathways through which neighborhood socioeconomic conditions may contribute to individual parent's behaviors with their young children. Specifically, we consider neighborhood availability of services for children and collective efficacy as links between neighborhood concentrated affluence and poverty, respectively, and three parenting behaviors related to the risk of maltreatment: harshness, warmth, and physical aggression (Wekerle & Wolfe, 2003). We focus on early childhood to understand how neighborhood context may contribute to emerging patterns of parenting behaviors that may set the foundation for subsequent parent-child interactions. In addition, early childhood is an important period for establishing children's trajectories of well-being (National Research Council and Institute of Medicine, 2000).

1.1. Conceptual background

Broadly, our research approach is rooted in relational developmental systems theories (RDST; Overton, 2015) and the bioecological model of human development (Bronfenbrenner & Morris, 2006). RDST and the bioecological model highlight the multi-faceted contexts in which individuals are embedded, as well as how individual behaviors are affected by both individual and contextual characteristics. This framework permits examination of multiple neighborhood-level influences on parenting without discounting the role of individual-level characteristics in shaping both neighborhood selection and parenting behaviors.

Within this general conceptual framework, we draw on the family investment model and the family stress model to understand the role of neighborhood socioeconomic conditions for individual parenting behaviors. Although originally formulated with regards to individual family socioeconomic status (SES), parenting, and children's outcomes, these two models can be extended to evaluate the role of neighborhood SES for parenting. The family investment model argues that parents with greater economic and social means are simply able to invest more in child-rearing, thereby contributing to children's well-being (Duncan, Magnuson, & Votruba-Drzal, 2015). Neighborhood affluence (e.g., percent high-income residents, percent professionals, and percent college-educated) may similarly facilitate investments in particular aspects of child-rearing, including access to services to support both parents' and children's well-being, and reinforcement of parenting

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behaviors that effectively manage children's time and activities. In addition, neighborhood affluence can be considered one type of investment parents make in their children (e.g., moving to neighborhoods with better resources for children). These reciprocal processes, with neighborhoods contributing to parenting and parenting goals contributing to neighborhood selection, emphasize the importance of looking beyond simple associations between neighborhoods and parenting to understand any causal effects of the former on the latter.

The family stress model posits that parents experiencing the strains of economic hardship behave differently with their children (e.g., less warm) and employ different parenting strategies (e.g., harsh discipline techniques) than parents without similar economic hardships (Conger, Ge, Elder, Lorenz, & Simons, 1994). Extending this model to the neighborhood-level, neighborhood poverty (e.g., percent poor, percent unemployed, percent on public assistance, and percent female-headed households) may confer risk for parenting behaviors in a parallel fashion. Rather than operating solely through individual perceptions, additional neighborhood-level processes are likely to transmit the effects of neighborhood poverty to parents (Leventhal & Brooks-Gunn, 2000). Often considered in the context of neighborhood crime and violence, lack of collective efficacy (a combination of social cohesion among neighbors and their willingness to intervene on behalf of the neighborhood to prevent problems) may be important for enabling violence in the family as well as when community norms and values breakdown (Garbarino, Bradshaw, & Kostelny, 2005). In the subsequent sections, we explore more thoroughly how these complementary family investment and family stress models can be used to identify potential pathways of neighborhood influences on parenting, specifically as related to the risk of child maltreatment.

1.2. Early childhood, parenting, and neighborhoods

Early childhood experiences lay the foundation for later development (National Research Council and Institute of Medicine, 2000). Young children may have limited direct exposure to their neighborhoods compared with older children and adolescents (Leventhal, Dupéré, & Shuey, 2015). However, theories linking socioeconomic resources to child development suggest early childhood is a time when environmental resources can have lasting ramifications for children's well-being (Chetty, Hendren, & Katz, 2015; Duncan, Ziol-Guest, & Kalil, 2010): Neighborhood affluence appears to play a particularly salient role (Anderson, Leventhal, & Dupéré, 2014).

Moreover, young children are at greatest risk for maltreatment (U.S. Department of Health and Human Services, 2013), and although lack of parental warmth, parental harshness, or physical aggression with children may not themselves constitute maltreatment, such parenting behaviors can be a marker for child maltreatment risk (MacKenzie, Nicklas, Brooks-Gunn, & Waldfogel, 2011). In addition, early childhood is a period during which parents may have limited access to needed parenting assistance through formal institutions, in contrast to later years when children enter formal schooling and families may benefit from feedback and support from teachers and school administrators. Thus, neighborhood resources and social dynamics may play a unique role in protecting families with young children from risk of maltreatment.

