

# A MULTILEVEL INVESTIGATION OF NEIGHBORHOOD EFFECTS ON PARENTAL WARMTH

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*Although researchers recognize that social contexts shape parenting behaviors, the relationship between neighborhood environment and parenting remains poorly understood. To address this gap, we investigated the associations between compositional and contextual (structural, social, and safety) characteristics of neighborhoods and parental warmth. Data came from the Project on Human Development in Chicago Neighborhoods (PHDCN) Study and the 1990 Census. Results of multilevel linear regression analyses suggested that most of the unexplained variation in warmth resulted from compositional differences between caregivers within neighborhoods. We also found significant unexplained neighborhood variation in warmth after adjusting for numerous compositional variables, though our neighborhood variables did not explain this remaining variation. Other compositional or contextual variables may account for this neighborhood level variation. Findings suggest that although differences between caregivers explain most of the between-neighborhood variation in parental warmth, neighborhood environment is important. These findings highlight the importance of the neighborhood in studies of parenting. © 2010 Wiley Periodicals, Inc.*

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## INTRODUCTION

Extant research has demonstrated that parental emotional responsiveness to a child's needs is one of the most salient constructs for understanding how caregivers influence child development (Brooks-Gunn & Markman, 2005; Chen, Liu, & Li, 2000; Melson, Ladd, & Hsu, 1993; O'Neil, Parke, & McDowell, 2001; Schlette et al., 1998; Steinberg, Fletcher, & Darling, 1994). Parental responsiveness predicts secure attachment; infants who experience harshness from caregivers are more likely to develop insecure internal working models of themselves (Ainsworth, Bell, & Stayton, 1974; Bowlby, 1969). More recently, studies show that even among adolescents, parental responsiveness exerts protective effects on a variety of child outcomes. For example, high levels of parental acceptance have been shown to lead to better adolescent school performance and stronger school engagement (Steinberg, Lamborn, Dornbusch, & Darling, 1992). These findings have prompted further consideration of ways to promote responsiveness among parents.

Parents, like children, are embedded within multiple social contexts that influence their behavior (Belsky, 1984; Bronfenbrenner, 1979). One such context, the neighborhood context has received some attention in the last decade, but merits further study. Neighborhood environments affect parenting behaviors, which in turn influence child outcomes (Collins, Maccoby, Steinberg, Hetherington, & Bornstein, 2000; Stern & Smith, 1995). More specifically, studies have found that both structural factors, such as poverty, as well as social factors, such as community social ties, are associated with several parenting behaviors (Beyers, Bates, Pettit, & Dodge, 2003; Chung & Steinberg, 2006; Klebanov, Brooks-Gunn, & Duncan, 1994; Molnar, Buka, Brennan, Holton, & Earls, 2003). These behaviors include parental warmth and responsivity (Klebanov et al., 1994), disciplinary strategies (Griffin, Scheier, Botvin, Diaz, & Miller, 1999), parental monitoring (Coley & Hoffman, 1996; Rankin & Quane, 2002), parental self-efficacy (Elder, Eccles, Ardel, & Lord, 1995), and even parent-to-child abuse (Coulton et al., 1999; Molnar et al., 2003). For instance, R. Simons, Johnson, Conger and Lorenz (1997) linked neighborhood poverty to low levels of parental warmth, high levels of restrictive control, and harsh discipline. They showed that in their rural sample, individuals living in communities characterized by higher concentrations of socioeconomically disadvantaged people had lower levels of parental warmth (Simons et al., 1997). Moreover, Pinderhughes, Nix, Foster, and Jones (2001) found that inadequate public services, for example, police protection, neighborhood danger, and garbage collection was linked to harsher parenting practices (Pinderhughes, Nix, Foster, & Jones, 2001). Taken together, these studies suggest that neighborhood environment exerts an important "contextual" effect on parenting behaviors (i.e., the effect environments have on parents), even after controlling "compositional" effects (i.e., the effect of characteristics of neighborhood residents on parents; Garbarino, Bradshaw, & Kostelny, 2005; Klebanov et al., 1994).

Despite the emerging evidence for the potential importance of contextual effects on parenting, the extant research has four methodological limitations. First, existing studies often rely on census-type variables measuring structural features of the neighborhood environment (Rajaratnam, Burke, & O'Campo, 2006). These variables fail to provide information about more proximal social mechanisms by which structural processes may result in changes in parenting behaviors. Second, self-report methods are often relied on to gather information on parenting. This is problematic because these measurements, subject to respondent bias have been shown to not be as

consistently valid predictors of child outcomes as compared with observational measures of parenting (Zaslow et al., 2006). Third, many studies also do not thoroughly control for compositional (i.e., child or parent level) variables, which can lead to incorrect conclusions about the magnitude of the contextual effect. Finally, few studies focus on the effect of neighborhood context on positive aspects of parenting such as parental warmth.

