Neighborhood Attributes as Determinants of Children's Outcomes

How Robust are the Relationships?

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ABSTRACT

Estimates of neighborhood effects on children's outcomes vary widely among the studies that seek to identify their existence and magnitude, reflecting substantial variation in data and model specification. Here, we review that literature, and ask if the disparity in estimates of neighborhood effects may reflect the differences among studies in the specification of family characteristics, and hence omitted variables bias. We report a systematic set of robustness results for three youth outcomes (high school graduation, the number of years of completed schooling, and teen nonmarital childbearing) using data on about 2,600 children from the Panel Study of Income Dynamics. We observe these children over a period of at least 21 years and have included an extensive set of neighborhood variables for these individuals measured over the entire school-age period. We measure the relationship of these neighborhood variables to the three outcomes, moving from basic models containing no individual and family characteristic variables to models containing an extensive set of individual and family statistical controls. We conclude that the reliability of estimates of these impacts may be an artifact of the degree to which family background is characterized in model specification. Confidence that reported neighborhood effects reveal true relationships requires statistical controls for the full range of family and individual background that may also influence children's attainments; not all variables with coefficients showing asterisks have significant effects.

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I. Introduction

The past three decades have witnessed continued economic and social decline in the urban neighborhoods in which many poor and minority children are concentrated (Jargowsky 1997). Given the conjectures of economists and sociologists concerning the adverse effects on children's attainments of growing up in low quality family, neighborhood and school environments, this trend is of concern, and has stimulated substantial social science research on the relationship of neighborhood characteristics to children's outcomes. In this paper, we review recent results on "neighborhood effects" and assess the robustness of these findings.

The issue of neighborhood effects has a long research history among both sociologists and developmental psychologists. Although sociologists emphasize the potential impact of role models and peer effects on children's behavior and outcomes, scholars concerned with the process of child development rest their analyses on ecological models that view individual attainments as the product of the interaction of personal traits and a variety of "ecosystems"—family, relatives, peers, community, schools, and the welfare/criminal justice systems.[1] Interest in this issue among economists is relatively recent. In this literature, the attainments or choices of youths are viewed as the outcome of a production process in which both parental choices (or family circumstances) and neighborhood and social circumstances influence youth outcomes.[2]

Estimates of neighborhood effects vary widely among the studies that seek to identify their existence and magnitude. The substantial variation in data and model specification among the prominent studies of children's attainments[3] raises the question of the robustness of estimates of the effects of neighborhood characteristics on children's outcomes. Here we ask if the disparity in estimates of neighborhood effects may reflect the differences among studies in the specification of family characteristics, and hence omitted variables bias?[4]

Our study is distinguished by four characteristics. First, we report a systematic set of robustness results for three youth outcomes (high school graduation, the number of years of completed schooling, and teen nonmarital childbearing), and reveal quite different robustness patterns among them. Second, we use an extensive set of neighborhood variables to describe the characteristics of narrowly defined residential areas (primarily Census tracts containing about 4,000 individuals). Third, we measure these neighborhood characteristics over the entire school-age period for a large, na-

1. See Sewell and Armer (1966) for one of the more prominent early efforts by sociologists to relate neighborhood socioeconomic status to children's outcomes, while controlling for a limited set of individual and family characteristics. Bronfenbrenner (1989) and Crockett and Crouter (1995) discuss the ecological model that has guided much of the research of developmental psychologists.

2. Haveman and Wolfe (1994, 1995) discuss the implications of this framework for empirical estimation. In some formulations, youth choices are modeled as a response to incentives, with family and neighborhood environment having both direct effects on outcomes, and indirect effects through their influence on incentives. See Haveman, Wolfe, and Wilson (1997).

3. Haveman and Wolfe (1995) review and critique these studies.

4. Other studies have recognized this potential problem, noting that "omitting or mismeasuring . . . family characteristics [may] tend to inflate neighborhoods' estimated effects on children" (Jencks and Mayer 1990), and providing some evidence on this problem (Brooks-Gunn et al. 1993; Plotnick and Hoffman 1999).

tionally representative set of children. Finally, we specify a number of models that vary in the extent to which family characteristics are introduced as statistical controls, thereby revealing the robustness of estimates of neighborhood effects to researcher choice or data constraints in this dimension.

