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Cross-sectional and longitudinal measurements of neighborhood experience and their effects on children ☆

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Abstract

Despite the abundance of research on neighborhoods' effects on children, most studies of neighborhood effects are cross-sectional, rendering them unable to depict the dynamic nature of social life, and obscuring important aspects of community processes and outcomes. This study uses residential histories from the Los Angeles Family and Neighborhood Survey and the Child Development Supplement of the Panel Study of Income Dynamics to explore two questions: (1) How much do residential mobility and neighborhood change contribute to the overall socioeconomic variation in children's neighborhoods? (2) Does measuring community factors at more than one point in time matter for the conclusions that we draw from research on "neighborhood effects" on children's behavioral, cognitive and health-related well-being? Residential mobility plays a non-trivial role over the period of childhood in determining children's exposure to neighborhoods of different economic types. However, quantitative estimates of neighborhood effects that allow neighborhood characteristics to vary through residential mobility and neighborhood change do not depict a strikingly different picture from cross-sectional estimates. Children do not experience enough variation in their local surroundings to produce meaningful differences between static and dynamic measurements of

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neighborhoods. We also uncover interesting regional and race/ethnic differences in neighborhood dynamics and neighborhood effects.

Keywords: Neighborhood effects; Child well-being; Residential mobility; Neighborhood change

1. Introduction

This article argues for the integration of a temporal dimension into studies of childhood, by treating that period as cumulative and variable, rather than isolated and static. Empirically, we address a potentially important methodological issue in the study of "neighborhood effects:" how much do the neighborhood-level processes of residential mobility and neighborhood change determine children's exposure to disadvantage, and does incorporating these processes into research on neighborhood effects have implications for one's research conclusions? We seek to better understand the role of residential mobility and neighborhood change in determining children's exposure to neighborhood disadvantage and to investigate the extent to which the temporal definition of the neighborhood matters for the outcomes that are observed among children and the conclusions that we draw from our research.

Recent sociological research has documented the relationship between characteristics of neighborhoods and children's life chances (Jencks and Mayer, 1990; Massey et al., 1992; Furstenberg and Hughes, 1997; Small and Newman, 2001; Sampson et al., 2002; Pebley and Sastry, 2004). However, studies of the effects of neighborhoods on children are often undertaken by looking at people's neighborhoods at one point in time, making them less able to account for the dynamic nature of social life among individuals and environments. The use of cross-sectional data on children's neighborhood conditions therefore potentially obscures important aspects of neighborhood processes and outcomes, and may or may not affect the conclusions that are drawn from research on neighborhood effects on children. Either way, it is important to understand whether our conclusions are sensitive to our temporal conception of childhood. Using data from the Los Angeles Family and Neighborhood Survey (L.A. FANS) and the Child Development Supplement (CDS) of the Panel Study of Income Dynamics (PSID), we consider the role played by residential mobility and neighborhood change in determining children's exposure to neighborhood disadvantage. We also examine what differences in estimates of the effects of neighborhood characteristics on children's well-being, if any, arise from considering neighborhoods statically versus longitudinally.

2. Background

2.1. The importance of the local environment

Children and adolescents may be especially influenced by their neighborhood context, as they are more likely than adults to spend the majority of their time in their local surroundings. Recently, research in this area has focused on two goals. First, many quantitative studies try to identify the effects of children's neighborhoods above and beyond those of other indicators of their social status. Accomplishing this goal is not easy because characteristics of children's neighborhood context are correlated with characteristics of

their more immediate individual and family context. Many of these individual and family characteristics are often unobserved by researchers, making it hard to draw meaningful conclusions about whether characteristics of neighborhoods and schools independently affect children's well-being. Nonetheless, although the magnitude of neighborhoods' effects is still contested, experimental and rigorous observational studies have demonstrated that characteristics of neighborhoods do in fact structure children's opportunities, activities and achievement (Goering and Feins, 2003; Harding, 2003). Living in socioeconomically disadvantaged neighborhoods is negatively associated with several aspects of children's quality of life, including educational achievement (e.g., Crane, 1991; Brooks-Gunn et al., 1993), risky sexual behavior (Brooks-Gunn et al., 1997) and rates of teenage childbearing (Sucoff and Upchurch, 1998). These effects are almost certainly smaller than those of individual and family characteristics. Nonetheless, small effects do not preclude neighborhoods from playing a meaningful role in children's lives, especially because environmental characteristics are often more easily altered than genetic or family factors.

The second goal of research on neighborhood effects is to understand the mechanisms through which disadvantage affects children, and how these relationships differ by child-specific characteristics such as age and race/ethnicity. Brooks-Gunn et al. (1993), for example, point to the importance of a child's age of exposure to a particular neighborhood in determining the nature and strength of its influence. Although researchers may assume a direct relationship from neighborhood conditions to well-being, it is more likely that the relationships are mediated by proximate factors such as institutional resources, social resources and stress.

2.2. Childhood as a dynamic process: the role of residential mobility and neighborhood change

There is clearly an abundance of research on children's neighborhoods and well being, as well as on the magnitude of these relationships and the social mechanisms connecting them. Although we recognize the importance of this research and build on it in this work, in this article we focus on a separate yet fundamental question, namely, what is the appropriate temporal definition of childhood in studies of children's neighborhood context? What are the relevant dynamic processes that determine children's neighborhoods, and does incorporating these processes into our research have implications for the conclusions we draw? Most research on the importance of the neighborhood for children has been conducted with data that provide only a cross-sectional "snapshot" of neighborhoods and individuals. It is likely that both current and past experience in neighborhoods affect child well-being, and that neighborhood characteristics affect children's outcomes over time. Depending on the amount of variability in children's experiences over time, cross-sectional depictions of individuals' neighborhood experiences may or may not provide an accurate representation of the experiences that they endure over the long-run.

There are two ways that children's neighborhoods can vary over their lifetime. First, children change residences with their families. It is possible for children to move upward or downward socio-economically, thereby producing a different cumulative neighborhood experience than they would have if they lived in the same neighborhood for their entire childhood. Second, just as it is possible for children to experience different neighborhoods, it is possible for their neighborhoods to change around them. Migration can alter the composition of a neighborhood, as can processes such as urban redevelopment and gentrification.

