Neighborhood Residence and Mental Health Problems of 5- to 11-Year-Olds

Yange Xue, PhD; Tama Leventhal, PhD; Jeanne Brooks-Gunn, PhD; Felton J. Earls, MD

Context: Little research has investigated possible effects of neighborhood residence on mental health problems in children such as depression, anxiety, and withdrawal.

Objective: To examine whether children's mental health is associated with neighborhood structural characteristics (concentrated disadvantage, immigrant concentration, and residential stability) and whether neighborhood social processes (collective efficacy and organizational participation) underlie such effects.

Design and Setting: The Project on Human Development in Chicago Neighborhoods is a multilevel, longitudinal study of a representative sample of children aged 5 to 11 years in the late 1990s recruited from 80 neighborhoods. A community survey assessing neighborhood social processes was conducted with an independent sample of adult residents in these 80 neighborhoods and is used in conjunction with US census data to assess neighborhood conditions.

Participants: A total of 2805 children (18.1% European American, 33.8% African American, and 48.1% Latino) and their primary caregivers were seen twice.

Main Outcome Measures: Child Behavior Checklist total raw and clinical cutoff scores for internalizing behavior problems (depression, anxiety, withdrawal, and somatic problems).

Results: The percentages of children above the clinical threshold were 21.5%, 18.3%, and 11.5% in neighborhoods of low, medium, and high socioeconomic status, respectively. A substantial proportion of variance in children's total internalizing scores (intraclass correlation, 11.1%) was attributable to between-neighborhood differences. Concentrated disadvantage was associated with more mental health problems and a higher number of children in the clinical range, after accounting for family demographic characteristics, maternal depression, and earlier child mental health scores. Neighborhood collective efficacy and organizational participation were associated with better mental health, after accounting for neighborhood concentrated disadvantage. Collective efficacy mediated the effect of concentrated disadvantage.

Conclusions: A large number of children in poor neighborhoods have mental health problems. The mechanism through which neighborhood economic effects operated was community social control and cohesion, which may be amenable to intervention.

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Children’s neighborhood of residence may be associated with their mental health above and beyond individual- and family-level attributes. For example, greater neighborhood economic resources were associated with fewer internalizing problems for low-birth-weight, premature 3- and 5-year-olds, as assessed by the CBCL. Associations were found between neighborhood socioeconomic composition and 5- to 6-year-olds’ internalizing problems, as measured by a short form of the CBCL not developed for clinical studies, in a sample of children born to young mothers. Almost no research, however, has examined the mechanisms through which neighborhood disadvantage may exert its deleterious effect on children’s internalizing problems.

Of note is that most extant studies were not designed specifically to examine neighborhood contextual effects on well-being and therefore have several limitations. First, children were not sampled by neighborhood, so the number of children per neighborhood was not adequate to conduct multilevel modeling. Second, no information about children’s prior mental health was used to control for potential selection bias. Finally, only US census information was available to assess neighborhood sociodemographic characteristics, with no data on neighborhood social processes or institutional resources.

The present study uses data from the Project on Human Development in Chicago Neighborhoods (PHDCN). With its longitudinal, neighborhood-based design and independent community survey, the PHDCN is the first study, to our knowledge, to address the limitations in most neighborhood research. The first goal of this study was to examine associations between neighborhood structural characteristics (concentrated disadvantage, immigrant concentration, and residential stability) and children’s mental health problems, after accounting for child and family background characteristics. Based on emerging evidence that neighborhood social processes may account for neighborhood structural effects on rates of community violence, disorder, and adolescent delinquency, the second goal of this study was to examine whether neighborhood social processes (collective efficacy and organizational participation) are important mechanisms for explaining neighborhood compositional effects on children’s mental health.

## METHODS

### RESEARCH DESIGN

The PHDCN is a multilevel, longitudinal study designed to investigate neighborhood contextual effects on individual development. Our study used data from 2 of its components, the longitudinal cohort study and the community survey.

### LONGITUDINAL COHORT STUDY

Participants were drawn from a multistage probability sample that represented the ethnic and socioeconomic diversity of Chicago, Ill, neighborhoods. At the first stage, the PHDCN used 1990 US census data for Chicago to combine 847 US Census tracts, which made up the city of Chicago, into 343 neighborhood clusters (NCs), which included 2 to 3 US census tracts (approximately 8000 residents). Major geographic boundaries (eg, railroad tracks, parks, and freeways), knowledge of Chicago’s local neighborhoods, and cluster analysis of US census data guided the stratification of the NCs so that they were homogeneous with respect to racial or ethnic mix, socioeconomic status (SES), housing density, and family structure. A probability sample of 80 NCs was drawn from the 343 NCs cross-classified by 7 categories of racial or ethnic composition and by a trichotomized measure of SES, both assessed from the 1990 US census (Table 1). In our sample, the mean annual family income was $19,000 (poverty rate, 40%), $26,000 (poverty rate, 19%), and $42,000 (poverty rate, 10%) for low-, medium-, and high-SES neighborhoods, respectively.