In Section II, we describe the primary, recent research studies that measure the relationship of neighborhood characteristics to selected children's outcomes; each seeks to control for a variety of individual and family attributes and choices. Section III describes the data on which our robustness analysis rests, and indicates the research strategy that we pursue. In effect, we identify a set of neighborhood characteristics that we measure during the childhood years (ages 6–15) for about 2,600 children, each of whom is observed over a period of at least 21 years. Then, we measure the relationship of these neighborhood variables to the three outcomes at issue, moving from basic models containing no individual and family characteristic variables to models containing a very extensive set of individual and family statistical controls. Section IV summarizes the findings from a series of robustness tests of the estimated effects of neighborhood characteristics on children's outcomes over alternative sets of these statistical controls. The final section concludes.

II. Research on the Effect of Neighborhood Characteristics on Children's Outcomes: A Review

A. Neighborhood Effects: Theoretical Links

Much of the recent interest in the potential influence of neighborhoods on children's attainments stems from the writings of William Julius Wilson in the 1980s (for example, Wilson 1987). Wilson suggests a process by which neighbors' status, choices, or values can lead to a concentration of positive and adverse attributes in particular neighborhoods, which attributes affect the aspirations, attitudes, and motivations of those who grow up in these areas, and hence their attainments and success. Following Wilson's lead, social science researchers have offered several speculations as to how neighborhood and environmental factors might influence children's outcomes.[5]

In the view of some observers, children or youths are influenced by the behavior and status of those with whom they socialize, affiliate, or accept as role models. Hence, the behavior and values of children's friends, neighbors, and acquaintances alter their perceptions, influence their behavior, and structure their norms, in much the same way as do the behavior and values of their own parents. A variant of this perspective suggests that the quality of the educational, medical care, and law enforcement institutions in a community—social capital—influences children's outcomes, even if neighbors' behavior and values do not.[6] In short, a "good" neighbor-

5. The varying hypotheses regarding the effects of neighborhoods and peers on attainment are explored in more detail by Jencks and Mayer (1990). See also Brooks-Gunn, Duncan, and Aber (1997).

6. The concept of "social capital" and its effects on individual behavior and outcomes was first discussed by James Coleman (1988). A critical view of the extensive research and writing that has followed this early contribution is Durlauf (1999).

hood environment—like a prosperous, supportive and nurturing family—confers benefits on the children that grow up in it. This view is described by various writers as conforming to sociological theories related to either "contagion" or "collective socialization," or economists' models regarding the effects of "economic deprivation" or family investments in children (Haveman and Wolfe 1994).

An alternative view is that growing up in a good neighborhood may have an *adverse* effect on a child, especially if the child is from a poor or minority family. In this view, poor children raised in more affluent neighborhoods may view themselves as being in competition with those in their neighborhood. An example of this phenomenon is the potential discouragement felt by a poor or minority child attending an affluent school that is academically demanding, or populated by whites, and the adverse effects of this on school performance or retention. Hostility or disengagement may follow from a child's perception that he or she will ultimately lose in the resulting zero-sum competition that divides a fixed stock of community resources among a set of competitors. Such theories are known as "competition" or "relative deprivation" theories.[7]

B. Neighborhood Effects: Empirical Estimates

These conjectures regarding the potentially powerful effect of neighborhood characteristics on children's attainments have stimulated several empirical studies. Two of the earliest studies grew out of the concern during the 1960s with the effects of racial segregation in American public schools on children's attainments. The Coleman Report (Coleman et al. 1966) focused on the unequal academic attainments of white and black children, and found that the socioeconomic composition of the student body of the schools attended had significant effects on verbal test scores, controlling for student background and attitudes, and school and teacher characteristics.[8] Another early study focused directly on the effect of neighborhood context, as proxied by the prevalence of male white collar employment, and concluded that neighborhood status had a small but statistically significant effect on children's outcomes, after controlling for gender, parental socioeconomic status, and intelligence, with substantial effects for women from high economic status families (Sewell and Armer 1966).