Some studies examining residential mobility and neighborhood change have found that the quality of children's neighborhood environments is quite stable, suggesting that the distinction between "snapshot" and cumulative measures of neighborhood experience is not substantial (Kunz et al., 2003). Other work portrays a less stable picture that varies by race and ethnicity (Gramlich et al., 1992; Massey et al., 1994; Timberlake, 2003; Quillian, 2003). Quillian (2003), for example, finds that blacks are as likely as non-Latino whites to move, but that they are more likely to repeat spells of poverty. Few observational studies have examined what bearing a longitudinal consideration of neighborhood experience would have on estimates of neighborhoods' effects on children's well-being (Johnson and Schoeni, 2003; Ginther et al., 2000; Goering and Feins, 2003). (Wolfe et al. (1996): p. 970) and Aaronson (1998) suggest that there is a "window problem" created by using a static time frame and that cross-sectional measures of a child's environment do not accurately represent long-run experiences.

Previous research on residential mobility, neighborhood change and neighborhood effects points to the possibility for group differences in exposure to neighborhood disadvantage, as well as the possibility that the strength of neighborhood influence depends on the ways in which we temporally measure individuals' neighborhoods. These questions will be the focus of this article.

3. The present study

We ask how much of the variability that children experience in their neighborhoods is due to movement between neighborhoods and to changes in the characteristics of their neighborhoods over time. How relevant are these processes in determining children's exposure to poor neighborhoods? In addition, what bearing, if any, does a longitudinal consideration of neighborhood experience, versus a cross-sectional representation, have on estimates of children's well-being? These are important conceptual and empirical considerations in research on neighborhood effects.

If individuals move primarily between neighborhoods of the same type, then incorporating information about residential mobility may not significantly change cross-sectional estimates of neighborhood effects. If there is a lot of socioeconomic variation in children's moves, however, then residential mobility may alter estimates of neighborhood effects. Because children consistently exposed to disadvantage may be hurt more than those who experience disadvantage for only a short time, high rates of movement in and out of poverty may attenuate the influence of neighborhood poverty relative to the association observed at any one time. These effects, however, may be offset if residential mobility adversely influences children, regardless of the type of neighborhood the child moves to (e.g., Long, 1975; Haveman et al., 1991). Finally, if children do not move but their neighborhoods change around them, neighborhood change may explain some of the variation in neighborhood poverty and to alter estimates of neighborhood effects in the direction of the neighborhood change. If a child's neighborhood becomes more affluent over time, for example, increased affluence may decrease the cross-sectional association between local poverty and well-being.

4. The setting

A unique feature of this study is its use of data on both Los Angeles and the nation. West coast cities, which are rapidly changing and developing, are an understudied setting.

The complex interactions among racial/ethnic, spatial and institutional factors in Los Angeles make it an important city in which to examine the structure and significance of neighborhoods. As in cities in the Northeast, the Latino population in Los Angeles is growing as its native white and black populations are decreasing in size (Frey, 2001, 2002). In contrast to other cities, Los Angeles also has a substantial Asian population, making its population multicultural. In addition, the black population as a whole is not the most economically disadvantaged group in Los Angeles, with Latinos lagging behind blacks in economic status (Treiman and Lee, 1996). These differences in the composition of the samples allow for interesting regional comparisons.

5. The sample

Given the importance of childhood well-being for success later in life, it is imperative that we understand the intricacies of the period of childhood. The sample is therefore limited to children (defined as individuals aged 17 and younger) who have lived with their primary caregiver for the entire period for which there are residential histories; this restriction excludes about 200 children. Information on children's mobility, demographic characteristics, behaviors and health is obtained from their primary caregivers, typically their mothers.

6. Defining the neighborhood

For the purposes of this analysis, we define neighborhoods by their administrative boundaries, as being encompassed within census tracts. Census tracts are typically made up of about 4000 people and include the area within a small number of city blocks (White, 1987). Although they are designed to approximate areas that have real meaning for residents in their opportunities for social interaction, developing meaningful relationships, and exposure to both positive and negative influences, census tracts are an imperfect representation of neighborhoods (Pebley and Sastry, 2004). However, the census tract is useful for maximizing data availability and making comparisons across neighborhoods. In addition, the census tract is the lowest level of aggregation provided within our national sample.

7. Data

7.1. Survey data

Data come from the first wave of the Los Angeles Family and Neighborhood Survey (L.A. FANS), and from both waves of the Child Development Supplement (CDS) of the PSID. L.A. FANS is a panel study of families in Los Angeles County that was launched in 2000. The first wave of data was collected from a representative sample of about 3200 households in 65 neighborhoods. The design of L.A. FANS is a stratified probability sample, with poor neighborhoods and households with children oversampled (Sastry et al., 2003). The response rate for the portion of the questionnaire in which parents provide information about their children is 89%, which compares favorably to the response rates of major nationally representative surveys (Peterson et al., 2003).

The PSID–CDS was launched in 1997 with the goal of collecting detailed information about economic and social disparities in child development on a national scale

(PSID-CDS User Guide, 1997). PSID respondents were selected to participate in the CDS if they had at least one child under the age of 13. The 1997 CDS contains information on 2394 PSID families and 3563 children ages 0–12, with a response rate of 88%. In 2002 a follow-up wave was conducted, providing information on 2019 families and 2907 children ages 5–18, with a response rate of 91% (PSID-CDS User Guide, 2002).

The L.A. FANS data are cross-sectional, with two-year retrospective longitudinal residential histories. The PSID–CDS data are longitudinal (two waves), and also include retrospective residential histories. The residential histories provide geocoded data for all of children's residences during the two-year period prior to the interview, in the case of L.A. FANS, and during their whole lifetime or since their caregiver's inclusion in the PSID sample, in the case of PSID–CDS. These data permit examination of the total number of moves, the exact dates of residential moves and the duration in each residence (''spells'').