1.3. Pathways of influence between neighborhoods and parenting

As the different perspectives of the family investment and family stress models suggest, it is likely that neighborhood affluence and neighborhood poverty are associated with parenting through different pathways (Jencks & Mayer, 1990; Leventhal et al., 2015). For example, parents in more affluent neighborhoods may invest disproportionate time in their careers (Luthar, 2003), potentially limiting their capacity for child-rearing activities; whereas parents living in higher poverty neighborhoods may have more physical health problems (Ludwig et al., 2012), limiting their capacity for child-rearing activities in very different ways. The manner in which neighborhood affluence and poverty differentially impinge on parenting behaviors is likely related, at least in part, to neighborhood resources and social conditions.

1.3.1. Neighborhood affluence and family investment

More affluent neighborhoods tend to provide more resources, such as health services, libraries, recreational programs, and quality child care programs, for families (Burchinal, Nelson, Carlson, & Brooks-Gunn, 2008; Zhou, 2010). When services are readily available and supportive of families, neighborhood resources may promote optimal parenting behaviors simply by encouraging parents' investments in their children (Dupéré, Leventhal, Crosnoe, & Dion, 2010). Such investments may take the form of consistent and non-harsh approaches to discipline, as well as expressions of warmth (Kohen, Leventhal, Dahinten, & McIntosh, 2008). However, neighborhood affluence may not uniformly facilitate investments in parenting (e.g., Fauth, Leventhal, & Brooks-Gunn, 2008; Klebanov, Brooks-Gunn, & Duncan, 1994), and thus other aspects of neighborhoods, particularly availability of resources for children, should be considered as possible links between neighborhood affluence and parental investments.

1.3.2. Neighborhood poverty and family stress

Collective efficacy tends to be lower in neighborhoods with greater concentrated poverty, contributing to greater neighborhood crime and less safety (Sampson, 2012). In such neighborhoods, parents may feel overwhelmed and highly stressed by the demands of raising children, perhaps furthering their use of harsh or aggressive parenting strategies. Findings from the quasi-experimental Yonkers Project suggest that compared with families who stayed in low-income neighborhoods, parents who moved to middle-class neighborhoods used less restrictive control and less harsh discipline tactics, possibly due in part to safer conditions in their new neighborhoods (Briggs, 1998; Fauth, Leventhal, & Brooks-Gunn, 2007). Similarly, nonexperimental studies find associations between neighborhood safety and specific parenting behaviors (Hill & Herman-Stahl, 2002; Pinderhughes et al., 2007). Moreover, lower neighborhood social capital is associated with parents' greater endorsement of yelling and threatening as effective discipline strategies (Caughy & Franzini, 2005). Despite these research findings, and the fact that neighborhood poverty on its own is a risk factor for child maltreatment (e.g., Coulton et al., 2007), the ways in which neighborhood poverty may confer risk for maltreatment in individual families remain unclear (see Esposito, Chabot, Rothwell, & Trocmé; and Maguire-Jack & Font, this issue).

1.4. Neighborhood selection

Families are not randomly assigned to neighborhoods, but rather have varying degrees of choice regarding where they live. Parental characteristics and family circumstances are strongly related to neighborhood of residence, and these aspects of parent and family background also are tightly linked to other family outcomes, including risk for maltreatment (Duncan et al., 2015; Leventhal et al., 2015). Correlational findings link neighborhood conditions and parenting; however, studies attempting to estimate causal associations in this arena are scarce. In contrast to some support for the premise that neighborhood SES contributes to specific parenting practices, experimental findings from Moving to Opportunity (MTO) indicate that parents who moved from high-poverty to lower-poverty neighborhoods experienced both psychological and physical health benefits, but few program effects on parenting behaviors were found (Sanbonmatsu et al., 2011). The experimental design of MTO provides more robust estimates of neighborhoods as causal influences on parenting behaviors than is possible in the correlational research that dominates the neighborhood literature. The null findings from MTO regarding parenting outcomes, however, must be considered in the context of the experiment, which included only low-income families who were living in public housing in high-poverty neighborhoods at the study outset and were required to move. Thus, more research using other methods is needed to advance

our understanding of the pathways between neighborhood conditions and parenting behaviors associated with risk for maltreatment for diverse families in a greater range of neighborhoods.

1.5. Current study

Along these lines, the current study employs data from a representative neighborhood-based sample of families in Chicago and uses propensity score techniques to mitigate the threat of selection in estimating the link between neighborhood conditions and parenting behaviors related to risk of child maltreatment. Consistent with the family investment and family stress models described, we anticipate that neighborhood concentrated affluence and poverty will contribute to harsh parenting via different neighborhood pathways. Specifically, we expect that neighborhood concentrated affluence will be associated with greater availability of neighborhood services for children, facilitating parental investments in children, including displays of warmth, and thereby limiting use of harsh or physically aggressive parenting behaviors. Conversely, we anticipate neighborhood concentrated poverty to operate on parenting via lower neighborhood collective efficacy, which we hypothesize will be associated with parents' fewer displays of warmth and greater use of harsh or physically aggressive behaviors with their children (see Fig. 1).