In Table 1, we summarize 17 studies of neighborhood effects undertaken by economists and sociologists since 1980. The data used in the studies range from very large census-based samples to longitudinal data from the Panel Study of Income Dynamics (PSID) and the National Longitudinal Surveys (NLS) to detailed community-specific surveys. Numerous econometric models are specified, especially standard least squares regressions and alternative nonlinear models (for example, probit,

7. See Cutler and Glaeser (1997).

8. These findings were supported in other research on the effects on student achievement of school and teacher characteristics and the socioeconomic status of the student body (See Wilson 1969; Summers and Wolfe 1977). These early studies are discussed and critiqued in Jencks and Mayer (1990). There were significant differences among the studies in the extensiveness of the family background characteristics used as control variables and the extensiveness of the neighborhood indicators employed.

logit), with a scattering of sibling fixed effects estimates; most are reduced form estimates. Several outcomes are studied, including high school completion, years of schooling, teenage fertility and childbearing, welfare receipt, and earnings.

The neighborhood variables differ widely across these studies, and include economic conditions (for example, average family income, occupational composition), educational attainment, racial characteristics, prevalence of poverty, or especially low (and high) incomes, and demographic composition (for example, prevalence of female headed families, welfare receipt). There is also substantial variation in the extent to which family characteristics or circumstances are introduced as control variables in the estimation of neighborhood effects. Race, parental education, family economic status (for example, income, income-to-needs, welfare receipt), composition (for example, one versus two parents), and size (for example, number of siblings) are included in some form in nearly all of the studies. In addition, a wide range of other family variables are included in one or more of the studies, including residential mobility, religion, employer, region (or urban/rural), employment, health/disability, and expectations.[9]

The estimated effects of neighborhood and peer characteristics on children's outcomes are not consistent among these studies. In several studies, neighborhood characteristics appear to be important determinants of outcomes: however, statistically insignificant relationships are also plentiful. Overall, positive neighborhood characteristics (in particular, the presence of affluent families) are positively associated with youth attainments, while a number of adverse neighborhood and peer characteristics are negatively related to success. The conclusions reached by the authors vary as widely as the estimates, from a "rather circumscribed role" for neighborhood variables to "substantial" effects.

Two effects appear rather consistently. First, the most consistent relationships appear when neighborhood characteristics and outcomes are linked (for example, schooling attainments in the neighborhood and the schooling attainment of the child). Second, a series of studies (co)authored by Greg Duncan find that the presence of "affluent [and high occupational status] . . . families are key dimensions of neighborhood economic and social structure most likely to affect . . . [outcomes] . . . over and above family resources" (Brooks-Gunn, Duncan, Klebanov, and Sealand 1993).

The variation in results is troubling, however, and raises questions regarding the robustness of the estimated effect of neighborhood factors in the face of this extensive disparity in statistical controls for family characteristics. If the measures of neighborhood characteristics used in these models are either incomplete or endogenous to family characteristics, estimates of the effects of neighborhood conditions on children's outcomes could be subject to omitted variable or selection biases. If neighborhood characteristics are related to family circumstances that themselves influence children's attainments, the results will underestimate the true impacts of neighborhood factors. Further, if unmeasured family characteristics affect both the choice of neighborhood and children's outcomes, the resulting selection process

9. The number of family control variables ranges from 4 to nearly 20 over the studies included in Table 1; several employ more than 10 family-specific controls.