This study addressed the above-mentioned methodological limitations using data from the Project on Human Development in Chicago Neighborhoods (PHDCN) by (a) examining both structural and social properties of neighborhoods, (b) using an observational measure of parenting, (c) controlling for key compositional variables, and (d) focusing on the positive parental attribute of warmth. Specifically, we addressed the following research questions: Does parental warmth vary between neighborhoods? Is there remaining, significant between-neighborhood variation in parental warmth after taking into account compositional characteristics of the neighborhood? Are there significant physical, social, and safety neighborhood characteristics that influence parental warmth and account for neighborhood level variations in parental warmth?

## **METHODS**

### *Study Design*

Data for these cross-sectional analyses came from the Project on Human Development in Chicago Neighborhoods (PHDCN), a landmark study investigating the individual, family, and neighborhood-level causes and consequences of youth exposure to urban violence (Earls & Buka, 1997). The PHDCN consisted of two main components: (a) a community survey (CS) of residents living in urban neighborhoods aimed at understanding the social, economic, organizational, political, and cultural structures and processes of those neighborhoods (Earls, Brooks-Gunn, Raudenbush, & Sampson, 1997), and (b) a longitudinal cohort survey (LCS) of children, adolescents, and young adults ages 0, 3, 6, 9, 12, 15, and 18 living in those neighborhoods. To obtain more information about the structural characteristics of each neighborhood, PHDCN investigators also linked these two data sources to the 1990 U.S. Census (U.S. Census, 1990). As described below, we used data from the LCS to construct the adolescent- and family-level variables and data from the CS and 1990 Census to derive the neighborhood-level variables.

### *Longitudinal Cohort Survey*

To obtain a sample of participants for the LCS, PHDCN investigators began by dividing the city of Chicago into 847 populated census tracts, then collapsed these tracts to form 343 ecologically meaningful, geographically compact, homogenous neighborhood clusters (NCs).

They then stratified the 343 NCs into seven levels of race/ethnicity and three levels of socioeconomic status (SES), resulting in 21 strata (three strata did not contain any NCs) and 80 NCs. A list of all dwelling units in the 80 NCs was enumerated, and probability proportional to size-sampling methods were used to select blocks, dwelling units, and persons within dwelling units. Households with children (and pregnancies) within 6 months of the target cohort age (0, 3, 6, 9, 12, 15, and 18) were selected to

participate in the LCS. Researchers invited all household members to participate in the study. They followed primary caregivers, defined as individuals who spent the most time caring for the child and resided with the child at least 5 nights per week and children, ages 0, 3, 6, 9, 12, 15, and 18, over a period of 7 years (from 1994 to 2001), across three waves of data collection.

For all LCS cohorts except 0 and 18, PHDCN researchers interviewed both primary caregivers and children. Separate research assistants administered the caregiver and child interviews. Interviews took place primarily in-person, though participants who declined to complete in-person interviews were interviewed via phone. Interpreters were provided for participants who spoke other languages and researchers conducted interviews in Spanish, English, and Polish. Participants received between \$5–\$20 per interview depending on their age and the wave of data collection. Interviews with child participants focused on a range of topics including language development, substance use, values, and sensation-seeking traits; caregiver interviews gathered information on topics including family structure, parent–child relationships, and family mental health.

### ***Community Survey***

For the CS, investigators used a three-stage cluster sampling design. At the first stage, researchers randomly sampled city blocks within each of the 343 NCs. At the second stage they randomly sampled dwelling units within each city block. In most cases, they selected all dwelling units in a NC though in large NCs, census blocks were sampled using probability proportional to size sampling methods. At the third stage, researchers randomly selected and interviewed one adult resident (aged 18 and over) within each dwelling unit for the CS. These CS respondents ranged in age from 18 to 83, were predominately female (65%), and representative of the neighborhoods from which the LCS sample was drawn. Although they interviewed residents from all areas of Chicago, a greater percentage of respondents were included in the CS that represented the NCs of the LCS.