2. Method

Data were drawn from the Project on Human Development in Chicago Neighborhoods (PHDCN). PHDCN is a multilevel, longitudinal study designed to investigate the role of neighborhoods in individual development (Leventhal & Brooks-Gunn, 2003). In addition to the longitudinal Cohort Study with data on children and families, PHDCN included an independent Community Survey, which provides neighborhood-level data on social dynamics.

2.1. Study design

2.1.1. Cohort study

Participants were drawn from a multistage probability sample designed to capture the diversity of Chicago's neighborhoods. 1990 U.S. Census data were used to create 343 neighborhood clusters (NCs), which include two to three geographically contiguous and relatively homogenous census tracts (approximately 8000 residents). Next, a stratified probability sample of 80 NCs cross-classified by racial/ethnic composition (7 categories including homogeneous and heterogeneous make-ups) and SES (high, medium, and low) was drawn from the 343 NCs. Within the 80 NCs, approximately 1000 children falling within each of seven age cohorts (birth, 3, 6, 9, 12, 15, and 18 years) were sampled from randomly selected households (N = 6226). Although longitudinal data are available, this study draws on data from the first wave of data collection in 1995–1996 with families of children in the 3-year cohort in order to focus on parenting during early childhood. Home-based interviews were conducted with families, with a response rate of 75% (Inter-University Consortium for Political and Social Research).

2.1.2. Community Survey

The Community Survey was designed to have a representative sample of households within each of 80 NCs, with sample sizes large enough to create reliable NC measures (average of 50 interviews per NC; Raudenbush & Sampson, 1999; Sampson, Raudenbush, & Earls, 1997). Although conducted in conjunction with the first wave of the Cohort Study in 1994–1995, an independent sample was obtained for the Community Survey (N = 8782, 78% response rate; Sampson & Raudenbush, 2004). Respondents were interviewed in their homes and asked about various aspects of their neighborhoods.

2.2. Sample

This study utilized Wave 1 data from families of children in the 3-year cohort, excluding four families who were missing neighborhood-level data. The final analytic sample included 999 children. Roughly half of the children were boys, and they were from diverse racial/ethnic and economic backgrounds (see Table 1). Children's primary caregivers were mostly biological mothers (90.4%), hereafter referred to as "mothers" (other primary caregivers were predominantly grandmothers or biological fathers). At the time of their children's birth, mothers were, on average, 26 years of age. At Wave 1, 53.7% of mothers were married or cohabiting and 47.3% were employed. Average family income-to-needs was approximately 1.5, which is 150% of the federal poverty threshold. On average, there were 12.65 (*SD* = 6.00) children per NC (hereafter referred to as "neighborhood"), which is adequate to obtain unbiased estimates from multi-level models (McNeish, 2014).

2.3. Measures

All individual-level measures were drawn from interviews conducted with mothers by a highly heterogeneous set of interviewers; subsets of interviewers were bilingual in English and Spanish or Polish. Descriptive statistics for all measures appear in Table 1.

2.3.1. Child, maternal, and family characteristics

To address selection into neighborhoods as well as individual risk for the specific parenting behaviors of interest, a range of child, maternal, and family characteristics were included in analyses. Child characteristics included age (in years), sex (girl = 0; boy = 1), and race/ethnicity (three dummy codes for African American, Mexican, and other minority, with European American as omitted referent). Children's early behavior problems were assessed using the total problems score from the Child Behavior Checklist for children ages 2 to 3 (CBCL; Achenbach, 1992). Parents reported on their children's behavior and emotional problems during the past 6 months, with items rated on a three-point scale from "not true" (0) to "often true" (2). Standard scores (T-scores) were employed.

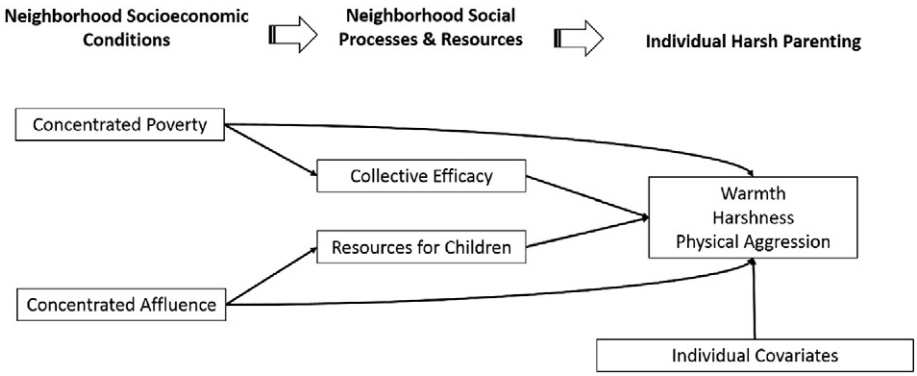

Fig. 1. Conceptual model.