Table 1
Studies of Neighborhood Effects

Study	Data and Sample	Specifications	Outcome	Control Variables	Neighborhood Variables	Neighborhood Results	Conclusions
Primary Studies							
Datcher (1982)	PSID-552 male household heads ages 23–32 in 1978 who lived with parents in 1968, in SMA	OLS, race specific	Years of schooling Hourly earnings Annual earnings	Parents' education, family income, number of siblings, region, family receipt of welfare, parental expectations, parental efficacy/ambition, urban/rural	Average family income Percentage white in zipcode	Significant only for whites in sparse schooling specification Significant for blacks and whites in all earnings specifications	At least one-quarter of the gap in education and earnings of black men . . . can be accounted for by variations in neighborhood quality. The same is true for educational differences among white men.
Crane (1991)	1970 Census PUMS 92,512 16–19 year-olds (schooling) 44,466 16–19 year-olds females (teen child bearing)	Reduced form logit, race specific	Probability of dropping out of high school Probability of teenage childbearing	Family income, parents' education, family head's occupational status, household structure, family size, rural origin, gender	Percent of workers with professional/managerial jobs	Statistically significant for blacks and whites for both outcomes	High professional status has strongest effects among 15 other neighborhood factors, and pattern of impacts supports epidemic hypothesis.

Case and Katz (1991)	NBER Survey of Youth, 1989–1,200 youths aged 17–24, in low income Boston neighborhoods	OLS; Probit	Any crimes committed last year, use illegal drugs, single parent status, idle, high school dropout, attend church often, friendship with gang members	Presence of mother and father at age 14, parental marital status, mother a teen at child's birth, parents' education, family member drug and alcohol use history, family member in jail, family church attendance, age, gender, race	Mean values of behavior/outcome variables of neighbor youths (defined as youths that are in the same and adjacent neighborhoods, and in the survey) matched to own outcomes	All outcome matched neighborhood characteristics are significant and positive, except for single parent status and idle	"Behaviors of neighborhood peers appear to substantially affect youth behaviors in a manner suggestive of contagion models of neighborhood effects.". . . [F]amily and peer influences both operate in a manner such that "like begets like" (Abstract).
Evans, Oates, and Schwab (1992)	NLSY-1,453 women aged >20 in 1979 NLSY, who lived in SMA, and not pregnant before 1979	Reduced form and simultaneous	Probability of pregnancy	Pregnancy before age 20, race, sex education course taken, religious activism, female headed household dummy, stepfather present, siblings, income quartile, mother's education, state AFDC payments, state requires license to sell contraceptives, religion, *student/teacher* ratio, ratio of clinics in county to at-risk teens	ln (% of students in respondents school who are economically disadvantaged) ("student SES")	Peer variables significant in reduced form, but not in simultaneous model	

Table 1 (*continued*)

Study	Data and Sample	Specifications	Outcome	Control Variables	Neighborhood Variables	Neighborhood Results	Conclusions
Clark (1992)	1980 Census-22,534 males aged 15 to 18 who live in SMA	Logistic regression	Probability of dropping out of high school	Age, race, ethnicity, nativity, family structure, family income, welfare use, parents' occupation, parents' labor force participation, parents' earnings, whether disabled, parents' educational attainment, and parents, nativity, SMA returns to education, SMA race-specific dropout rate	% of adults who are Professional/ Managerial % of families with incomes >$40,000 % of adults college graduates Male unemployment rate % of adults who are dropouts % female headed families % families on welfare % individuals in poverty	Each neighborhood variable is significant when entered alone in equation with extensive individual, family, and SMA control variables	"The share of the population that is disadvantaged—as measured by the poverty rate . . .—and the share of the population that is middle class—as measured by the proportion of the population with incomes over $40,000 and the proportion in middle class occupations—both affect the likelihood that a boy will drop-out of school" (p. 28–29).