Then, within these 80 NCs, approximately 1000 children falling within each of 7 age cohorts (birth and 3, 6, 9, 12, 15, and 18 years) were sampled from randomly selected households, using an overlapping cohort design (N=6226). For each age cohort, children were recruited who had birthdays that fell within a 6-month window above or below the designated age. Home-based interviews and assessments were first conducted with children and their primary caregivers from 1995 to 1996 (wave 1) and again after approximately 2 years (wave 2). Data from the 3-, 6-, and 9-year-old cohorts (hereafter referred to as cohorts 3, 6, and 9) were used in this study (n=2805). The response rates were 75.7% and 87.3% for waves 1 and 2, respectively.

### COMMUNITY SURVEY

The community survey was designed to have a representative sample of households within each of the 343 identified NCs, with sample sizes large enough to create reliable NC measures; this sample is independent from that of the longitudinal cohort study. Participants were interviewed in their homes from 1994 to 1995 and were asked about various aspects of their neighborhoods. This study used data from 3846 interviews with residents from the 80 stratified NCs (response rate, 78.0%).

### SAMPLE

The children were, on average, 6 years old at wave 1 and 8 years old at wave 2. Latino children make up 48.1% of the sample (38.0% Mexican and 10.1% of other Latino origin), African Americans make up 33.8%, and European Americans make up the remaining 18.1%.

Family and maternal characteristics were similar across cohorts (Table 2). The mean family income-to-needs ratio was 2, or about twice the poverty threshold. The primary caregivers interviewed were predominantly female (93.0%), and 88.1% were the child’s biological mother (hereafter referred to as mothers). Approximately 43% of mothers had not completed high school, with a similar number having at least some college education; 13.4% of mothers had a high school education. Slightly more mothers of younger children than mothers of older children were unemployed or had received public assistance in the past year. Most mothers were married, and 16.8% were teenagers at the time of the target child’s birth.

In this study, neighborhood was operationalized as a US census tract rather than an NC (mean ± SD, 16±14 children per tract among 175 tracts). Comparisons with analysis by NC indicated that tract-level analysis had greater statistical power to detect between-neighborhood variation and reduced the problems of multicollinearity among neighborhood variables (results using NCs are available from the senior author).

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Table 1. Profile of Internalizing Problems Among 5- to 11-Year-Olds at Wave 2 by Neighborhood Composition as Measured by the Child Behavior Checklist Internalizing Total Raw Scores and Clinical Cutoff Scores*