Table 1
Sample descriptive statistics (N = 999).

	M (SD)/%
Child characteristics	
Age	3.15 (0.32)
Male	50.25
Race/ethnicity	
Mexican	35.52
African American	33.77
European American	14.40
Other	16.31
Behavior problems (T-score)	53.38 (10.79)
Maternal characteristics	
Age at child's birth	25.92 (6.49)
Educational attainment	2.95 (1.28)
Married/cohabiting	53.65
Employed	47.27
Family income-to-needs	1.49 (1.30)
Parenting behaviors	
Warmth	7.10 (2.09)
Harshness	21.66
Physical aggression	1.36 (1.03)
Neighborhood characteristics	
Concentrated affluence	−0.20 (0.67)
Concentrated poverty	−0.05 (0.70)
Residential stability	0.53 (0.12)
Services for children	−1.71 (0.73)
Collective efficacy	3.87 (0.26)

Maternal characteristics included age at child's birth (in years), educational attainment (on a scale of 1 to 5 where 3 = high school completion/equivalency), marital status (not married = 0; married or cohabiting = 1), and employment status (unemployed = 0; employed = 1). Overall family income-to-needs (total annual family income divided by the official poverty threshold for the respective household size for the respective year) also was used as a covariate.

2.3.2. Parenting measures

Parenting measures were drawn from two sources: The PHDCN Homelife Interview, an expanded assessment of parenting and the home environment developed from the Home Observation for Measurement of the Environment (HOME; Bradley & Caldwell, 1979; Leventhal, Selner-O'Hagan, Brooks-Gunn, Bingenheimer, & Earls, 2004), and the Parent-Child Conflict Tactics Scale (PCCTS; Straus, 2001). Interviewers observed *maternal warmth* and *harshness* with the focal child using the PHDCN Homelife Interview. Warmth was assessed by nine items (e.g., parent caresses, kisses, or hugs child; parent answers child's questions orally) rated as present or absent during the visit (α = 0.99). Not surprisingly, the sum of items for this subscale had a significant negative skew. Roughly 37% of mothers were observed to use all nine warm behaviors, whereas only 7% of mothers used fewer than four warm behaviors. Harshness was assessed with four items (e.g., parent scolds or criticizes child; parent slaps or spanks child) rated as present or absent during the visit (α = 0.97). Harsh behaviors were observed relatively infrequently (in 8 to 15% of cases), and prior work with this subscale suggests the harsh parenting behaviors tended to co-occur (Leventhal et al., 2004). Therefore, this subscale was recoded as a dichotomous indicator to delineate the presence versus absence of observed harsh parenting behaviors.

Mothers reported on their use of *physical aggression* with their children in the past year (e.g., How many times did you slap or spank [child] with an open palm?; How many times did you throw something at [child]?) using seven items from the PCCTS; however, one item (How many times did you burn or scald [child]?) was excluded due to very low incidence (only two parents reported doing it). All PCCTS items were recoded as having occurred in the past year or not, and these dichotomous indicators were summed to form a physical aggression scale (α = 0.99). Less than one percent of the sample (approximately nine parents) had scores of five on this scale (no one reported using all six physically aggressive behaviors), and thus the measure was top-coded to four.

2.3.3. Neighborhood characteristics

Concentrated affluence and poverty were based on factor analysis of multiple 1990 U.S. Census variables (Leventhal, Xue, & Brooks-Gunn, 2006; Sampson, Morenoff, & Earls, 1999). Concentrated affluence is composed of percent college-educated, percent high-income (greater than $75,000), and percent professionals/managers. Concentrated poverty is a combination of the poverty rate, percent of residents receiving public assistance, percent of female-headed families, and the unemployment rate. The correlation between concentrated affluence and poverty in this sample is −0.66, suggesting the two measures are closely related, but in addition to the theoretical distinctions between these two constructs identified earlier, there is also some statistical distinction. Although not a focal construct, neighborhood residential stability was included in all models as a further control for neighborhood structural characteristics.

Data from the PHDCN Community Survey were used to assess the availability of institutional resources and collective efficacy. Respondents indicated whether six types of services were available for children in their neighborhoods (e.g., mental health services for children). Respondents also reported on neighborhood social control (five items; e.g., "People in the neighborhood would scold a child if the child shows disrespect to an adult") and social cohesion (five items; e.g., "This is a close-knit neighborhood"). Both social control and social cohesion were rated on a five-point scale, indicating how likely or how true it would be in respondents' neighborhoods, respectively. These two scales were combined to form a measure of neighborhood collective efficacy.