Brooks-Gunn, Duncan, Klebanov, and Sealand (1993)	PSID-2,200 black and white women observed ages 14–19, for child bearing and schooling outcomes IHDP-895 low birth weight, preterm infants for IQ and behavior	Reduced form	Had an adolescent out-of-wedlock birth Dropped out of high school IQ at age 5 Behavioral problems score	Family income-needs ratio, mother's education, female head, race	Percent of families with income <$10,000 Percent of families with income >$30,000 Percent black Percent of female head with kids Percent with public assistance Percent males not in labor force 40 percent + poor and ≤ 10 percent with families >$30,000 Professional/ Managerial <5 percent	Significant alone, not significant with family variables Significant alone, significant with family variables for teen birth and high school grad. Not significant with family variables Not significant with family variables Not significant with family variables Not significant with family variables Not significant with family variables Significant with family variables	Number of affluent, high occupational status, and perhaps two parent families are key dimensions of neighborhood economic and social structure most likely to affect . . . [outcomes] . . . over and above family resources (p. 377).

Table 1 (*continued*)

Study	Data and Sample	Specifications	Outcome	Control Variables	Neighborhood Variables	Neighborhood Results	Conclusions
Duncan (1994)	PSID-3,439 metropolitan teens ages 16 to 22 in 1968–91; Census geocode for neighborhood characteristics	OLS, gender, and race-specific	Years of completed schooling	Family income/needs ratio, percent years in mother only family, mother's education, percent income from welfare, percent years mother worked, calendar year child turned 16	Percent of families with income <$10,000 Percent of families with income >$30,000 Percent black Percent female headed families with kids Percent of adult women working 26+ weeks	Seldom significant Significant for all groups other than black males Significant (−) for black males[a] Significant (−) for black females Significant (−) for black females; significant (+) for white males	"... affluent neighbors confer benefits on all groups other than black males" (p. 48). "Racial neighborhood composition counts for blacks but not whites" (p. 48). "... affluent neighbors benefit black males if the neighbors are black" (p. 48). "... benefits of affluent families appeared to be stronger for children in more advantaged families" (p. 49).
Aaronson (1997)	1968–85 PSID-2,178 individuals with a sibling at least three years apart in age and in respondent household for at least two years in adolescence	Linear probability; sibling fixed effects	High school graduation	Race, gender, household income, parental marital status, whether father or mother graduated from high school, whether child worked, number of children in household, county unskilled wage rate, whether family moved	Percent of young adults who dropped out Percent of households in poverty	Both variables significant in both linear probability and fixed effects	"The fixed effect results suggest that the impact of neighborhoods exists even when family specific unobservables are controlled" (p. 31).

Plotnick and Hoffman (1999)	PSID-764 women who turned 26 between 1976 and 1987, with at least one sister and 1970 and 1980 Census neighborhood information	Logistic regression; sibling fixed effects (sisters)	Have a teenage nonmarital birth Obtained any postsecondary schooling Received AFDC at age 25	Parents' education, grew up in two parent family, region, race, family income/needs	Percent of female headed families with kids Percent of families with income <$10,000 Percent of families with income >$30,000 Race Nonelderly poverty rate Percent of families receiving welfare	Significant in welfare cross-sections Not significant Significant in schooling and welfare cross-section No effect No effect Significant in welfare cross-section	"Across 24 estimated cross-section effects . . . nine statistically significant relationships in directions consistent with theories . . . ; 2 significant relationships in unexpected directions" (p. 15). "[In fixed effects] none of the 24 estimated relationships is statistically significant with the expected sign."
Other Studies							
Duncan and Laren (1990)	PSID-1,548 black and 2,194 white babies born between 1972 and 1985; Census geocode information on neighborhoods	Reduced form logit	Low birth weight	Mother's age, mother marital status, mother smoking, family welfare receipt, mother's prenatal employment, poverty status of mother's family, crowdedness of mother's household, parents' education, mother grew up with both parents, mother low-birthweight, region, urban/rural address of prenatal mother	Poverty rate Percent with public assistance Percent black	High poverty incidence significant when entered alone; disappears when background, family, and risk controls introduced High incidence of public assistance significant in all models No apparent correlation	Neighborhood poverty is *much* less important than neighborhood proportion on public assistance (p. 11).