<table>
<thead>
<tr>
<th>Racial or Ethnic Composition</th>
<th>Neighborhood Socioeconomic Status†</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of children in neighborhoods ≥75% African American</td>
<td>234</td>
<td>73</td>
<td>92</td>
<td></td>
</tr>
<tr>
<td>Mean ± SD total raw score</td>
<td>7.56 ± 6.95</td>
<td>7.04 ± 7.17</td>
<td>6.15 ± 5.39</td>
<td></td>
</tr>
<tr>
<td>Scores above the clinical threshold, %</td>
<td>17.5</td>
<td>16.7</td>
<td>10.9</td>
<td></td>
</tr>
<tr>
<td>No. of children in neighborhoods ≥75% European American</td>
<td>NA</td>
<td>120</td>
<td>161</td>
<td></td>
</tr>
<tr>
<td>Mean ± SD total raw score</td>
<td>NA</td>
<td>8.93 ± 7.97</td>
<td>5.78 ± 6.62</td>
<td></td>
</tr>
<tr>
<td>Scores above the clinical threshold, %</td>
<td>NA</td>
<td>20.8</td>
<td>11.8</td>
<td></td>
</tr>
<tr>
<td>No. of children in neighborhoods ≥75% Latino</td>
<td>150</td>
<td>121</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Mean ± SD total raw score</td>
<td>8.43 ± 7.12</td>
<td>7.95 ± 7.44</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Scores above the clinical threshold, %</td>
<td>20.7</td>
<td>20.0</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>No. of children in neighborhoods ≥20% Latino and ≥20% European American</td>
<td>120</td>
<td>182</td>
<td>131</td>
<td></td>
</tr>
<tr>
<td>Mean ± SD total raw score</td>
<td>8.09 ± 7.40</td>
<td>7.75 ± 6.63</td>
<td>7.16 ± 6.43</td>
<td></td>
</tr>
<tr>
<td>Scores above the clinical threshold, %</td>
<td>20.0</td>
<td>15.3</td>
<td>13.0</td>
<td></td>
</tr>
<tr>
<td>No. of children in neighborhoods ≥20% Latino and ≥20% African American</td>
<td>149</td>
<td>149</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Mean ± SD total raw score</td>
<td>9.57 ± 7.58</td>
<td>8.05 ± 6.81</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Scores above the clinical threshold, %</td>
<td>26.8</td>
<td>20.1</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>No. of children in neighborhoods ≥20% African American and ≥20% European American</td>
<td>52</td>
<td>71</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>Mean ± SD total raw score</td>
<td>9.67 ± 7.55</td>
<td>7.18 ± 6.30</td>
<td>5.80 ± 7.57</td>
<td></td>
</tr>
<tr>
<td>Scores above the clinical threshold, %</td>
<td>28.8</td>
<td>15.5</td>
<td>8.9</td>
<td></td>
</tr>
<tr>
<td>No. of children in other heterogeneous neighborhoods</td>
<td>129</td>
<td>109</td>
<td>59</td>
<td></td>
</tr>
<tr>
<td>Mean ± SD total raw score</td>
<td>8.41 ± 6.86</td>
<td>7.53 ± 6.23</td>
<td>5.75 ± 4.74</td>
<td></td>
</tr>
<tr>
<td>Scores above the clinical threshold, %</td>
<td>21.9</td>
<td>19.3</td>
<td>10.2</td>
<td></td>
</tr>
<tr>
<td>Total No. of Children</td>
<td>834</td>
<td>826</td>
<td>488</td>
<td></td>
</tr>
<tr>
<td>Mean ± SD total raw score</td>
<td>8.41 ± 7.21</td>
<td>7.86 ± 6.96</td>
<td>6.22 ± 6.25</td>
<td></td>
</tr>
<tr>
<td>Scores above the clinical threshold, %</td>
<td>21.5</td>
<td>18.3</td>
<td>11.5</td>
<td></td>
</tr>
</tbody>
</table>

Abbreviation: NA, no neighborhoods existed in the stratum.

*Percentage of scores above the clinical threshold is based on a clinical cutoff score of 63.
†Defined by a composite scale from 1990 US census data that included poverty, public assistance, income, and education measured at the neighborhood cluster level.

MEASURES

All individual-level measures of children and their families were drawn from interviews conducted with mothers as part of the longitudinal cohort study; descriptive statistics are given in Table 2. Neighborhood-level measures were assessed by the community survey and by administrative US census data.

MENTAL HEALTH PROBLEMS

The CBCL/4-188 was administered at both waves to assess children’s mental health problems (except cohort 3 at wave 1, at which the CBCL/2-322 was used). Mothers were asked to report how true each behavior was of their children during the past 6 months on a 3-point scale, ranging from “not true” (zero points) to “often true” (2 points). This study used the internalizing subscale, which combines scores for depression or anxiety (eg, too fearful or anxious), somatic complaints (eg, feels dizzy), and withdrawal (eg, shy or timid). Higher scores indicate more problems. Adequate reliability and validity of the CBCL have been demonstrated, including clinical validation.6,27 For purposes of this study, children’s mental health was assessed by (1) subclinical problems, represented by total raw scores (ie, the sum of 31 items; possible score range, 0-62), and (2) clinical problems, represented by clinical cutoff scores (cutoff T score, ≥63).8 Our primary outcome measures were children’s scores at wave 2; however, wave 1 scores were included in analyses to control for potential selection effects. In terms of sensitivity, the CBCL clinical cutoff identified approximately 60% of children diagnosed as having major depressive disorder or generalized anxiety disorder, as assessed by the Diagnostic Interview Schedule for Children.28,29