Data from individual respondents to the Community Survey were aggregated to the neighborhood level using a three-level rating scale analysis (items nested within respondents nested within neighborhoods). Level two in this analysis controlled for individual respondent characteristics (e.g., age, race, marital status, employment status, level of education). Empirical Bayes (EB) residuals from this three-level analysis were used as scale scores in all analyses. EB estimates take into account the reliability with which the NC-level values of each scale are estimated, providing a more conservative estimate of neighborhood-level effects than would be attained by simply aggregating individuals' scores within neighborhoods (Raudenbush & Bryk, 2002). The resulting scales have good multi-level reliability and validity (Raudenbush & Sampson, 1999). Correlations among neighborhood-level scales are included in Table 2.

2.4. Analytic strategy

Missing data on analytic variables ranged from 0.0% to 5.7% and were imputed using a bootstrap-based Expectation Maximization Bayesian algorithm (Honaker & King, 2010) via the Amelia program in R to create 20 complete data sets. The MI data sets were used in all subsequent analyses.

Mplus 7.11 was used to conduct multi-level path models to account for the nested structure of the data (families within neighborhoods). Each of the three parenting behaviors was examined as a separate outcome while controlling for the other parenting behaviors. The greatest

Table 2
Correlation coefficients for neighborhood characteristics.

	1	2	3	4
1. Concentrated affluence	1.0			
2. Concentrated poverty	-0.66***	1.0		
3. Residential stability	0.05	-0.01	1.0	
4. Services for children	0.40***	-0.13***	-0.01	1.0
5. Collective efficacy	0.48***	-0.50***	0.53***	0.26***

*** $p < 0.001$.

Spearman rho rank correlation between the parenting variables was −0.17 (between warmth and harshness), suggesting the three constructs were sufficiently distinct that including them in the models simultaneously would not greatly reduce precision in the resulting estimates.[1] Models included all covariates (both individual- and neighborhood-level) to explore the associations among neighborhood socioeconomic conditions (concentrated affluence and poverty), institutional resources and collective efficacy, and parenting. Although we hypothesized that paths from concentrated affluence to institutional resources and from concentrated poverty to collective efficacy would be most salient for parenting outcomes, models included the paths from concentrated affluence to collective efficacy and from concentrated poverty to institutional resources. When significant associations emerged, follow-up analyses tested indirect pathways between neighborhood socioeconomic conditions and parenting outcomes via neighborhood institutional resources and/or collective efficacy (see Fig. 1).

In all analyses, standardized versions (*z*-scores) of all continuous variables were used to facilitate interpretation of regression coefficients. Logistic regression was used for the dichotomous harsh parenting outcome and Poisson regressions were used to address the count nature of the warmth and physical aggression variables. Because intra-class correlations (ICCs) cannot be meaningfully calculated for multilevel Poisson regressions, dichotomous versions of each of these variables were used to summarize between neighborhood variability for low versus high levels of each construct. Resulting ICCs revealed that 5%, 7%, and 2% of the variance in warmth, harshness, and physical aggression, respectively, was at the neighborhood level. Although relatively small amounts of the overall variance in each parenting construct, these ICCs are consistent with past literature on the role of neighborhoods for explaining individual outcomes including prior work with this sample (Leventhal & Brooks-Gunn, 2000).

Finally, significant indirect effects of neighborhood characteristics were further examined using propensity score methods to better assess the robustness of the results with methods that more closely approximate causal estimates between neighborhood conditions and parenting behaviors. Coarsened exact matching (CEM) in Stata 12.1 was used to match participants in neighborhoods with higher concentrated affluence or poverty with participants in neighborhoods with lower concentrated affluence/poverty. Considering higher neighborhood affluence/poverty as a "treatment," CEM reduces imbalances in covariates between groups who receive the treatment and those who do not (i.e., higher vs. lower groups) to better estimate causal links and approximate the conditions of random assignment. CEM was chosen for use in this study because of the numerous advantages it offers for this type of causal estimation, specifically its flexibility for handling continuous treatment variables (i.e., neighborhood concentrated affluence/poverty) and its ability to easily integrate results across MI data sets.

Rather than using exact matches on a range of covariates as in other propensity score matching paradigms, CEM temporarily coarsens variables to identify cases that match within strata. After matches are determined, data are returned to their original form and weights are estimated to balance the sample according to the matched cases with respect to the strata in which matches occurred. Analyses of interest can then be re-estimated using these analytic weights (Blackwell, Iacus, King, & Porro, 2009). Cases that are not matched receive a weight of zero, functionally excluding them from the weighted analyses. Weights were trimmed to the 99th percentile to reduce the influence of extreme values in subsequent models (Frank et al., 2008). To estimate selection into neighborhoods, the following covariates were used to match participants: child's race/ethnicity, family income-to-needs ratio, mother's primary language as English, marital status, employment status, receipt of welfare, and education. See Appendix 1 for pre- and post-match comparison on covariates.

[1] Nonetheless, final models were tested with parenting variables separately; the overall pattern of results was the same as when all parenting variables were included simultaneously.