### ***Full and Analytic Samples***

Of 8,304 eligible participants (caregivers and their offspring), 6,228 participated in data collection (75% completion) at Wave 1 (Martin & Schoua-Glurberg, 2002). For this study, the analytic sample consisted of 1,957 caregivers and 2,210 preadolescents and adolescents (i.e., participants in cohorts 9, 12, and 15) from Wave 1. We excluded children from other ages. The study sample was almost equally balanced with respect to sex (50.4%,  $n = 1,113$  male; 49.6%,  $n = 1,097$  female) and cohort (35.6% in cohort 9; 35.0% in cohort 12; 29.5% in cohort 15). In contrast, the caregiver sample was predominantly female (90.2% female,  $n = 1,993$ ), Hispanic (44.0%,  $n = 973$ ) and consisted of families representing two married, biological parent households (45.9%,  $n = 1,014$ ). Household income varied with 16.1% of households earning more than \$50,000 per year and 21.09% earning less than \$10,000 per year.

### ***Measures***

*Parental warmth.* We measured parental warmth, the outcome of interest in this study, via the Home Observation for Measurement of the Environment (HOME). The

semistructured HOME measure, which was completed with primary caregivers, includes eight observational items that assessed the quality and quantity of stimulation and support available to a child in their home environment (Caldwell & Bradley, 1984). The original HOME, created by Caldwell and Bradley's (1984) was adapted by PHDCN investigators to standardize the collection of data on the home environment across the 0–18 age range represented in the LCS. The PHDCN investigators also added an additional 21 observation-based items to the HOME to measure the internal and external environment of the home. The revised HOME therefore consisted of 82 items measuring parenting style, caregiver involvement, and the physical conditions of the home's internal and external environment. In this study, we used nine items from this scale, all collected via interviewer observation, to construct a measure of parental warmth. These observational items measured PC behaviors directed towards the child during a home observation visit. Sample items included "Primary Caregiver uses some term of endearment or some diminutive for subject's name when talking about or to the subject twice during the visit" and "Primary Caregiver caresses, kisses, cuddles or hugs subject once during the visit." We coded all items as binary response choices (yes/no) and derived a mean scale score for each participant (higher scores representing higher warmth). This scale demonstrated good internal consistency reliability, with an alpha coefficient of 0.76.

### *Neighborhood Measures*

Measures of the neighborhood environment tapped both structural and social characteristics of each neighborhood and came from either the 1990 Census or the 1995 CS data. We constructed a neighborhood structural measure called *neighborhood poverty*, which was obtained via a factor analysis from a previous PHDCN study (Buka, Brennan, Rich-Edwards, Raudenbush, & Earls, 2003). This factor had high loadings for percentage of neighborhood residents who were (a) living below the poverty line, (b) unemployed, and (c) on public assistance.

We also used a measure from the CS sample to assess resident's perceptions of neighborhood social support as in a previous PHDCN study (Buka et al., 2003). We derived this measure from two 5-item subscales: (a) reciprocated exchange, and (b) social cohesion. The conceptually related five-item reciprocated exchange subscale tapped resident's perceptions of mutual support in the neighborhood. Sample items included "How often do you and people in your neighborhood do favors for each other" and "Watch over each other's property." The social cohesion subscale, also consisting of five conceptually related items, asked respondents to report the degree to which they think there is mutual trust and solidarity among residents in their neighborhood. Sample items to this subscale included "This is a close-knit neighborhood" and "People in this neighborhood can be trusted." Both scales used a 5-point Likert Scale, with response options ranging from *strongly disagree* to *strongly agree*. The social support scale demonstrates very high internal consistency reliability in this study ( $\alpha = .93$ ).

Our final neighborhood measure examined resident's perceptions of availability of safe play spaces in their neighborhood. This measure was constructed in a previous PHDCN study and demonstrated good internal consistency reliability ( $\alpha = 0.71$ ; Molnar, Gortmaker, Bull, & Buka, 2004). Items on this scale tapped residents' level of agreement with five statements including "Children around here have no place to play but the street" and "Adults watch out for children in the neighborhood."

### **Covariates**

Several adolescent- and caregiver-level covariates were included in this study. These covariates were included to capture compositional effects that could explain variations in parental warmth between neighborhoods. Adolescent covariates included were cohort age, sex, and temperament measured via caregiver reporting, through the 40-item EASI Temperament Survey (EASI; Buss & Plomin, 1975). Caregiver-/family-level variables included measures of self-reported caregiver characteristics such as age (in years), race/ethnicity (White, Hispanic, Black, Other), education (less than high school, high school, more than high school), sex (male, female), nativity (U.S. born, foreign born), language spoken in the home (English, not English), employment type (1 fulltime job, less than 1 fulltime job, 1 or more part-time/temp jobs, not currently working), family structure (two married, biological parents, two married, biological/not biological parents, two unmarried, biological/not biological parents, Single parent with/without other adult) and size (less than four, more than four), household salary (more than \$50,000, between \$40,000–\$49,999, \$30,000–\$39,999, \$20,000–\$29,999, \$10,000–\$19,999, \$0–\$9,999). Finally, given that we imputed household salary information for approximately 4% of cases, we also included an imputation indicator reflecting whether household salary was imputed.