CHILD AND FAMILY OR MATERNAL CHARACTERISTICS

We consider 3 child characteristics: age (in years), sex (boy, 1; and girl, 0), and race or ethnicity (2 indicator variables for African American and Latino, with European American as the omitted referent). Family or maternal characteristics included measures of family income and maternal education, marital status, age, employment, receipt of public assistance, and mental health. For income, we constructed a family income-to-needs ratio by dividing the reported total annual family income by the official poverty threshold for the respective household size in 1995; thus, an income-to-needs ratio of 1 or less signifies poverty status.30 Mothers’ education was assessed by 2 indicator variables signifying less than a high school education and at least some college education (with high school education as the omitted referent). Mothers’ marital status was also represented by 2 indicator variables for single and partnered (ie, not legally married), with married status as the omitted referent. Maternal age was measured by the mother’s age when the child was born (<20 years, 1; and ≥20 years, 0). The mother’s current employment status (unemployed, 1; and employed, 0) and receipt of public assistance in the past year (yes, 1; and no, 0) were assessed as well. The Composite International Diagnostic Interview–Short Form2 was administered to all mothers at wave 2 to evaluate their mental health in the past year.

NEIGHBORHOOD CHARACTERISTICS

Neighborhood structural measures were constructed by oblique factor analyses of 1990 US census data, which resulted...
The first dimension of neighborhood concentrated disadvantage comprised the poverty rate, percentage of residents receiving public assistance, percentage of female-headed families, unemployment ratio, and percentage of African American residents. The second measure of immigrant concentration included the percentage of Latino residents and the percentage of foreign-born persons. The third dimension of residential stability was defined by the percentage of residents living in the same house as 5 years earlier and the percentage of owner-occupied homes.

Two measures of neighborhood social processes were generated from community survey data by aggregating individual responses to the neighborhood (tract) level. Previous published work has reported the measurement properties of these scales, indicating adequate validity and reliability. First, a measure of informal social control was constructed from respondent assessments of the likelihood (on a 5-point Likert scale from “very likely” to “very unlikely”) that their neighbors could be counted on to intervene in 5 situations (eg, children skipping school). A measure of social cohesion was constructed from 5 items measuring how strongly respondents agreed on a 5-point scale to statements such as “people around here are willing to help their neighbors.” Informal social control and social cohesion were closely associated (r = 0.68, P < .01), suggesting a latent construct of collective regulation and mutual trust, and were combined to create a measure of collective efficacy (aggregate reliability at the US census tract level, r = 0.68). The next measure, organizational participation, included 7 items assessing involvement by residents in local organizations (eg, religious organizations).

**ANALYTIC STRATEGY**

Given the hierarchical data structure (children nested within neighborhoods), a multilevel modeling approach was adopted using HLM statistical software (Scientific Software International, Chicago). The level 1 units were individuals, and the level 2 units were neighborhoods (tracts) falling within the sampled 80 NCs.

**LINEAR MULTILEVEL MODELS**

For the continuous outcome measure (total raw score), 2-level hierarchical regression models were formulated to account for individual variation within neighborhoods and variation between neighborhoods. As a preliminary step, we ran an unconditional model that included only the intercept (ie, the mean) of children’s total internalizing scores and no other predictors; this step partitioned the variance in the outcome into between-neighborhood and within-neighborhood proportions. The intraclass correlation (ICC) for the percentage of variance between neighborhoods was calculated by the formula ICC = τ_b / (τ_b + τ_0), where τ_b represents the between-neighborhood variance in the