3. Results

Findings are presented first for paths between neighborhood socioeconomic conditions and services for children and collective efficacy, as these results are the same across models predicting each of the three parenting outcomes. Next, results from paths linking neighborhood characteristics to parental warmth, harshness, and physical aggression are discussed. Regression coefficients from all models are presented in Table 3.

As expected, greater concentrated affluence was significantly associated with more reported services for children, and greater concentrated poverty was significantly associated with lower collective efficacy. In addition, greater neighborhood affluence was associated with higher collective efficacy.

In terms of parenting, greater availability of services for children was significantly associated with parents' lower reports of physical aggression with their children, in line with our hypothesis. Given that availability of services for children was significantly associated with neighborhood concentrated affluence, the indirect link between concentrated affluence and parents' physical aggression with their children was tested. Results supported an indirect association between neighborhood concentrated affluence and parental physical aggression through the neighborhood availability of services for children ($b = -0.03$ [robust $SE = 0.01$], $p < 0.05$). This finding suggests that holding all else constant in the model, an increase of 0.46 *SD* in the neighborhood availability of services for children (which would result from a 1 *SD* increase in neighborhood concentrated affluence) would lead to approximately a 2.6% reduction in parents' reports of physical aggression. In contrast to our hypotheses, none of the neighborhood-level variables were related to either parental warmth or harshness.

The significant indirect effect between neighborhood affluence and parental physical aggression was further probed using CEM to generate propensity score weights and re-estimate the model using those weights. The CEM model resulted in 59% of cases being matched between different levels of exposure to neighborhood concentrated affluence (top tertile versus lower two tertiles). The final path analysis using the resulting propensity score weights revealed that the association between availability of services for children and parental physical aggression remained statistically significant ($b = -0.07$ [robust $SE = 0.03$], $p < 0.05$), and greater neighborhood concentrated affluence also continued to be significantly associated with availability of services for children as well ($b = 0.46$ [robust $SE = 0.11$], $p < 0.001$). Although the value of the coefficient for the indirect effect of neighborhood concentrated affluence on physical aggression through neighborhood services for children was unchanged from the coefficient in the model without weights, this effect was no longer statistically significant in the weighted model ($b = -0.03$ [robust $SE = 0.02$], $p = 0.07$).

4. Discussion

The goal of this study was to identify pathways between neighborhood socioeconomic conditions and parenting behaviors that may place families at risk of child maltreatment. This study extends previous research on neighborhood conditions and child maltreatment by using robust methods to examine neighborhood-level mechanisms that contribute to individual-level risk. We employed both self-report and observational measures of parenting, providing a clear advantage for interpreting findings regarding these sensitive and low-incidence behaviors. Another methodological strength of this study was the use of an independent community sample to obtain neighborhood-level measures of resources for children and collective efficacy. The majority of studies linking neighborhood processes and resources and parenting behaviors, both generally and specifically as related to risk of child maltreatment,

Table 3
Regression coefficients with robust standard errors predicting neighborhood services for children, collective efficacy, and parenting behaviors.

	Services for children	Collective efficacy	Harshness	Warmth	Physical aggression
Child and maternal characteristics					
Child age	–	–	−0.20* (0.09)	0.00 (0.01)	0.03 (0.02)
Child is male	–	–	0.26 (0.16)	−0.02 (0.02)	0.07 (0.06)
Mexican	–	–	−0.24 (0.42)	−0.02 (0.03)	0.05 (0.09)
African American	–	–	0.37 (0.41)	−0.02 (0.04)	0.11 (0.10)
Other race/ethnicity	–	–	0.03 (0.43)	−0.04 (0.04)	0.01 (0.11)
Behavior problems	–	–	0.24* (0.12)	−0.02* (0.01)	0.21*** (0.03)
Mom age	–	–	0.05 (0.09)	−0.01 (0.01)	−0.07** (0.03)
Mom education	–	–	−0.01 (0.11)	0.04** (0.01)	0.03 (0.03)
Mom married	–	–	−0.57** (0.20)	0.03 (0.02)	0.03 (0.06)
Mom employed	–	–	0.37* (0.19)	0.04* (0.02)	−0.02 (0.05)
Income-to-needs	–	–	−0.16 (0.12)	0.01 (0.01)	0.07* (0.03)
Parenting behaviors					
Harshness	–	–	–	−0.09** (0.03)	0.10 (0.07)
Warmth	–	–	−0.14** (0.04)	–	−0.01 (0.01)
Physical aggression	–	–	0.15 (0.10)	−0.01 (0.01)	–
Neighborhood characteristics					
Concentrated affluence	0.46*** (0.11)	0.24** (0.07)	−0.08 (0.13)	−0.03 (0.02)	0.04 (0.04)
Concentrated poverty	0.24 (0.14)	−0.30*** (0.08)	−0.10 (0.16)	−0.02 (0.02)	0.02 (0.05)
Residential stability	0.03 (0.10)	0.56*** (0.08)	−0.17 (0.11)	0.00 (0.01)	0.00 (0.02)
Services for children	–	–	0.05 (0.09)	0.01 (0.01)	−0.06* (0.02)
Collective efficacy	–	–	−0.12 (0.12)	0.00 (0.02)	−0.02 (0.03)