### **Analysis**

We began by conducting univariate and bivariate analyses to examine sample demographic characteristics, obtain an understanding of the distribution of each variable and interrelationships among the variables, and determine the extent of missing data present. Given the hierarchical structure of the data, combined with our explicit interest in modeling variance at each level and exploring main effects of higher-level variables, we then fit a series of hierarchical or multilevel regression equations to test our research questions. Multilevel models allow us to disentangle the sources of variation in an outcome of interest (Goldstein, 1995). To explore the first research question (whether parental warmth varies across neighborhood context), we constructed a three-level hierarchical null or intercept-only model (Model 1), with adolescents (Level 1), nested within household/caregivers (Level 2), nested within neighborhoods (Level 3). Level 2 was included as a level given the clustering of adolescents by caregiver/household, as 22% of adolescents ( $n = 486$ ) were from households with more than one participating youth (e.g., adolescents with siblings in the study in cohorts 9, 12, or 15). We also used this null model to estimate the intraclass correlation coefficient (ICC), or the proportion of variation in parental warmth attributable to differences between neighborhoods. To answer the second research question (whether there was significant between-neighborhood variation in parental warmth after taking into account compositional characteristics of the neighborhood), we modified Model 1 by introducing adolescent (Level 1) and caregiver (Level 2) variables. This created Model 2. Model 2 allowed us to control for individual (i.e., adolescent and caregiver) variables that may account for between neighborhood variation observed in Model 1. Lastly, we introduced neighborhood-level variables (Models 3–5) to answer the third research question (whether physical, social, and safety characteristics of neighborhood environments influenced parental warmth and accounted for unexplained neighborhood variations in parental warmth). We first

introduced neighborhood poverty alone (Model 3). We then constructed models with neighborhood social support (Model 4), and safe play spaces (Model 5).

We performed all analyses in SAS 9.1 using the SAS Proc Mixed procedure. All the continuous variables, including the adolescent, caregiver, and neighborhood level variables were grand-mean centered to facilitate interpretation. Only adolescents with complete information on all items comprising the parental warmth measure were included in this analysis, which resulted in the exclusion of approximately 6% of cases.

## RESULTS

### *Sample Characteristics*

The sample descriptive characteristics are presented in Table 1. The adolescent sample in this study consisted of approximately equal male ( $n = 1,113$ , 50.36%) and female ( $n = 1,097$ , 49.64%) adolescents in cohorts 9 (35.57%), 12 (35.04%), and 15 (29.51%). In contrast, the caregiver sample was comprised of predominantly female ( $n = 1,993$ , 90.18%) caregivers. Additionally, the caregiver sample was predominately Hispanic ( $n = 973$ , 44.03%), with approximately 45.88% of the families representing two married, biological parent households. About 16.11% of households had earnings of >\$50K and 21.09% had household earnings of <\$10K.

### *Correlations Between Neighborhood Variables*

As shown in Table 2, we found that all of the neighborhood variables were significantly and strongly correlated with one another. In particular, neighborhood social support was significantly and positively correlated with neighborhood safe play spaces ( $r = 0.72$ ,  $p = .0001$ ). Moreover, both neighborhood social support ( $r = -0.38$ ,  $p = .0001$ ) and safe play spaces ( $r = -0.60$ ,  $p = .0001$ ) were significantly and negatively correlated with neighborhood poverty. Based on these findings and the potential for collinearity, we chose not to include these three variables in the model at the same time.

### *Null Model (Model 1) and Model Adjusting for Compositional Variables (Model 2)*

The first hierarchical linear model constructed in this analysis partitioned the variation in parental warmth into three components: variation due to the adolescent level, caregiver level, and neighborhood level. As shown in Table 3, each of these variance components was statistically significant. In particular, we estimated that approximately 4.9% ( $p < 0.0001$ ) of the variation in parental warmth was attributable to differences across neighborhoods.