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Cohort 3 (n = 999)</th>
<th>Cohort 6 (n = 979)</th>
<th>Cohort 9 (n = 827)</th>
<th>Total (N = 2805)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child Male, %</td>
<td>50.3</td>
<td>48.9</td>
<td>52.6</td>
<td>50.5</td>
</tr>
<tr>
<td>Race or ethnicity, %</td>
<td>17.9</td>
<td>18.3</td>
<td>18.0</td>
<td>18.1</td>
</tr>
<tr>
<td>European American</td>
<td>17.9</td>
<td>18.3</td>
<td>18.0</td>
<td>18.1</td>
</tr>
<tr>
<td>African American</td>
<td>33.8</td>
<td>33.3</td>
<td>34.3</td>
<td>33.8</td>
</tr>
<tr>
<td>Latino</td>
<td>48.2</td>
<td>48.4</td>
<td>47.7</td>
<td>48.1</td>
</tr>
<tr>
<td>Mean ± SD age, y</td>
<td>3.15 ± 0.32</td>
<td>6.16 ± 0.33</td>
<td>9.16 ± 0.33</td>
<td>5.97 ± 2.44</td>
</tr>
<tr>
<td>Wave 1</td>
<td>3.15 ± 0.32</td>
<td>6.16 ± 0.33</td>
<td>9.16 ± 0.33</td>
<td>5.97 ± 2.44</td>
</tr>
<tr>
<td>Wave 2</td>
<td>5.35 ± 0.56</td>
<td>8.49 ± 0.57</td>
<td>11.36 ± 0.61</td>
<td>8.18 ± 2.48</td>
</tr>
<tr>
<td>Mean ± SD income-to-needs ratio</td>
<td>1.95 ± 1.10</td>
<td>1.99 ± 1.09</td>
<td>2.05 ± 1.09</td>
<td>1.99 ± 1.09</td>
</tr>
<tr>
<td>Maternal education, %</td>
<td>42.1</td>
<td>44.1</td>
<td>42.1</td>
<td>42.8</td>
</tr>
<tr>
<td>&lt; High school</td>
<td>42.1</td>
<td>44.1</td>
<td>42.1</td>
<td>42.8</td>
</tr>
<tr>
<td>High school</td>
<td>15.0</td>
<td>11.3</td>
<td>13.9</td>
<td>13.4</td>
</tr>
<tr>
<td>&gt; High school</td>
<td>32.9</td>
<td>44.7</td>
<td>44.0</td>
<td>43.9</td>
</tr>
<tr>
<td>Maternal marital status, %</td>
<td>53.9</td>
<td>54.7</td>
<td>59.2</td>
<td>55.7</td>
</tr>
<tr>
<td>Married</td>
<td>53.9</td>
<td>54.7</td>
<td>59.2</td>
<td>55.7</td>
</tr>
<tr>
<td>Single</td>
<td>30.4</td>
<td>30.9</td>
<td>29.1</td>
<td>30.2</td>
</tr>
<tr>
<td>Partnered</td>
<td>15.7</td>
<td>14.5</td>
<td>11.6</td>
<td>14.1</td>
</tr>
<tr>
<td>Maternal unemployment, %</td>
<td>52.7</td>
<td>47.0</td>
<td>43.4</td>
<td>48.0</td>
</tr>
<tr>
<td>Maternal receipt of public assistance, %</td>
<td>40.3</td>
<td>38.0</td>
<td>33.4</td>
<td>37.5</td>
</tr>
<tr>
<td>Teenage mother, %</td>
<td>17.0</td>
<td>14.7</td>
<td>19.1</td>
<td>16.8</td>
</tr>
<tr>
<td>Maternal depression, %</td>
<td>14.5</td>
<td>14.8</td>
<td>16.4</td>
<td>15.2</td>
</tr>
<tr>
<td>Internalizing problems as measured by the CBCL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 1 Mean ± SD total raw score</td>
<td>10.35 ± 6.43*</td>
<td>6.66 ± 6.23</td>
<td>7.60 ± 6.60</td>
<td>8.25 ± 6.61</td>
</tr>
<tr>
<td>Mean ± SD T score</td>
<td>53.82 ± 10.60</td>
<td>51.40 ± 10.13</td>
<td>52.83 ± 10.92</td>
<td>52.68 ± 10.58</td>
</tr>
<tr>
<td>Scores above the clinical threshold, %</td>
<td>18.4†</td>
<td>11.5</td>
<td>16.5</td>
<td>15.4</td>
</tr>
<tr>
<td>Wave 2 Mean ± SD total raw score</td>
<td>6.79 ± 5.99</td>
<td>8.14 ± 7.28</td>
<td>8.31 ± 7.53</td>
<td>7.70 ± 6.95</td>
</tr>
<tr>
<td>Mean ± SD T score</td>
<td>51.46 ± 10.34</td>
<td>53.41 ± 11.34</td>
<td>53.49 ± 11.65</td>
<td>52.74 ± 11.19</td>
</tr>
<tr>
<td>Scores above the clinical threshold, %</td>
<td>14.1</td>
<td>18.8</td>
<td>22.0</td>
<td>18.0</td>
</tr>
</tbody>
</table>

*Percentage of scores above the clinical threshold is based on a clinical cutoff score of 63.
outcome, and \( \tau_y \), the within-neighborhood variance in the outcome.

**BERNOULLI MULTILEVEL MODELS**

When examining clinical scores (a dichotomous outcome), 2-level logistic regression models were used. Because a statistic comparable to the ICC was not available for Bernoulli models, we calculated a 95% confidence interval \( \gamma_{00} \pm 1.96 \times \text{SE}(\gamma_{00}) \), where \( \gamma_{00} \) is the mean log odds of meeting the clinical threshold, and \( \text{SE}(\gamma_{00}) \) the variance between neighborhoods in the log odds of meeting the clinical threshold) for the probability of meeting the clinical threshold based on results from the unconditional model.