Table 1 (*continued*)

Study	Data and Sample	Specifications	Outcome	Control Variables	Neighborhood Variables	Neighborhood Results	Conclusions
Corcoran, Gordon, Laren, and Solon (1992)	PSID-841 male children from ≈ 600 PSID families who, by 1983, were ages 25–32 and heads of household	OLS	Log earnings Log hourly wage Log hours of work Log family income Log income/needs	Parental education, religion, total family income, proportion of years in poverty, "broken home," region, city size, son's education, age, race, years interviewed	Median family income Male unemployment rate Percent female headed with kids Percent receiving public assistance	Negligible Negligible Negligible Significant and large effect, but difficult to separate from individual welfare receipt	"Find evidence of disadvantages for men from communities with higher rates of welfare participation" (p. 595).
Lillard (1993)	NLS72-4,611 males of '72 graduating class 1970 Census of Population and Housing-zipcode (1,339) and school district (486) information	OLS	Years of college attended Years of college planned	Race, family income, parental education, ability, school quality, full time occupation, parental education expectations, family size	Household earnings in school district Occupational specialties differences between mean neighborhood earnings and national mean Percent professionals/managers in zipcode Percent craftsmen in zipcode Average adult education in zipcode Variance in education in zipcode Percent college bound in high school	Not significant Significant for professionals/managers Significant Not significant Not significant or negative significant Not significant Significant	"Controlling for mean community income, average adult education levels in a zipcode area are associated with *lower* college attainment" (p. 24). "Investment in college is . . . higher in neighborhoods in which more work as professionals and managers . . . and . . . [when] professionals and managers earned more than the national average (p. 12).

					Percent Mexican-Americans in high school	Significant	
					Percent black in high school	Significant	
					Number of library hours in high school	Significant	
Duncan, Brooks-Gunn, and Klebanov (1994)	IHDP-895 infants >2,500 grams at birth and 40 weeks postconceptual age in 1985 PSID-1,337 children aged 0–3 in 1980 to obtain matched Census geocode neighborhood poverty measure	OLS	IQ at age 5 Internalizing behavior Externalizing behavior	Gender, ethnicity, birth weight, mother's education, female family head, mother's marital status, mother's race, whether family in treatment group, family income/needs ratio	Percent of families with income <$10,000 Percent of families with income >$30,000	Significant only for IQ at age 5 Significant only for externalizing behavior	"A measure of affluent neighbors proved important for IQ, while the measure of low income neighbors was a significant predictor of externalizing behavior" (p. 309).
Duncan, Connell, and Klebanov (1997)	About 700 children from the 1990 IHDP; 2,464 individuals from PSID with completed schooling	OLS; "transactions model" (several variants)	IQ at age 3 Completed Schooling	Mother's education, family income/needs ratio, mother's age at child's birth, ethnicity, birth weight, neonatal health, gender, whether teen pregnancy	"Low SES" "High SES" "Male Joblessness" "Family Concentration" "Ethnic Diversity"	For both outcomes insignificant For both outcomes significant[b] For both outcomes insignificant For both outcomes insignificant For both outcomes insignificant	" . . . no evidence that adjustments for typically unmeasured family factors changed the estimated effects of neighborhood" (p. 32) High SES generally significant except for black men, unless high SES neighbors are black.

Table 1 (*continued*)

Study	Data and Sample	Specifications	Outcome	Control Variables	Neighborhood Variables	Neighborhood Results	Conclusions
Solon, Page, and Duncan (1996)	1985 PSID excluding oversampled low income group—687 males and females with completed schooling in 144 geographic clusters	Neighbor fixed effects	Years of completed schooling	Race, log family income, female family head, head's years of education	"Neighbor correlations"	Small effect of "neighborhood"	"Results seem to indicate a rather circumscribed role for neighborhood effects on educational attainment. . . . A policy that . . . achieved complete equalization of all neighborhood backgrounds would [reduce educational inequality by less than 10 percent] (p. 17).
Chase-Lansdale and Gordon (1996)	1986 NLSY-673 black and white children ages 5 or 6 who live with their mothers	Multivariate analyses of variance	Cognitive functioning at age 5–6 Behavioral functioning at age 5–6	Region, family income, number of adults in household, number of children in household, mother's education, mother working, race, gender, child's age, child in school	Neighborhood SES	Significant for cognitive and internalizing behavior (but wrong sign)	". . . Neighborhood SES . . . [is] positively related to cognitive functioning . . . in the Midwest and Northeast, but not in the South and West." . . . higher levels of adult presence in the neighborhood are associated with lower levels of children's behavior problems . . . in the Midwest and Northeast (p. 26).
					Male joblessness	Significant for internalizing behavior	
					Population concentration	Significant for cognitive and externalizing behavior	
					Racial similarity	Not significant	