7.2. Community data

We link neighborhoods in both samples to data from the US Census, which provides information on specific characteristics and services of communities. PSID–CDS data are linked to 1980–2000 Census data, depending on the age of the child. In addition, the L.A. FANS data are linked to the 2000 data and to 1997 estimates for Los Angeles County that provide similar information.[1] The 1997 data were constructed from both 1990 Census data and administrative data. All of these data allow us to connect children with their neighborhood poverty status, racial/ethnic composition and other socioeconomic and demographic information.[2] The 1997 and decennial data were used to linearly interpolate values for neighborhood characteristics in the years between.[3]

7.3. Dependent variables

We consider a variety of child outcomes. In particular, we analyze two dimensions of children's well-being, health and achievement.[4] We present results for one health-related and one achievement-related indicator. Children's scores on the Peterson-Zill Internalizing Behavior Problems Index (BPI) represent behavioral health.[5] In both surveys, primary

[1] The 1997 data were prepared by John Hedderson at the Los Angeles County Urban Research Division.

[2] The meaning of the census tract may differ across the L.A. FANS and PSID–CDS. Los Angeles is spatially unique, and the L.A. FANS only includes neighborhoods in a metropolitan area. The PSID is a national survey, however, and includes neighborhoods in both metropolitan and rural areas. The spatial layout of census tracts may be quite different between regions (e.g., in density).

[3] The 1998 and 1999 values were also obtained by linearly interpolating between 1990 and 2000, in order to assess the quality of the 1997 data. Results did not change.

[4] We also conduct an analysis where we represent the latent construct of child ''well-being'' with observed indicators, each of which may be prone to measurement error. This model, also known as a multiple-indicator, multiple-cause (MIMIC) model, explicitly allows for measurement error in the indicators of the latent construct, thereby increasing the precision of the estimated relationship between neighborhood conditions and child well-being (Skrondal and Rabe-Hesketh, 2004). Results of this analysis are available on request, but are not presented here because we find that the individual indicators do not follow a common factor structure.

[5] The *internalizing behavior index* includes the following behaviors, which are combined to create a continuous count of behaviors: Child has felt unloved; has been fearful/anxious; has been easily confused; has felt worthless; is unliked by other children; has been obsessed with thoughts; has been sad or depressed; has been withdrawn; has been clinging to adults; has cried too much; has felt others were out to get him/her.

caregivers were asked to provide information on their children's (ages 3–17) behavior, and whether they exhibited a particular behavior problem never, sometimes, or often. Particular behaviors were grouped together to create scales of internalizing (withdrawn, sad) and externalizing (aggressive, angry) behaviors. Although we do not devote substantial attention to age variation in the behavior problems index, we recognize that a high score may mean something different for a 6-year-old versus a 17-year-old.[6]

Children's scores on the Woodcock–Johnson scholastic math achievement test represent academic achievement. Standardized scores are used in this analysis. In results not shown here, we also conduct analyses with children's externalizing behaviors, general health status and verbal achievement. Within each dimension of wellbeing, the results parallel those presented.

7.4. Focal independent variable

The results that we show here use neighborhood poverty rate to operationalize the socioeconomic composition of neighborhoods. Wilson's (1987) hypotheses about the adverse effects of poor neighborhoods have led researchers to investigate a possible connection between living in neighborhoods with a high prevalence of poverty and experiencing adverse outcomes. Although not our focus in this study, there are several possible mechanisms through which poverty at the neighborhoods level may influence residents' wellbeing. Residents of poor neighborhoods are plagued by under-funded social services, higher crime rates, close proximity to sources of harmful pollutants and low housing quality, and the stressful feelings of hopelessness and powerlessness that go along with the experience of social and economic disadvantage (Boer et al., 1997; Krivo and Peterson, 1996; Ross et al., 2000). It is likely that differences in presence and quality of neighborhood services/resources, in systems of social organization and norms that enable collective action and create social and economic role models, and in access to labor markets and other extra-local resources combine to create both positive and negative outcomes for children.

Neighborhood poverty is calculated as the proportion of people in each census tract living below US poverty thresholds, and therefore ranges from 0 to 1. As described above, the decennial Census measures were used to linearly interpolate values for intermittent years, in order to provide an estimate of neighborhood change over the observed period. We also conduct analyses with several other neighborhood characteristics, including racial/ethnic composition, median household income and the percentage of female-headed poor households with children. Because substantive results do not change across measures, for the sake of brevity we present results only for the poverty measure.

7.5. Control variables

In addition to the focal neighborhood-level variables, we include both individual and family level variables in the analysis, in order to account for the possibility that any

[6] A high BPI score among a 6-year-old may reflect perfectly normal developmental transitions, while a high score among a 17-year-old may more strongly reflect their context. We partially address this possibility by testing for an interaction between age and neighborhood poverty rate. Although the interaction is not statistically significant, it is worth examining age differences in the meaning of behavioral health measures in greater detail in future research.

association between neighborhood characteristics and the dependent variables could reflect the impact of variables correlated with neighborhood poverty. Individual and family level variables include logged total family income, family poverty status, the total number of children in the household, the race/ethnicity, educational attainment, marital status and nativity status of the caregiver, whether the caregiver suffered from depression, and the age, sex and recent mobility status of the child. Given the small percentage of people identifying as groups other than white, black, Asian/Pacific Islander or Latino in the L.A. FANS, we have combined "Others" into the white category.[7] In the PSID–CDS, "others" include all respondents other than those identifying as black on non-Hispanic white. Total family income was obtained by combining family earnings, income from assets and transfer income. Information on the educational attainment of the primary caregiver is gathered from self-reports of the number of years of schooling completed. Family poverty status is assessed by matching a child's total family income with corresponding poverty thresholds based on income and family size.

8. Methods

The analysis consists of two parts: a decomposition with a synthetic cohort of the variation in poverty due to residential mobility and neighborhood change over the period of childhood, and an analysis of neighborhood effects.[8]

8.1. Decomposition of variance in neighborhood poverty

The first step is to decompose the variance in children's exposure to neighborhood poverty into the relative contributions of neighborhood change, residential mobility, and variation between children. Because some children are observed more than others and most children are not observed through the age of 18, the data do not directly provide a total-childhood measure. The PSID–CDS provides a more cumulative measure than the L.A. FANS analysis, which includes only 2 years, but still does not cover the period of entire childhood. We nonetheless seek to estimate the variance in exposure to poverty due to residential mobility and neighborhood change for *a synthetic cohort* of children who experienced over their entire childhood the same age-specific transitions between poor and non-poor neighborhoods as the children in the PSID–CDS or L.A. FANS samples. Both samples include children from ages 0–18, enabling us to use information about children at all ages of childhood, combined with the mobility rates that we observe in the data. The decomposition is done on a sample of person-spell-months in L.A. FANS, where each person has twenty-four observations, and person-spell-years in the PSID–CDS, where each child has an observation for each year lived and during which their caregiver was observed in the PSID. Each month or year counts as an observation, and is attached to information about the poverty rate in the census tract that the child lived in during that month or year.