Table 4 presents the regression coefficients and standard errors for all subsequent models. After introducing compositional (i.e., caregiver and adolescent) variables into this null model (Model 2), we found that the between neighborhood variation remained significant. This suggests that variations in parental warmth may be attributable either to compositional variables other than those included in Model 2 or to contextual differences between neighborhoods. As presented in Table 3, after accounting for these compositional variables, we estimated that 5.4% of the remaining variation in parental warmth was attributable to differences at the neighborhood level.

**Table 1. Descriptive Statistics for Total Sample (n = 2,210 Adolescents and n = 1,957 Caregivers)**

		<i>Sample size n (%) M ± SD</i>
Child level		
Cohort	9	786 (35.57)
	12	772 (34.93)
	15	652 (29.50)
Sex	Female	1097 (49.64)
	Male	1113 (50.36)
Temperament	Sociability	3.70 ± 0.78
	Shyness	2.44 ± 0.89
	Activity	3.68 ± 0.88
	Impulsivity	2.67 ± 0.59
	Emotionality	2.76 ± 1.12
Adolescent age	–	11.97 ± 2.44
Caregiver level		
Race/ethnicity	White	352 (15.93)
	Hispanic	973 (44.03)
	Black	764 (34.57)
	Other	101 (4.57)
	Missing	20 (0.90)
Education	High school	952 (43.08)
	High school	283 (12.81)
	> High school	912 (41.27)
	Missing	63 (2.85)
Sex	Female	1993 (90.18)
	Male	216 (.977)
	Missing	1 (.05)
Nativity	U.S.-born	1266 (57.29)
	Foreign-born	929 (42.04)
	Missing	15 (0.68)
Employment type	1 Fulltime job	965 (43.67)
	> 1 Fulltime job	72 (3.26)
	1/1+ Part-time/temp job	235 (10.63)
	Not currently working <sup>a</sup>	905 (40.95)
	Missing	33 (1.49)
Caregiver age		38.86 ± 7.85
Family structure	2 Married, biological parents	1014 (45.88)
	2 Married, biological/not bio parents	242 (10.95)
	2 Unmarried, biological/not bio parents	246 (11.13)
	Single parent w/wo other adult	708 (32.04)
Family size (# adults & children)	< 4 Family	827 (37.42)
	≥ 4 Family	1367 (61.86)
	Missing	16 (0.72)
Household salary	> \$50,000	356 (16.11)
	\$40,000–\$49,999	211 (9.55)
	\$30,000–\$39,999	303 (13.71)
	\$20,000–\$29,999	431 (19.50)
	\$10,000–\$19,999	440 (19.91)
	\$0–\$9,999	466 (21.09)
	Missing	3 (0.14)
Primary home language	English	1447 (65.48)
	Not English	753 (34.07)
	Missing	10 (0.45)
Neighborhood level		
Poverty		20.07 ± 14.25
Social support		2.91 ± 0.26
Safe play space		3.30 ± 0.40

<sup>a</sup>Includes on leave, homemaker, retired, unemployed, volunteer.



**Table 2. Correlations Between Neighborhood Variables**

Neighborhood variable	Correlations <sup>a</sup>		
	Neighborhood poverty	Neighborhood social support	Neighborhood safe play spaces
Neighborhood poverty	1	-0.38	-0.60
Neighborhood social support		1	0.72
Neighborhood safe play spaces			1

<sup>a</sup>All correlations are significant ( $p < .0001$ ).

**Table 3. Variance Parameter Estimates**

	Neighborhood level Est (SE)	Caregiver level Est (SE)	Adolescent level Est (SE)	ICC <sup>a</sup> (%)
Null model	.0027 (.0008)*	.0357 (.0020)*	.0165 (.0013)*	4.9
Adjusted for compositional (i.e., adolescent and caregiver) characteristics	.0028 (.0008)*	.0330 (.0020)*	.0157 (.0013)*	5.4
Adjusted only for neighborhood poverty <sup>b</sup>	.0028 (.0008)*	.0330 (.0020)*	.0157 (.0013)*	5.4

\* $p < .001$ .

<sup>a</sup>ICC = Intraclass correlation coefficient, proportion of the unexplained variation in parental warmth attributable to the neighborhood level.

<sup>b</sup>Variance estimates presented only for neighborhood poverty. All subsequent neighborhood models were identical to this model.

Several covariates were significant in the fully adjusted compositional effects model (Model 2). In particular being a non-English speaker was significantly and negatively associated with parental warmth,  $\beta(SE) = -.056 (.0194)$ ,  $p < .01$ . Additionally living in a larger household,  $\beta(SE) = -.031 (.0116)$ ,  $p < .01$ , and being a single parent ( $p < .05$ ), as compared with two biological, married parent households, was also significantly and negatively associated with parental warmth. In addition, both child impulsivity,  $\beta(SE) = -.025 (.0095)$ ,  $p < .001$ , and emotionality,  $\beta(SE) = -.012 (.0049)$ ;  $p < .05$ , were significantly and negatively associated with parental warmth.