* $p \leq 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

have used less methodologically rigorous assessments of neighborhood conditions—most often parental neighborhood perceptions—or have assessed parenting risk for maltreatment only at the aggregate neighborhood level (Coulton et al., 2007). A final methodological strength of this study was the use of robust analytic methods to appropriately handle the multi-level structure of the data and address concerns about missing data and selection into neighborhoods.

In addition to the rigorous methodological approach, our analyses were guided by hypotheses based on theory, drawing from the family investment and family stress models. With respect to the former, we anticipated that availability of neighborhood institutional resources would act as a pathway between neighborhood concentrated affluence and parenting behaviors, facilitating parental investments in child-rearing in the form of greater maternal warmth and less harsh and physically aggressive tactics. Results partially supported these expectations with greater neighborhood affluence contributing to mothers' lower use of physical aggression with their young children via more neighborhood services for children.

However, when propensity score weights were included in the model to address family selection into neighborhoods, the indirect association between neighborhood affluence and mothers' use of physical aggression via neighborhood services for children failed to reach traditional levels of statistical significance. Nonetheless, higher neighborhood concentrated affluence remained significantly associated with greater reported neighborhood availability of services for children, and this latter aspect of neighborhoods continued to be significantly associated with mothers' lower use of physical aggression. Although these findings do not support a potentially causal role of neighborhood affluence in shaping mothers' use of physical aggression with their young children, they suggest that neighborhood conditions (i.e., services for children) are linked with some aspects of individual parenting in early childhood beyond individual-level family characteristics. Moreover, this result highlights the potential importance of neighborhood affluence, as opposed to neighborhood poverty, which has generally received greater attention in neighborhood research and intervention efforts.

Notably, neighborhood conditions were not associated with interviewers' observations of mothers' warmth or harshness. The low incidence of observed harsh parenting behaviors may partially explain these null results. Alternatively, neighborhood-based services may be less relevant for the more affective aspects of parenting captured by these observed measures than for parenting practices related to discipline. Further research addressing the ways in which neighborhood resources for children contribute to mothers' reports of less use of physical aggression with their children is warranted. For example, neighborhood resources may promote effective parenting by providing families needed services such as childcare, mental health services, recreational programs, and the like (Freisthler et al., 2006; Small, 2009). In addition, neighborhood resources may facilitate parents' access to information about effective parenting.

Turning to the family stress model, we expected that neighborhood collective efficacy would serve as a pathway from neighborhood concentrated poverty to less warm and more harsh and physically aggressive parenting behaviors given the potential challenges of child-rearing in neighborhoods where collective efficacy is low. Although concentrated poverty was linked with lower neighborhood collective efficacy as documented in numerous other studies (see Sampson, 2012), no associations with parenting behaviors were found. This unanticipated null result suggests that despite links between collective efficacy and neighborhood crime and safety, the former may be of less direct importance to parents than the latter (Molnar, Buka, Brennan, & Earls, 2003). In addition, individual-level social support may be of greater relevance for parents than the neighborhood-level construct of collective efficacy (i.e., shared norms and values and willingness to enforce them) at least for understanding this particular constellation of parenting behaviors (Tendulkar, Buka, Dunn, Subramanian, & Koenen, 2010), perhaps especially so among parents with young children.

Despite its strengths, this study has several key limitations. First, findings from this sample may not generalize beyond the single city (Chicago) where data were collected, and the meaning and importance of neighborhoods for parenting may vary in relation to the broader ecological context in which neighborhoods are situated (e.g., urban, suburban, or rural). Second, although a goal of this study was to examine links between neighborhood conditions and parenting during early childhood, our analyses are limited to a single time point. The use of propensity score weights improves our ability to test causal relations with these data, but longitudinal data, including families' length of exposure to their neighborhoods, would allow for a stronger test. Similarly, the propensity score technique used in this study approximates random assignment into neighborhoods of

varying levels of concentrated affluence, but cannot fully eliminate concerns regarding family selection into their neighborhoods. Our propensity scores were based on a range of family characteristics—such as race/ethnicity and family income-to-needs—that are known to be associated with neighborhood selection, but we were not able to match families on unobserved characteristics that may contribute to both neighborhood selection and parenting behaviors. Relatedly, families in the U.S. increasingly live in neighborhoods segregated by socioeconomic status (Reardon, Fox, & Townsend, 2015). Although our propensity score models adequately matched families in our sample based on their residence in neighborhoods with higher or lower concentrated affluence, the reality is that throughout the country, families of different racial/ethnic and socioeconomic backgrounds are not equally likely to be exposed to these conditions.