[7] Analyses with "Others" omitted from the analysis produce identical results.

[8] All analyses are conducted using probability weights to correct for differential family and child selection and for household non-response/attrition between waves.

For each of the first 18 years of life, we calculate mobility rates (r_t):

$$r_t = \frac{m_t}{n_t} \tag{1}$$

where m_t is the moves occurring in a particular month/year, and n_t is the number of children whom we observe in a particular month/year. A given monthly/yearly mobility rate implies a spell length (s_t) of $\frac{1}{r_t}$. From these monthly (yearly) lengths, we estimate the average length of a residence spell during the first 216 months (18 years) of life as:

$$\overline{s} = \frac{\sum_{t=1}^{216} s_t}{216} \tag{2a}$$

for the L.A. FANS,

$$\text{or } \overline{s} = \frac{\sum_{t=1}^{18} s_t}{18} \tag{2b}$$

for the PSID–CDS. We also calculate person-specific averages ($\overline{s_p}$): that is, the average number of residence spells that each child experiences over the period during which he or she is observed.

From these calculations, we compute a weight for the residential mobility component of the decomposition:

$$W_{\mathrm{M}} = \frac{\overline{s}}{\overline{s_{\mathrm{p}}}}, \tag{3}$$

which is the ratio of the expected average number of spells over the 18-year period ($\overline{s}$) to the number of spells experienced by each child over the 2-year observed period ($\overline{s_{\mathrm{p}}}$). The weight for the neighborhood change component (W_{N}) in L.A. FANS is simply equal to nine times each child's 2-year value for the neighborhood change component, and the PSID–CDS weight is equal to 18 divided by the number of years that a child is observed. We also correct for the over-representation of children in certain months of life by calculating a third weight (W_{D}), the inverse of the ratio of the number of children observed in each month (n_t) to the average number of children in a month ($\overline{n}$):

$$W_{\mathrm{D}} = \frac{\overline{n}}{n_t} \tag{4}$$

These weights are combined with the other components to yield the decomposition:

$$\sum_P \sum_T \frac{1}{N}(Y_{TP} - \overline{Y})^2 = \sum_P \sum_T \frac{1}{N} * W_{\mathrm{N}} W_{\mathrm{D}} (Y_{TP} - \overline{Y_{SP}})^2 + \sum_P \sum_S \frac{1}{N} * W_{\mathrm{M}} W_{\mathrm{D}} (\overline{Y_{SP}} - \overline{Y_P})^2 + \sum_P \frac{1}{N} * W_{\mathrm{D}} (\overline{Y_P} - \overline{Y})^2 \tag{5}$$

where P denotes individuals, T denotes the time period (month in L.A. FANS and year in PSID–CDS) and S denotes spells of residence. In addition,

$\overline{Y}$ = the mean neighborhood poverty rate for the entire sample;
Y_{TP} = each month's/year's value of neighborhood poverty;
$\overline{Y_P}$ = the person-specific mean poverty rate over the observed period;
$\overline{Y_{SP}}$ = the mean of neighborhood poverty in a particular spell within a person;
N = the total number of person-months/years.

Each of these terms represents a sum of squares; that is, the terms are calculated for each child and then summed over person-spell-months/years to get a value for the total sample. The first term, $(Y_{TP} - \overline{Y}_{SP})$, is the deviation of the individual from his/her spell mean and is summed across person-months/years; this component measures the contribution of neighborhood change to the total variation in neighborhood poverty over the observed period. The second component, $(\overline{Y}_{SP} - \overline{Y}_{P})$, is the deviation of the spell mean from the person mean and is summed across spells; this component makes up the contribution of residential mobility. Finally, unlike the previous two measures, which are "within-person" measures, $(\overline{Y}_{P} - \overline{Y})$ is the deviation of the person mean from the overall sample mean and is summed across people; it represents the contribution of variation between children in neighborhood poverty to the total sample variation in neighborhood poverty. This last component is a cross-sectional measure. These three measures add up to the total sum of squares. The amount of variation in neighborhood poverty that is explained by each component is therefore its proportion of the total sum of squares.[9]

8.2. Neighborhood effects

The second part of the analysis uses least squares regression to consider differences between several measurements of neighborhood experience on the outcomes within our two samples of children. Standard errors in our regressions are computed using the Huber/White Sandwich estimator to account for the clustering of individuals within neighborhoods (Huber, 1967; White, 1980). We control for a number of family and individual characteristics, as described above. We cannot account for changes in these characteristics over time in the L.A. FANS because we have only one wave of data. To exploit the longitudinal nature of the PSID–CDS, we pool both waves of data and conduct pooled regression analyses. We also run individual fixed effects models in the PSID–CDS to control for unobserved differences between children that may bias the neighborhood coefficients. We do not present the results of the fixed effects analyses, however, since they do not change the substantive results. Results of these analyses are available upon request.[10] Finally, it should be noted that the analyses presented here do not differentiate between the effects of residential mobility and neighborhood change on children's well-being.[11]

[9] The decomposition is only done for people with non-missing values on neighborhood characteristics. The elimination of non-missing values biases this part of the analysis toward people who do not move, but is the best way around the problem.

[10] We take several steps to control for individual and family level factors that could confound the relationship between neighborhood poverty and children's well-being. As in all observational studies, though, we cannot rule out the possibility that neighborhood poverty is endogenous to qualities of children and families that we have not measured. Families may choose their neighborhoods in part to maximize their children's success, for example. Failure to measure this in a regression model may lead to biased estimates.

[11] Given our interest in the first part of the article in understanding the role of residential mobility and neighborhood change in determining children's environments over time, it is logical to consider any differences in their effects on children. This is especially true given research showing that residential mobility may have adverse effects on children's well-being, regardless of the type of neighborhood the child lives in (e.g., Long, 1975; Haveman et al., 1991). We conduct an analysis to separate the effects of these components. In results not shown here, we find that the effects of residential mobility and neighborhood change do not significantly differ from one another (Jackson and Mare, 2006).