**Introduction of Neighborhood Predictors**

We extended Model 2 by introducing neighborhood-level characteristics starting first with the structural variable neighborhood poverty (Model 3). We then proceeded to separately introduce social features of neighborhood social support (Model 4), and neighborhood safe play spaces (Model 5). As shown in Table 4, we found that none of these neighborhood level variables were significantly associated with parental warmth.

**DISCUSSION**

The present study aimed to address current gaps in the parenting and neighborhood context literature by estimating the magnitude of between-neighborhood variation in

**Table 4. OLS Regression Coefficients and Standard Errors for Models of Effects of Adolescent, Caregiver and Neighborhood Characteristics on Parental Warmth**

	Model 1 Est (SE)	Model 2 Est (SE)	Model 3 Est (SE)	Model 4 Est (SE)	Model 5 Est (SE)
Intercept	0.716(0.0080)****	.7510 (.0456)****	.7498 (.0461)****	.6374 (.1096)****	.7731 (.0934)****
<i>Adolescent level</i>					
Cohort					
9 (reference)		.0663 (.0436)	.0665 (.0436)	.0670 (.0436)	.0664 (.0436)
12		.1159 (.0863)	.1165 (.0863)	.1171 (.0863)	.1163 (.0863)
15					
<i>Sex</i>					
Female (reference)					
Male		-.005 (.0094)	-.005 (.0094)	-.005 (.0094)	-.005 (.0094)
<i>Temperament</i>					
Sociability		.0035 (.0068)	.0035 (.0068)	.0036 (.0068)	.0035 (.0068)
Shyness		-.009 (.0059)	-.009 (.0059)	-.009 (.0059)	-.009 (.0059)
Activity		-.001 (.0058)	-.001 (.0058)	-.001 (.0058)	-.001 (.0058)
Impulsivity		-.025 (.0095)****	-.025 (.0095)****	-.025 (.0095)****	-.025 (.0095)****
Emotionality		-.012 (.0049)**	-.012 (.0049)**	-.012 (.0049)**	-.012 (.0049)**
<i>Adolescent age mean</i>		-.028 (.0143)*	-.028 (.0143)*	-.028 (.0143)*	-.028 (.0143)*
<i>Caregiver level</i>					
<i>Race/Ethnicity</i>					
White (reference)					
Hispanic		-.026 (.0197)	-.027 (.0203)	-.024 (.0198)	-.027 (.0201)
Black		.0370 (.0204)*	.0365 (.0207)*	.0397 (.0206)*	.0359 (.0208)*
Other		-.001 (.0281)	-.001 (.0282)	.0007 (.0281)	-.001 (.0282)
<i>Education</i>					
> High school (reference)					
High school		-.039 (.0168)**	-.039 (.0168)**	-.018 (.0140)**	-.039 (.0168)**
< High school		-.019 (.0139)	-.019 (.0140)	-.039 (.0168)	-.019 (.0140)
<i>Sex</i>					
Female (reference)					
Male		-.048 (.0185)****	-.048 (.0185)****	-.048 (.0185)****	-.048 (.0185)****
<i>Nativity</i>					
U.S.-born (reference)					
Foreign-born		.0238 (.0195)	.0239 (.0195)	.0254 (.0195)	.0237 (.0195)