**MODEL-BUILDING STRATEGY**

We used the same modeling strategy for both outcomes of total raw scores and clinical cutoff scores. In the first model, all child and family characteristics except children’s wave 1 scores were entered into the model. The second model included wave 1 scores and neighborhood structural measures. In the final 2 models, we included neighborhood social processes (collective efficacy and organizational participation). All of the continuous variables were standardized in our analysis; thus, the results presented for the multilevel models can be interpreted as effect sizes using the metric of standard deviation units.

**RESULTS**

**AGE TRENDS IN MENTAL HEALTH PROBLEMS**

Given the overlapping, longitudinal design of the longitudinal cohort study, we first graphed age curves for mental health problems (unadjusted total raw scores and clinical cutoff scores) for each wave (Figure 1 and Figure 2A). Because a different version of the CBCL was administered to cohort 3 at wave 1, they were omitted from analysis, resulting in an age range of 6 to 10 years at wave 1. At wave 2, children ranged in age from 5 to 12 years. For both curves, an overall trend toward increasing mental health problems was seen as children got older.

As illustrated in Figure 2B, children in neighborhoods with the highest concentrated disadvantage had the worst mental health as assessed by clinical cutoff scores. These findings were compared with total raw scores (and checked for outliers), which showed a similar pattern (results are available from the senior author).

**DISTRIBUTION OF MENTAL HEALTH PROBLEMS BY NEIGHBORHOOD COMPOSITION**

Table 1 displays children’s mental health problems as measured by the CBCL by neighborhood racial or ethnic composition and by SES using the sample stratification design. Generally, children living in low-SES neighborhoods had more mental health problems (subclinical and clinical) than those in high-SES neighborhoods. Within each SES stratum, children living in predominantly minority neighborhoods tended to have more mental health problems than children living in neighborhoods with fewer minority residents.

**CHILDREN’S TOTAL INTERNALIZING SCORES (SUBCLINICAL PROBLEMS)**

The results from the unconditional model revealed significant variation between neighborhoods in children’s total internalizing scores (ICC, 11%). Without adjusting for individual and family characteristics, children’s mean total internalizing scores in low-, medium-, and high-SES neighborhoods were 8.4, 7.9, and 6.2, respectively (Table 1).

Child and Family or Maternal Characteristics

In the first model, child age was significantly associated with mental health problems, with older children having poorer mental health than younger children (Table 3). Compared with European American children, Latino children had poorer mental health. In terms of family characteristics, family income-to-needs ratio was negatively associated with mental health problems; more affluent children had significantly better mental health than poor children. For maternal characteristics, children whose mothers had less than a high school education had marginally worse mental health than children whose mothers graduated from high school. Children whose mothers were unemployed had poorer mental health than those whose mothers were working. In addition, children with depressed mothers had significantly poorer mental health than children without depressed mothers.

In the second model, we included children’s total internalizing scores at wave 1 and neighborhood characteristics. As expected, prior behavior was significantly positively associated with current mental health problems (Table 3). The inclusion of these variables caused the child race or ethnicity, family income, and maternal education effects to drop to nonsignificance. Maternal depression remained significant, while maternal unemployment became marginally significant in the model. This pattern suggests that family or demographic effects op-
erated primarily on children’s mental health problems at wave 1 and did not contribute to changes in total internalizing scores from wave 1 to wave 2. No significant effects were found for child sex and maternal marital status, age, or receipt of public assistance.

Neighborhood Characteristics

Results of the analysis that included neighborhood structural characteristics indicated that children living in disadvantaged, poor neighborhoods had significantly worse mental health than those raised in more advantaged neighborhoods, after adjusting for child and family background (Table 3, second model). An increase of 1 SD in concentrated disadvantage was associated with an increase of 0.05 SD in total internalizing scores. Immigrant concentration and residential stability were not significantly associated with children’s mental health.

In the third and fourth models, neighborhood social processes were entered (Table 3). As shown in the third model, collective efficacy was marginally significantly associated with better mental health (after controlling for child and family characteristics and neighborhood structural characteristics). Moreover, the coefficient for concentrated disadvantage was reduced to nonsignificance once collective efficacy was included in the model, with collective efficacy accounting for 35% of the effect of concentrated disadvantage on children’s mental health problems. A Sobel test revealed a trend-level mediation effect for collective efficacy (Sobel test statistic=1.92, P<.10). In the fourth model, higher levels of organizational participation were significantly associated with better mental health, and the coefficient for collective efficacy diminished to nonsignificance. Another Sobel test revealed that organizational participation mediated the effect of collective efficacy on children’s total internalizing scores, albeit marginally (Sobel test statistic=1.86, P<.10).