Table 1
Weighted descriptive characteristics of L.A. FANS and PSID–CDS samples[a]

	White	Black	Latino	Asian	Other	Total
L.A. FANS (N = 2112)						
Race/ethnic composition	26	11	53	10		100
Mean education of caregiver (years)	14.9	13.6	10	15.6		12.2
Median family income	65,411	33,300	27,000	58,350		35,000
Mean neighborhood poverty	12.1	22.7	23.4	12.7		19.9
Mean child age	9.8	9.6	9.2	10		9.4
Caregiver married	81	28	64	85		67
Mean number of children in household	2.2	2.7	2.8	2		2.6
Caregiver foreign-born	22	8	81	86		38
Moved at least once	17	33	28	18		25
Mean no. of internalizing behaviors (range 0–22)	2	2.5	3.5	2.4		2.9
Mean no. of externalizing behaviors (range 0–33)	6	6.5	6.7	5.1		6.3
Mean general health status (range 1–5)	1.4	1.9	2.0	1.4		1.8
Mean applied problems standardized score	110.8	100.2	97.6	111.5		102.7
PSID–CDS 2002 (N = 2865)						
Race/ethnic composition	64	16			21	101
Mean education of caregiver (years)	13.7	12.4			10.7	12.9
Median family income	68,000	29,500			33,000	54,567
Mean neighborhood poverty	9.1	21.8			20.4	13.4
Mean child age	11	11.5			10.9	11.1
Caregiver married	82	37			73	73
Mean number of children in household	2.2	2.4			2.8	2.4
Moved at least once in 2-year period	31	34			22	29
Mean no. of internalizing behaviors (range 0–14)	3.2	3.2			3.9	3.3
Mean no. of externalizing behaviors (range 0–17)	5.5	6.2			5.6	5.6
Mean general health status (range 1–5)	1.5	1.8			1.8	1.6
Mean applied problems standardized score	109.1	95.1			99.9	105.8

[a] Unless row is specified to be the mean, numbers are percentages.

9. Results

9.1. Descriptive characteristics

Table 1 presents descriptive characteristics of the L.A. FANS and 2002 PSID–CDS samples, respectively. The two samples have similar distributions of parental education, marital status, and family size. The racial/ethnic composition of the two populations is fundamentally different, however, with a Hispanic majority (53%) in the L.A. FANS and a non-Hispanic white majority (64%) in the PSID–CDS. The PSID–CDS children also come from more well-off families, live in wealthier neighborhoods, and score slightly higher on the math assessment, on average. Not surprisingly, Asian and non-Hispanic white children have the most educated caregivers and are from the wealthiest families, and black and Hispanic children are more economically disadvantaged.[12] The mean neighborhood poverty rate is twice

[12] "Others" in the PSID–CDS consist primarily of Hispanic children.

as high for blacks and Hispanics/Others as for whites and Asians. All racial groups experience a similar number of behavior problems and similar levels of general health.

In both samples, blacks are slightly more likely than other groups to have moved at least once over a 2-year period, while in the L.A. FANS, Hispanics are also more likely to move than whites/others and Asians. This pattern reflects the tendency of disadvantaged groups to move more than their advantaged peers (South and Crowder, 1997, 1998). It is surprising that blacks in Los Angeles are more likely than Hispanics to move, however, given blacks' relative economic advantage in Los Angeles. This pattern may be a result of including increasing numbers of blacks moving out of the central city in the face of Latino influx during the late 1990s, or changes in the upward and downward mobility of blacks (Halle et al., 2003).

9.2. Decomposition of variance: the role of residential mobility and neighborhood change in shaping children's neighborhood poverty exposure

9.2.1. L.A. Fans

Table 2 shows the components of expected variation in neighborhood poverty rate over 18 years into parts due to residential mobility, neighborhood change, and between-person

Table 2
Expected contribution of residential mobility, neighborhood change and between-person differences to total variation in neighborhood poverty over 18 years[a]

	All races	Blacks	Whites	Latinos	Asians
L.A. FANS					
Total sample ($N = 59{,}073$)					
Residential mobility	15	35	7	15	9
Neighborhood change	7	8	7	8	4
Between-person	78	57	88	77	87
Total	100	100	100	100	100
N	59,073	4887	13,324	36,607	4255
Movers ($N = 14{,}169$)					
Residential mobility	47	70	30	44	39
Neighborhood change	4	3	3	5	3
Between-person	49	27	67	51	58
Total	100	100	100	100	100
N	14,169	1464	2652	9387	666
Stayers ($N = 47{,}455$)					
Residential mobility	0	0	0	0	0
Neighborhood change	9	12	7	10	4
Between-person	91	88	94	90	96
Total	100	100	100	100	100

	All races	Blacks	Whites	Others
PSID–CDS				
Total sample ($N = 27{,}627$)				
Residential mobility	22	27	22	16
Neighborhood change	9	10	7	12
Between-person	68	63	71	72
Total	100	100	100	100
N	27,627	12,217	13,041	2303

[a] Numbers in table are percentages.

variation. Results are separated by data source and presented separately for the total sample and by race. In the L.A. FANS, residential mobility in particular is expected to play a significant role in determining children's exposure to neighborhood poverty exposure over the course of childhood. The top panel of Table 2 shows that residential mobility and neighborhood change are 15% and 7% (respectively) of the variation in neighborhood poverty that children experience over childhood, assuming that they experience the age-specific mobility rates observed in the sample. Residential mobility is a much larger part of blacks' variation in neighborhood poverty than of other groups' variation; that is, 35% of their variation in neighborhood poverty relative to 15% or less for other racial/ethnic groups in Los Angeles.

In trying to understand the greater contribution of residential mobility among blacks, it is helpful to look at the trends for only people who move. Residential mobility accounts for 70% of black movers' variation, much more than for the other three groups. This pattern could stem from two possible explanations: (1) blacks move more often than other groups, or (2) blacks experience more economic heterogeneity in their moves than members of other groups. While a higher percentage of blacks than other groups move three or more times (12% of blacks report three or more moves, compared to 10% of whites/others, 4% of Latinos, virtually 0% of Asians), the overall differences in frequency of mobility are not large. This provides some support for the second possibility, that there is more economic heterogeneity in blacks' moves. Neighborhood change, on the other hand, does not appear to contribute as substantially to the variation in neighborhood poverty.