These limitations notwithstanding, our results have potential implications for programs and policies aimed at preventing child maltreatment and suggest areas for further research. First and foremost, our findings suggest that neighborhood services geared towards children are associated with favorable parenting norms around discipline strategies, lowering parents' use of physical aggression with their young children, at least in the context of greater neighborhood affluence. That is, our results suggest that, consistent with the family investment model framework, neighborhood concentrated affluence and availability of services for children may matter for parenting behaviors beyond individual family circumstances. The distinction between neighborhood concentrated affluence and concentrated poverty may be key for understanding how services succeed in helping families: neighborhood poverty was not associated with reported availability of services, whereas neighborhood affluence was positively associated with perceived service availability. This distinction may shed some light on null findings in previous studies, experimental and otherwise, where addressing exposure to neighborhood poverty rather than affluence was the focus for reducing child maltreatment (Daro & Dodge, 2009). Understanding the role of neighborhood-based resources for families with young children in the context of greater neighborhood affluence may elucidate other neighborhood-level mechanisms for preventing child maltreatment.

Yet, claims regarding the causal role of neighborhood affluence in curtailing parent-to-child physical aggression cannot be made based on our findings, and further research is needed to confirm the patterns of results observed in this study. Given that only maternal reports (and not interviewer observations) of parenting were associated with neighborhood availability of resources for children, it will be important to understand whether such services truly alter parenting behavior, or whether they are simply effective in shifting reporting behaviors. That is, services for children may contribute to clear norms around acceptable parenting behaviors, but whether they alter parents' actual behaviors deserves further investigation. In addition, future work should assess the types of resources that may be most beneficial for parents and young children, as well as the quality of such resources. Our study was able to examine only neighbors' knowledge of existing local resources, but the quality of these resources may be critical for preventing child maltreatment. Additional research is needed to understand the function of community resources across a broader range of geographies, particularly for families living outside of an urban context, where low population density may make access to community resources challenging (Miller & Votruba-Drzal, 2013). Finally, family selection into neighborhoods will continue to pose difficulties for disentangling multi-level influences on parenting, yet it is evident that there are advantages for families living in areas with greater affluence.

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Appendix 1. Differences on individual covariates for families in neighborhoods with lower versus higher concentrated affluence on individual covariates pre- and post-CEM

	Pre-CEM mean (SD)		Post-CEM mean (SD)	
	Lower two tertiles neighborhood concentrated affluence	Upper tertile neighborhood concentrated affluence	Lower two tertiles neighborhood concentrated affluence	Upper tertile neighborhood concentrated affluence
Child characteristics				
Age	3.15 (0.32)	3.15 (0.33)	3.13 (0.47)	3.15 (0.33)
Male	0.51 (0.50)	0.49 (0.50)	0.53 (0.71)	0.45 (0.50)
Race/ethnicity[a]				
Mexican	0.44 (0.50)***	0.19 (0.39)	0.27 (0.57)	0.25 (0.43)
African American	0.33 (0.47)	0.34 (0.48)	0.49 (0.71)	0.46 (0.50)
European American	0.06 (0.23)***	0.31 (0.47)	0.12 (0.61)	0.18 (0.39)
Other	0.17 (0.38)	0.15 (0.36)	0.12 (0.45)	0.11 (0.32)
Behavior problems (T-score)	53.98 (10.77)*	52.23 (10.64)	53.67 (14.28)	53.13 (10.88)
Maternal characteristics				
Age at child's birth	25.19 (6.50)***	27.34 (6.06)	25.17 (9.75)*	26.54 (6.36)
Educational attainment[a]	2.68 (1.22)***	3.47 (1.24)	3.19 (1.77)	3.34 (1.25)
Married/cohabiting[a]	0.50 (0.50)**	0.61 (0.49)	0.48 (0.72)	0.52 (0.50)
Employed[a]	0.42 (0.50)***	0.58 (0.50)	0.51 (0.71)	0.55 (0.50)
Family income-to-needs[a]	1.16 (1.03)***	2.11 (1.50)	1.63 (2.39)	1.80 (1.49)
Primary language is English[a]	0.63 (0.49)***	0.79 (0.41)	0.77 (0.49)	0.79 (0.41)
Receiving welfare[a]	0.48 (0.50)***	0.25 (0.45)	0.37 (0.62)	0.34 (0.48)
Parenting behaviors				
Warmth	7.05 (2.17)	7.19 (1.96)	7.13 (2.69)	6.98 (2.07)
Harshness	0.22 (0.43)	0.20 (0.42)	0.25 (0.61)	0.24 (0.44)
Physical aggression	1.36 (1.06)	1.37 (0.97)	1.46 (1.42)	1.46 (1.04)

[a] Variable included in CEM.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

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