<i>Employment type</i>				
1 Fulltime job (reference)				
> 1 Fulltime job	-.005 (.0300)	-.006 (.0300)	-.005 (.0300)	-.005 (.0301)
1/1 + Part-time/temp job	-.020 (.0180)	-.021 (.0180)	-.020 (.0180)	-.020 (.0180)
Not currently working <sup>a</sup>	-.014 (.0132)	-.015 (.0132)	-.014 (.0132)	-.014 (.0132)
<i>Caregiver age</i>	-.000 (.0007)	-.000 (.0007)	-.000 (.0007)	-.000 (.0007)
<i>Family structure</i>				
2 Married, biological parents (reference)				
2 Married, bio/not biological parents	-.030 (.0183)	-.029 (.0183)	-.030 (.0183)	-.030 (.0183)
2 Unmarried, bio/not biological parents	-.049 (.0186)***	-.048 (.0187)***	-.049 (.0186)	-.049 (.0186)***
Single parent w/wo adult in household	-.040 (.0156)**	-.040 (.0156)**	-.040 (.0156)**	-.040 (.0156)**
<i>Family size (# of adults &amp; children)</i>				
< 4 Family (ref)				
≥ 4 Family	-.031 (.0116)***	-.031 (.0116)***	-.031 (.0116)***	-.031 (.0116)***
<i>Household salary</i>				
> \$50,000 (reference)				
\$40,000-\$49,999	-.001 (.0214)	-.002 (.0214)	-.002 (.0214)	-.002 (.0214)
\$30,000-\$39,999	-.010 (.0199)	-.010 (.0200)	-.010 (.0200)	-.011 (.0201)
\$20,000-\$29,999	-.017 (.0196)	-.017 (.0198)	-.015 (.0197)	-.018 (.0198)
\$10,000-\$19,999	-.018 (.0211)	-.018 (.0213)	-.015 (.0212)	-.018 (.0213)
\$0-\$9,999	-.042 (.0231)	-.042 (.0233)*	-.039 (.0232)*	-.043 (.0233)*
<i>Primary language spoken in home</i>				
English (reference)				
Not English	-.056 (.0194)***	-.059 (.0195)***	-.059 (.0195)***	-.059 (.0195)***
<i>Salary imputation</i>				
No (reference)				
Yes	.0031 (.0268)	-.001 (.0272)	-.002 (.0272)	-.001 (.0272)
<i>Neighborhood level</i>				
Structural: Neighborhood poverty				
Social: Neighborhood social support	.0001 (.0006)	.0372 (.0326)		
Safety: Neighborhood safe play space				-.006 (.0229)

\* $p < .10$ . \*\* $p < .05$ . \*\*\* $p < .01$ . \*\*\*\* $p < .001$ .

parental warmth and determining whether specific neighborhood factors were associated with this parenting behavior. In line with the prior literature, we found that there was significant between-neighborhood variation in parental warmth, controlling for key compositional variables. More specifically, we estimated that in a fully adjusted model, where a large set of both adolescent and caregiver characteristics were controlled, 5.44% of the unexplained variation in parental warmth was attributable to differences between neighborhoods.

However, in contrast to other studies (Klebanov et al., 1994; Pinderhughes et al., 2001), the neighborhood characteristics we examined—neighborhood poverty, neighborhood social support, and neighborhood safe places to play—did not explain this contextual variation or exert any main effects on parental warmth. These findings were surprising given that other studies have observed associations between neighborhood environment and parenting, including with respect to the neighborhood variables we tested. For instance, Klebanov and colleagues (1994) demonstrated an independent effect of neighborhood poverty on parental warmth towards 3-year-old children, adjusting for several family characteristics including household size, income, maternal education, and ethnicity. Our results are also surprising given the wider literature supporting an association between neighborhood features and parenting. For instance, Ceballo and McLoyd (2002) found that living in a poor or dangerous neighborhood diminished the positive association between caregiver social support and nurturing parenting in a group of economically disadvantaged African American mothers and their middle school children.

We hypothesize that one explanation for these null results is that unlike other studies of parenting, we controlled for a range of key adolescent and caregiver compositional variables in the models examining potential contextual effects. In particular, we included compositional variables such as child temperament, which are largely ignored in studies of parenting and context, despite evidence that both positive and negative child temperament characteristics elicit differential parental responses (Karraker & Coleman, 2005). However, despite this stringent adjustment, our finding of persistent neighborhood-level variation suggests that some aspects of neighborhoods do contribute to aggregate levels of parental warmth. Moreover, it is likely that other attributes of the neighborhood environment that we did not examine may be more salient for understanding parental warmth. For example, McDonnell (2006) reported that neighborhood vigilance was significantly related to nurturing parenting in a sample of parents of young children (McDonnell, 2006). Future research should incorporate these variables and conduct theory-generating qualitative work to identify additional factors that may be relevant. This work is sorely needed as neighborhood researchers both acknowledge the importance of placing family processes in context and recognize the challenges associated with conceptualizing and measuring community-level processes (Mancini, Bowen, & Martin, 2005). In addition, although this study focused on the adolescent developmental period, it is possible that the effect of the neighborhood environment on parenting may be more pronounced for parents of young children.