As a whole, the results suggest that, over the course of an entire childhood, residential mobility may be an important way in which children, particularly black children, experience neighborhoods of different economic types. The potentially greater economic heterogeneity of blacks' mobility does not fully follow the results of previous research, namely that blacks are more likely than other groups to repeat spells of poverty if they are poor (e.g., Quillian, 2003). This pattern could be the result of several factors, including the larger proportion of blacks who fall in the middle of the income distribution in Los Angeles relative to other cities.

9.2.2. PSID–CDS

The PSID–CDS allow us to observe a national sample of children over a longer period of time. These data reflect an overall pattern that is similar to the L.A. FANS. The bottom panel of Table 2 presents the expected contribution of residential mobility, neighborhood change and variation between children to the total variation in neighborhood poverty over 18 years. Residential mobility accounts for 22% of children's variation in neighborhood poverty over the 18 years of childhood, neighborhood change accounts for 9%, and differences among children explain 68%.[13]

9.2.3. Regional differences

The decompositions show two main differences between the national and the Los Angeles samples. First, residential mobility is a bigger part of variation in children's exposure to

[13] We do not disaggregate the PSID–CDS sample by mover status, because the majority of children have moved at least once over the longer observation period in these data.

Table 3
Regional differences in expected contribution of residential mobility, neighborhood change and between-person differences to total variation in neighborhood poverty over 18 years

	All races	Blacks	Whites	Latinos	Asians
L.A. FANS					
Residential mobility	15	35	7	15	10
Neighborhood change	7	8	7	8	3
Between-person	78	57	88	77	87
Total	100	100	100	100	100
N	59,073	4887	13,324	36,607	4255
	All races	Blacks	Whites	Others	
PSID–CDS West					
Residential mobility	14	23	19	10	
Neighborhood change	11	7	11	12	
Between-person	75	70	70	78	
Total	100	100	100	100	
N	4293	840	2387	1035	
PSID–CDS East/Midwest					
Residential mobility	24	23	24	28	
Neighborhood change	10	9	12	7	
Between-person	66	68	64	65	
Total	100	100	100	100	
N	11,157	3439	7120	586	
PSID–CDS South					
Residential mobility	21	23	23	9	
Neighborhood change	14	12	7	33	
Between-person	65	65	70	58	
Total	100	100	100	100	
N	12,173	7936	3532	682	

*Numbers in table are percentages.

neighborhood poverty over the course of childhood in the nation as a whole than in Los Angeles. Table 2 shows that mobility is about 15% of the total variation in L.A. FANS neighborhood poverty, versus 22% in the PSID–CDS. This suggests that children in Los Angeles are moving among more similar neighborhoods than children nationwide, inasmuch as the L.A. FANS only includes moves within Los Angeles County. Second, the racial differences are larger in the L.A. FANS than the PSID–CDS. Whereas the Los Angeles sample displays large black/non-black differences in the role of residential mobility in determining exposure to neighborhood-level poverty, residential mobility seems to equally determine black and non-black children's exposure to neighborhood poverty in the national sample. These differences between Los Angeles and the nation suggest that regional differences in racial/ethnic and socioeconomic composition produce differences in mobility patterns.

To examine this possibility, we conduct the decomposition on regional subsets of the PSID–CDS sample. Table 3 shows that PSID–CDS children who live in the West exhibit the greatest similarity to L.A. FANS children.[14] Residential mobility explains 14% of the neighborhood poverty variation among children who live in the West (compared to 15% in

[14] Regions are defined using US Census classifications. The West includes Alaska, Arizona, California, Colorado, Hawaii, New Mexico, Nevada, Oregon, Utah, Washington and Wyoming.

L.A. FANS), suggesting that mobility in the West occurs between neighborhoods that are more socio-economically similar than in other parts of the country. In addition, there is a four percentage-point difference between Western blacks and whites in the role played by residential mobility. This racial difference is not as large as the one observed in L.A. FANS. However, the patterns of children in the West are much more similar to the L.A. FANS than those of children in other regions. While the regional decomposition demonstrates the variation in blacks' mobility behavior, it also shows that the behavior of non-blacks varies significantly by region. In the national sample, for example, ''other'' children in the East and Midwest, who consist primarily of Hispanics, experience greater socioeconomic variation in their neighborhoods than in the West and South. This is likely due to the different composition of Hispanics across the nation.

9.3. Does measuring neighborhood experience at more than one point in time change estimates of neighborhood effects?

If residential mobility plays a non-trivial role in determining children's exposure to neighborhood poverty, then do temporal definitions of neighborhoods that include children's mobility histories produce estimates of neighborhood effects that differ from point-in-time measures? This question is important for researchers studying to understand children's well-being; considering children's contexts longitudinally can potentially provide a richer understanding of how children are influenced by their environments.

For each data source, we test several temporal definitions of the neighborhood environment, shown in Table 4. In the L.A. FANS, Models 1–4 provide longitudinal measures of the neighborhood environment by breaking the 2-year observed residential history into six-month intervals. Model 1 defines the neighborhood as the average of the first six months of the 2-year period (the furthest away from the interview date), Model 2 as the average of months 7–12, Model 3 as the average of months 13–18, and Model 4 as the average of months 19–24 (the six months leading up to the interview date).[15] Model 5 is also a longitudinal measure, defining the neighborhood as the average poverty rate over the 2-year observed period. This model assumes that each month during the 2 years has the same effect on children's well being. Finally, Model 6 provides a cross-sectional measure of the neighborhood by using children's neighborhood poverty rate at the time of the interview. In the PSID–CDS, Model 4 is a longitudinal measure, defined as the child's average neighborhood poverty rate over the past 5 years.[16] Models 1–3 define the neighborhood at different points leading up to the 2002 survey year (1997, 1999, 2001). Within each data set, we compare the models, which are non-nested, by examining their coefficients and R^2 values. Our temporal definitions allow us to assess any differences between recent and past neighborhood experience in its influence on well being.