Corcoran and Adams (1997)	PSID-770 nonblack and 550 black men aged 25–35 years in 1988 (5–15 years old in 1968); had to be observed three or more years between ages 5–17 and one or more since age 24	OLS	Average earnings since age 25 Average hourly wage since age 25 Average hours worked since age 25	Family poverty status, family income, mother's education, female headed household, percent years lived in female-headed household, percent years head disabled, mean annual hours worked of head, family welfare receipt	Poverty rate Percent families who are affluent Male unemployment rate in childhood neighborhood Percent black Percent on public assistance Male unemployment in adult labor market	Significant negative for nonblack; no association for black Insignificant for black; marginal significant and small for nonblack Significant for blacks; not for nonblacks Never significant Insignificant or marginal significant for black and nonblack Large and significant for earnings and hours for blacks	"Concentrated poverty, middle class neighbors, and labor market opportunities matter for black men." "Growing up in very poor neighborhoods does hurt nonblack men's economic outcomes" (p. 22).

[a] But when interacted, if neighbors are black *and* affluent effect is positive and significant.
[b] Except for blacks, unless interacted with percent black.

Glossary
AFDC: Aid to Families with Dependent Children
IHDP: Infant Health and Development Program
NLS72: National Longitudinal Surveys, 1972
NLSY: National Longitudinal Survey of Youth
PSID: Panel Study of Income Dynamics
PUMS: Public Use Microdata Samples
SMA: Statistical Metropolitan Area

could lead to either over- or underestimates of the effect of neighborhood characteristics.[10]

The "reflection problem" referred to by Manski (1993) is one example of the difficulty in statistically identifying neighborhood effects. The issue here is the ability of the researcher to infer whether the average behavior of a group (as reflected in a neighborhood variable) affects the behavior of individuals in that group when only the distribution of behaviors in the population is observed. He distinguishes three aspects of the "reflection problem" that make estimation of neighborhood or interaction effects difficult—contextual, endogenous, and correlated effects[11]—and examines the identification issues associated with each. Manski concludes that the presence of endogenous social effects makes inference of the impact of such neighborhood effects difficult, if not impossible. Gramlich (1993) similarly suggests that neighborhood characteristics may be proxies for unmeasured parental characteristics tied to the choice of neighborhood. However, Brock and Durlauf (forthcoming) demonstrate that social effects can be identified in binary choice models using neighborhood characteristics as regressors. Identification will hold so long as the variance-covariance matrix of the regressors is nonsingular (p. 36), and the underlying estimation model is compatible with this condition. Except for hairline cases, nonlinearity assists in identifying the model, and allows both endogenous and contextual effects to be identified.

These impediments to reliably identifying potentially endogenous neighborhood effects have not deterred researchers from interpreting estimated coefficients in reduced form models as implying causal relationships. In our approach we control for family and individual characteristics, assuming that neighborhood selection is a function of these observables. Second, in using linear regression, we investigate the statistical correlation of neighborhood characteristics and children's outcomes; but we do not impose any causal interpretation on these estimated coefficients. Third, we estimate two binary choice models where endogenous and contextual effects are potentially identified by the functional form. Our goal is to test the robustness of neighborhood variables to the inclusion of various sets of family characteristics. We produce evidence that many of the statistical correlations between neighborhood