Although not a central focus of our study, we did observe three notable associations between compositional variables and parental warmth. First, we found that family structure was strongly associated with parental warmth, with all family structure types (i.e., biological parents, two married, biological/not biological parents, two unmarried, biological/not biological parents, single parent with/without other adult) displaying less parental warmth as compared with two biological parent households. This finding is congruent with

research suggesting that two married parent households are most strongly linked to positive child outcomes (Simons, Chen, Simons, Brody, & Cutrona, 2006), potentially through mutual spousal support and diminished stress (Amato, 2001) these relationships offer caregivers. However, few studies have provided evidence to describe the relationship between family structure, particularly single parenting, and parental warmth; most of this literature has focused on parental control strategies (Simons, Lin, Gordon, & Lorenz, 1999). Given evidence that the impact of family structure on child outcomes may be explained in part by interparental conflict, which was not adjusted for in this study (Vandewater & Lansford, 1998), we suggest interpreting this finding with caution.

Second, we found that several adolescent temperament variables, particularly emotionality and impulsivity, were also significantly associated with parental warmth. It is believed that this relationship is at least partially mediated by parental stress (Mulsow, Caldera, Pursley, & Reifman, 2002). Cutrona and Troutman (1986) reported that difficult temperament was associated with maternal depression directly and through its impact on parental self-efficacy (Morris, Steinberg, Sessa, Avenevoli, & Essex, 2002). Although child characteristics are infrequently included in models linking neighborhood characteristics to parenting, they are important determinants of parenting and consequently should be considered (Belsky, 1984).

Third, our findings related to observed cultural differences in parental warmth are intriguing. We found that nativity was not a significant predictor of parental warmth. However, language spoken in the home was associated with parental warmth. Caregivers who did not predominantly speak English in their home were rated as less warm when compared with predominantly English-speaking caregivers. There are two possible explanations for these findings: methodologic differences (differences in observer rating tendencies) or substantive (cultural differences in the expression of parental warmth). This finding may reflect, in part, substantive differences in the socialization processes, as suggested in some literature (Julian, McKenry, & McKelvey, 1994). Although some form of caregiver warmth appears to be present in all cultures, its expression may vary. Indeed, preliminary evidence shows racial and ethnic differential item functioning, in particular for Latino populations, on the caregiver warmth subscale in a previous PHDCN study (Bingenheimer, Raudenbush, Leventhal, & Brooks-Gunn, 2005). This suggests that individuals from various racial/ethnic groups have a differing probability of providing the same response on the warmth scale. Collectively, these issues warrant further exploration and future research should explore diverse instruments to measure parental warmth.

There are several study limitations to consider when interpreting these findings. First, the PHDCN collected data from one particular geographic area, urban Chicago, and thus there may be limited generalizability of the study results to residents outside of urban Chicago. It is important to note that Chicago was chosen by PHDCN researchers because of the racial/ethnic and socioeconomic diversity seen across each neighborhood. Therefore, although the results may not generalize outside of Chicago, they do represent the experiences of a highly diverse U.S. urban population. Second, the cross-sectional nature of this study makes it difficult to establish causal associations between study variables, especially in terms of disentangling whether neighborhood characteristics are influencing parents or the other way around. Third, our parental warmth measure is derived from the HOME scale, one of the most widely used measures of parenting and home environment. There is evidence, however, that the HOME measure is most reliable for children living in particularly at risk home environments (i.e., the scale seemed to work best as a risk-assessment). It may not be as

reliable for children who are receiving adequate support and stimulation from their caregivers (Leventhal, Selner-O Hagan, Brooks-Gunn, Bingenheimer, & Earls, 2004). Although this is also a concern, prior research has shown that the parental warmth subscale appears to exhibit the highest reliability as compared with several other HOME scale measures in the PHDCN. Finally, as this is an observational study, there is a possibility of selection bias and a subsequently inflated Type 1 error. Although not possible in this study, this error could be addressed by using techniques such as instrumental variables, or by considering randomization of participants to neighborhoods as in the Moving to Opportunity Study (Leventhal & Brooks-Gunn, 2003).

In conclusion, this observational study of a large representative sample of urban youth identified several significant correlates of parental warmth and established, after taking into account a large number of potential compositional differences between neighborhood residents, that there remained significant and considerable (5.4%) between-neighborhood variation in levels of parental warmth. Although none of the three neighborhood factors considered, neighborhood poverty, social support, and safe play spaces accounted for the significant, unexplained between-neighborhood variation in parental warmth, these findings provide evidence for the importance of considering the neighborhood environment in studies of parenting. Future research should engage in further qualitative inquiry to identify particular neighborhood attributes that may explain this variation and examine potential mechanisms through which these neighborhood attributes impact parenting. This approach will inform community targeted prevention efforts for parents.

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