CHILDREN’S INTERNALIZING CLINICAL CUTOFF SCORES (CLINICAL PROBLEMS)

Results of the unconditional model also suggested significant variation across neighborhoods in children’s clinical cutoff scores. About 95% of neighborhoods had clinical rates between 8% and 35%. The descriptive information in Table 1 shows that, before adjusting for child and family or maternal characteristics, the percentages of children whose scores fell above the clinical threshold were 21.5%, 18.3%, and 11.5% in low-, medium-, and high-SES neighborhoods, respectively.

In terms of child characteristics, age was significantly associated with clinical cutoff scores, with older children more likely to be in the clinical range. Boys were significantly more likely than girls to meet the clinical threshold (Table 3, first model). More affluent children were significantly less likely than poor children to score in the clinical range. Latino children were marginally more likely to be in the clinical range than European American children. Maternal unemployment was associated with a higher likelihood of meeting the clinical threshold. Finally, worse mental health in mothers was significantly associated with unfavorable mental health in their children.

In the second model, which included prior clinical cutoff scores and neighborhood structural characteristics, children’s prior behavior was significantly associated with current clinical diagnoses. With the inclusion of these variables, family income was no longer significant, but maternal depression and unemployment remained significant. There were no significant effects for child race or ethnicity and maternal education, marital status, age, or receipt of public assistance.
Neighborhood Characteristics

After accounting for child and family or maternal characteristics, children living in more disadvantaged neighborhoods were significantly more likely to meet the clinical threshold (Table 3, third model). An increase of 1 SD in concentrated disadvantage would result in an increase of 0.19 in the log odds of meeting the clinical threshold (ie, a 2% increase in the probability of meeting the clinical threshold). No significant effects were found for immigrant concentration or residential stability.

In the final set of models, which included neighborhood social processes, children living in neighborhoods where residents were more involved in organizations had significantly better mental health (Table 3, fourth model). Collective efficacy was not significantly associated with children’s clinical cutoff scores. Finally, once neighborhood social process measures were accounted for in the model, concentrated disadvantage was no longer significant.

Results from this study revealed that a substantial proportion of the variance in children’s mental health problems, as reported by parents (ICC, 11%), was attributable to between-neighborhood differences, suggesting that...
neighborhood residence significantly contributes to children’s internalizing problems. In contrast, most prior studies have found that between-neighborhood differences accounted for only a small proportion of variance (ie, 1%-5%) in children’s mental health or behavior problems. However, these studies did not use clinically validated measures or clustered neighborhood designs.

After accounting for individual and family or maternal characteristics, children living in neighborhoods marked by concentrated disadvantage were more likely than their peers in more advantaged neighborhoods to have internalizing problems and to meet the clinical threshold, signifying more mild and severe mental health problems. These findings are in line with the existing literature pointing to associations between residence in low-SES neighborhoods and adult depression.

Living in neighborhoods with high immigrant concentration or residual instability had no significant effects on children’s mental health in this study (after controlling for concentrated disadvantage). The finding that concentrated disadvantage was more associated with children’s mental health than other neighborhood sociodemographic characteristics is consistent with studies of crime and other child outcomes.

The present study adds to a growing body of research on associations between neighborhood residence and health-related outcomes, with the important addition of identifying neighborhood social processes that may transmit these effects. Also of note is that neighborhood social process measures were assessed by sources independent from child and family measures, including children’s mental health. Specifically, we found that collective efficacy was associated with better mental health in children. Moreover, the adverse effect of neighborhood concentrated disadvantage on children’s mental health problems was accounted for by residents’ shared values and norms. High collective efficacy is a community-level process that is associated with reduced violent crime and disorder and has been shown to account for the association between neighborhood disadvantage and high rates of violence and disorder. The association between mental health problems such as depression and anxiety and exposure to violence is well established.

Collective efficacy appears to buffer young residents from these neighborhood threats to well-being.

Parents also reported that children had fewer mental health problems when they lived in neighborhoods where residents were actively involved in various neighborhood organizations. It appears that collective efficacy may affect children’s mental health, at least in part through residents’ use of community resources. To our knowledge, this aspect of community life has not been considered in other studies of child health, including the literature on neighborhood social organization. High organizational participation may signal availability of services in the neighborhood.