[15] We also test a model not discussed here, which includes all four six-month intervals in the same model. An *F*-test of this model against the models with each interval suggests that it does not provide a better fit for the data; the intervals in the model are highly collinear.

[16] We also tested models composed of averages longer than 5 years, up to 15 years prior to the interview date. The earlier the time point, however, the more missing data there is due to both children's young ages and geocoding procedures. We present the 5-year average here for the sake of simplicity because it does not lead to a different substantive conclusion.

Table 4
OLS regression of internalizing behavior problems and math achievement on neighborhood poverty

	Internalizing behaviors ($N = 2180$)				Applied problems score ($N = 2190$)			
	Gross β_{Pov}	R^2	Net β_{Pov}[a]	R^2	Gross β_{Pov}	R^2	Net β_{Pov}[a]	R^2
L.A. FANS								
(1) 19–24 months < interview	5.19***	.038	1.66*	.13	−43.16***	.092	−7.59	.255
	(.75)		(.98)		(6.72)		(5.49)	
(2) 13–18 months < interview	5.22***	.042	1.96**	.13	−43.03***	.093	−7.16	.256
	(.72)		(.88)		(6.45)		(5.14)	
(3) 7–12 months < interview	5.31***	.044	2.12**	.13	−41.41***	.091	−5.61	.257
	(.69)		(.86)		(6.76)		(5.22)	
(4) 1–6 months < interview	5.50***	.049	2.48***	.13	−41.75***	.086	−5.89	.255
	(.73)		(.91)		(7.04)		(5.45)	
(5) Time of interview	5.55***	.047	2.50***	.13	−42.34***	.083	−5.94	.249
	(.73)		(.87)		(6.92)		(5.20)	
(6) Mean	5.89***	.053	2.98***	.14	−43.12***	.085	−6.44	.254
	(.76)		(.94)		(6.66)		(5.50)	
PSID–CDS (2002)								
(1) 1997	1.45	.0032	−.32	.033	−45.36***	.080	−13.79***	.21
	(1.06)		(1.13)		(4.32)		(4.89)	
(2) 1999	2.33**	.0057	.73	.032	−49.91***	.095	−17.78***	.21
	(1.12)		(1.23)		(4.42)		(4.80)	
(3) Time of interview (2001)	2.45**	.0088	.91	.035	−51.24***	.11	−20.92***	.22
	(1.04)		(1.18)		(4.23)		(4.74)	
(4) Mean (of years 01, 99, 97)	2.32**	.0058	.48	.032	−54.47***	.11	−20.72***	.21
	(1.11)		(1.30)		(4.10)		(4.93)	

Standard errors are in parentheses.
[a] Net models control for race, logged family income, parental marital status, parental education, child's age, child's sex, parental depressive status, mover status, parental nativity status, number of children and family poverty status.
* Indicates $p < .10$.
** Indicates $p < .05$.
*** Indicates $p < .01$.

9.3.1. L.A. Fans

Table 4 presents the gross and adjusted coefficients from the regression of internalizing behaviors and math achievement on neighborhood poverty rate. A greater number of internalizing behavior problems suggests more withdrawn and sad behaviors, while a high score on the applied problems assessment indicates greater math achievement. The neighborhood poverty rate ranges from 0 to 1; its coefficient therefore indicates a comparison between a completely poor neighborhood (1) and a completely non-poor neighborhood (0). The table demonstrates that, in the L.A. FANS, there is a statistically significant net association between neighborhood poverty and children's frequency of internalizing behavior problems. This is not the case for children's math achievement, where observed child and family level characteristics fully explain the strong zero-order association between neighborhood poverty and achievement.

Table 4 shows that the magnitude and significance of the regression coefficients in the L.A. FANS are very similar for the various temporal definitions of the neighborhood. A child who lives in a completely poor neighborhood is expected to exhibit 1.5–3 more internalizing behavior problems than a child in a completely non-poor neighborhood,

depending on the temporal measurement. Temporal measures closer to the interview date produce slightly larger coefficients than more distant measures, presumably because behaviors are more strongly influenced by recent than earlier experiences. Overall, the estimated effects of time-invariant and time-varying measures of neighborhood poverty do not differ greatly. Longitudinal measures are likely the most comprehensive, however, because they include both the atypical and routine neighborhoods that children experience.

9.3.2. PSID–CDS

Results from the L.A. FANS suggest that, over a 2-year period, children's neighborhood environments do not vary enough to produce meaningful differences between cross-sectional and longitudinal measures. The mean may be preferred over cross-sectional measures, however, since it smoothes fluctuations in children's experiences. Is the similarity of the measures used in the L.A. FANS a reflection of reality, however, or of the short observed time period? The small differences that were observed raise the question of whether they would be larger with data spanning a longer time period. The PSID–CDS allows us to address this possibility, because children are observed over a longer period of time.

Table 4 shows that, in contrast to the small but significant association between neighborhood poverty and children's internalizing behavior problems (as well as externalizing behavior problems and general health status) observed in the L.A. FANS, there is no net association in the PSID–CDS. In addition, in contrast to the insignificant L.A. FANS association between local poverty and achievement, there is a strong and significant association between the two in the PSID–CDS. Living in a completely poor neighborhood in 2001 is associated with a 14–20 point decrease in math achievement in 2002, depending on the temporal measure. As in the L.A. FANS, however, the cross-sectional and longitudinal measures used produce similar estimates of the association between neighborhood and child well-being. More recent measures have a stronger association with achievement than more distant experiences, again suggesting that recent experiences have a stronger association with achievement.