Like all other neighborhood studies that are based on nonexperimental data, the findings from this study may be affected by potential selection bias. In our analyses, we controlled for child and family demographic characteristics, which are important given that individuals are not randomly assigned to neighborhoods but have some choice in where to live. To further reduce selection bias, the association of maternal depression and child outcome was controlled for; it did not account for the observed neighborhood effects. Moreover, significant neighborhood effects remained even after we included children’s mental health 2 years earlier, which is a much stronger control for selection effects than maternal depression. However, other unmeasured individual and family characteristics may still be associated with families’ choice of neighborhoods, thus accounting for associations among neighborhood conditions and children’s outcomes. Finally, the findings of this study are limited because no information on rates of mental health treatment is available at the individual or neighborhood level.

The number of children living in disadvantaged neighborhoods increased in the last decade. According to figures from the 2000 US census, 15 million children, or 20% of children nationally, were growing up in poor neighborhoods (poverty rates, ≥20%), with 15% of these children residing in extremely concentrated poor neighborhoods (poverty rates, ≥40%), which the low-SES neighborhoods in our sample resemble. If the prevalence of internalizing problems among children in extremely poor neighborhoods is 21.5%, as found in the present study, then nearly half a million children in extremely poor neighborhoods nationally may be experiencing internalizing problems. Therefore, the findings of the present study have important public health implications, particularly in light of the identification of social process mediators through which neighborhood concentrated disadvantage may operate on children’s internalizing problems. Most intervention programs target individual- and family-level risk factors for children’s mental health, however, our study suggests that interventions for at-risk children should also focus on neighborhood characteristics. The social compositional structure is only one aspect of a neighborhood, albeit an important contributor to a range of health outcomes. Our findings point to several social mechanisms that may play a role in children’s mental health and that can be used to guide future intervention efforts. From a policy perspective, promoting collective action and community building among residents and investing in community resources may provide optimal communities in which to foster enhanced child mental health. Although specific recommendations are beyond the scope of this study, building community social organizations should be considered within the larger rubric of child health policy. Finally, maternal depression and employment remained significant correlates of children’s internalizing problems even when considering neighborhood circumstances. These 2 maternal attributes are likely important factors that prevent the creation and maintenance of collective efficacy and lead to lack of participation in community organizations. As such, recognizing and treating depression and supporting meaningful employment for mothers may be critical for promoting the protective influences of collective efficacy and enhancing community participation.

The findings of this study point to several directions for future research aimed at promoting child mental health. First, exposure to community violence has been...
a widespread problem for children growing up in urban neighborhoods.\textsuperscript{45,56} Prior literature has documented the connection between exposure to violence and internalizing problems.\textsuperscript{45,57} Future research should examine whether exposure to violence is a pathway through which neighborhood effects on children's internalizing problems operate. Second, parenting (eg, supervision or monitoring and emotional support) has been shown to be associated with children's mental health,\textsuperscript{50} and further exploration of the role of parenting will help elucidate whether it can moderate the negative effect of neighborhood disadvantage on children's internalizing problems. Third, an investigation of variation in the availability of mental health services across neighborhoods and whether differential access contributes to children's mental health should be considered. Fourth, an examination of how school factors, such as school sector (public, religious, or private) and truancy rate, affect children's internalizing problems, independent from neighborhood, is warranted.

In conclusion, the present study adds to the evidence for neighborhood and area effects on mental health. Consistent with the adult literature, we found that neighborhood concentrated disadvantage was associated with the prevalence of children's mental health problems (after covarying individual and family background characteristics). Moreover, this effect was accounted for by informal mentoring and emotional support) has been shown to be as mediators of outcome.\textsuperscript{58} and further exploration of the role of parenting will help elucidate whether it can moderate the negative effect of neighborhood disadvantage on children's internalizing problems.\textsuperscript{45,57} Future research should examine whether exposure to violence is a pathway through which neighborhood effects on children's internalizing problems operate. Second, parenting (eg, supervision or monitoring and emotional support) has been shown to be associated with children's mental health,\textsuperscript{50} and further exploration of the role of parenting will help elucidate whether it can moderate the negative effect of neighborhood disadvantage on children's internalizing problems. Third, an investigation of variation in the availability of mental health services across neighborhoods and whether differential access contributes to children's mental health should be considered. Fourth, an examination of how school factors, such as school sector (public, religious, or private) and truancy rate, affect children's internalizing problems, independent from neighborhood, is warranted.

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