9.3.3. The unique case of hispanics

While both the L.A. FANS and the PSID–CDS yield similar results about the neighborhood processes that determine children's exposure to poor neighborhoods, and about the consequences of the temporal definition of "childhood" for estimates of neighborhood effects, there are noticeably different associations between neighborhood poverty and children's well-being in the two data sources. The L.A. FANS sample shows a small but significant relationship between local poverty and health, and no relationship with achievement, while the PSID–CDS sample showed the opposite. This variation could result from neighborhood-level differences between Los Angeles and the nation, or from differences in the sample designs. While the PSID–CDS sample is largely composed of non-Hispanic blacks and whites, the L.A. FANS sample has a majority Hispanic population. In addition, over 80% of Hispanic children have foreign-born caregivers, compared to about 20% of white children and only 8% of black children. Most Asian children also have foreign-born parents; they compose a small fraction of the sample, however. This compositional variation suggests that factors related to

Table 5
OLS regression of internalizing behavior problems and math achievement on neighborhood poverty, and interaction between neighborhood poverty and race/ethnicity[a]

	Internalizing behaviors ($N = 2180$) Net β	Applied problems score ($N = 2190$) Net β
Neighborhood poverty (Current)	−2.01	−27.62***
	(1.42)	(8.79)
Hispanic	−.71	−10.57***
	(.40)	(1.95)
Black	−.61	−5.80**
	(.60)	(2.90)
Asian	−.037	−2.68
	(.69)	(2.86)
Hispanic * Neigh. poverty	6.77***	27.77***
	(1.56)	(10.50)
Black * Neigh. poverty	3.23	5.62
	(2.10)	(12.00)
Asian * Neigh. poverty	2.09	17.91
	(3.84)	(16.73)
R^2	.14	.25

[a] Estimates are net of logged family income, parental marital status, parental education, child's age, child's sex, parental depressive status, mover status, parental nativity status, number of children and family poverty status.

ethnicity and nativity status could explain the different associations observed in the two samples.

To explore this possibility, we test for an interaction between neighborhood poverty and race/ethnicity, and between race/ethnicity and nativity status. Table 5 presents the results of the L.A. FANS regression of internalizing behavior problems and math achievement on neighborhood poverty and its interaction with race/ethnicity.[17] This model fits better than a model with an interaction between race/ethnicity and nativity status, which is not significant (results not shown here). Table 5 shows that there is a significant association between neighborhood poverty and internalizing behavior problems among Hispanics, but not among other racial/ethnic groups: Hispanic children in completely poor neighborhoods are expected to have about five more behavior problems than their wealthy, non-Hispanic white peers. This pattern of no significant relationship for black and white children is similar to the CDS, with its mostly black and white sample. Similarly, while there is no relationship between local poverty and math achievement among the Hispanic L.A. FANS sample, there is a very strong relationship for other children, particularly black children. These results are also quite similar to the CDS, where there is a strong relationship with achievement but not with behavioral and physical health.

10. Conclusions

This article has examined what neighborhood processes contribute to children's exposure to neighborhood poverty (and to other neighborhood compositional factors), as well

[17] We present this only for the current neighborhood poverty rate, rather than for all temporal measures, in order to explore the differences between the two samples in greater detail. Results do not differ across the temporal measures, however.

as whether or not the temporal definition of childhood affects inferences about how neighborhoods influence child well-being. We add this temporal dimension by considering the role of both residential mobility and neighborhood change in shaping children's overall exposure to neighborhood poverty. In addition, we use both regional and national data to broaden our study population and to uncover any regional differences in neighborhood dynamics and effects.

While the PSID–CDS provides as close to a full childhood residential history as is possible in the United States, we are nonetheless unable to observe all children for a full 18 years. We address this by conducting a synthetic cohort analysis, where we assume that children continue to experience their age-specific mobility rates until the age of 18. In addition, while the focus of our article has been on children's residential histories and neighborhood environments, we do not examine variation in children's individual and family environments over time. Finally, we have intentionally limited the complexity of our neighborhood effects analyses by not studying in-depth the mechanisms by which neighborhoods might influence children, and the great variation that likely exists by age, family environment, and sex. Instead, we have uncovered some ethnic differences in our analyses, which deserve further study.

These limitations notwithstanding, the results suggest that residential mobility plays a non-trivial role in determining children's exposure to neighborhoods of different economic types. This is particularly true for black children in the Western US, who appear to experience greater economic heterogeneity in their mobility experiences than other racial/ethnic groups. Western blacks' middle-class status relative to blacks in other regions may play a role in explaining this result, especially in relation to the large Hispanic influx to the West during the last few decades. The large immigrant influx in Los Angeles and other Western metropolitan areas suggests a process of neighborhood transition, whereby traditionally black neighborhoods become neighborhoods composed mainly of immigrants from Latin America and Asia. Blacks may move away from neighborhoods as they change in composition, in search of a more suburban and/or middle-class community in the West or elsewhere (Clark, 1996; Frey, 2001). When we incorporate these residential histories into estimates of the influence of neighborhood poverty on several indicators of children's well-being, however, we see that allowing neighborhood characteristics to vary through residential mobility and neighborhood change does not depict a strikingly different picture from cross-sectional estimates. Our findings suggest that children do not experience enough variation in their local surroundings to produce meaningful differences between static and dynamic measurements of neighborhoods. More variability in children's experiences across neighborhoods would likely produce bigger differences between temporal measures. Given the variability that exists both regionally and nationally, however, this particular methodological issue does not greatly threaten the validity of neighborhood effects research. Even so, longitudinal measures are to be preferred since they capture children's actual experience, and may smooth out atypical fluctuations in children's experiences.

Whether or not "neighborhood effects" exist more generally remains an open question. Among the overall population, our results show no significant relationship between neighborhood composition and children's health, and a very strong relationship with children's educational achievement. This pattern appears to be reversed for Hispanic children, whose behavior is significantly related to the compositional characteristics of their neighborhood, but whose achievement is not. It is unclear whether these ethnic differences are driven by neighborhood-level factors, or if the different observed relationships have more to do with

independent factors related to language and nativity status. While structural and compositional data on children's neighborhoods provide useful information, and were most useful for our purposes in this article, it is unlikely that these objective, administrative measures capture the nuanced ways in which children's local environment structures their opportunities and outcomes. Research that focuses on the more proximate characteristics of neighborhoods that are shaped by structural, compositional factors, such as crime, street life, interaction among neighbors, and individuals' perceptions of neighborhood safety and quality, may go further in identifying the ways in which neighborhoods matter for children above and beyond families and schools. This article has shown the extent of variability that children experience in their local environments, and the potential consequences of that variability for research conclusions. Attention to the temporal conceptualization of children's environments, and of childhood more generally, is neglected in research on child well-being, which too often portrays children's environments as isolated and unchanging, rather than cumulative and variable.

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