10. With the exception of Evans, Oates, and Schwab (1992), Hill and O'Neill (1993), and Gramlich (1993), the empirical literature on social interaction, peer group, and neighborhood effects neglects these potential problems. Of the studies in Table 1, only Evans, Oates, and Schwab model the potential endogeneity of neighborhood choice by parents in an attempt to determine if estimates of the effects of neighborhood or peer factors reflect unobserved family factors. Neighborhood influence is measured by one variable, the proportion of students in the child's school that are disadvantaged, and the family background variables included are limited. When the peer group (neighborhood) variable is treated as an endogenous variable in a system of simultaneous equations, the effect of neighborhood becomes insignificant and of the "wrong sign." Hill and O'Neill also explore the question of the endogeneity of neighborhood characteristics on attainments of children using an instrumental variable approach. The similarity of the simultaneous equation results and single equation estimates led the authors to conclude that single equation estimates of neighborhood effects "are not likely to be overestimates" (p. 90).

11. Endogenous effects exist when an individual's behavior varies with the manifestation of that behavior in a group; that is, when individual behavior is induced by the behavior of the group. Contextual or exogenous effects exist when an individual's behavior varies with the distribution of background characteristics in the reference group. Correlated effects occur when members of the same group face similar environments and/or share the same characteristics.

characteristics and youth outcomes reported in the literature may result from the omission of relevant family background characteristics.

III. Our Data and Research Strategy

Our basic data set consists of 21 years of information on 2,609 children from the Michigan Panel Survey of Income Dynamics (PSID). We selected children who were born from 1962 to 1972, and follow them from 1968, the first year of the PSID (or their year of birth, if later), until 1992. For the cohort born in 1962, therefore, we have annual information on these individuals from age 6 to age 31 years, a period of 25 years; for the 1972 cohort, we have annual information from age 0 to age 21 years.[12] Only those individuals who remained in the survey until they reached age 21 are included.[13]

We have extensive longitudinal information on the status, characteristics, and choices of family members, family income (by source), living arrangements, neighborhood characteristics, and background characteristics such as race, religion, and location for each individual. In order to make comparisons of individuals with different birth years, we index the time-varying data elements in each data set by age: that is, rather than have the information defined by the year of its occurrence (say, 1968 or 1974), we convert the data so that this time-varying information is assigned to the child by the child's age. Hence, we are able to compare the process of attainment across individuals with different birth years. All monetary values are expressed in 1976 dollars using the Consumer Price Index for all items.

We merged Census tract (neighborhood) information from the 1970 and 1980 Censuses onto our PSID data. The Census data are matched to the specific location of the children in our sample for each year over the years 1968–85.[14] Based on this

12. The latest final release data from the PSID that were available when we conducted this analysis included information only through 1992. While early release information through 1995 could have been included, use of this uncorrected data introduces the potential of noisy and biased estimates. As a result, our analysis of the years of completed schooling outcome excludes information on years of schooling accumulated beyond age 21.

13. Some observations did not respond in an intervening year but reentered the sample the following year. Such persons are included in our analysis, and the missing information was filled in by averaging the data for the two years contiguous to the year of missing data. For the first and last years of the sample, this averaging of the contiguous years is not possible. In this case, the contiguous year's value is assigned, adjusted if appropriate using other information that is reported. Studies of attrition in the PSID find little reason for concern that attrition has reduced the representativeness of the sample. See Becketti et al. (1988), Lillard and Panis (1994), and Haveman and Wolfe (1994). A more recent study by Fitzgerald, Gottschalk, and Moffitt (1998) finds that, while "dropouts" from the PSID panel do differ systematically from those observations retained, estimates of the determinants of choices such as schooling and teen nonmarital childbearing estimated from the data do not appear to be significantly affected.

14. The links between the neighborhood in which each family in the PSID lives and small-area (census tract) information collected in the 1970 and 1980 Census have been (painfully and painstakingly) constructed by Michigan Survey Research Center (SRC) analysts. For the years 1968 to 1970, the 1970 Census data are used in this matching; for the years 1980 to 1985, the 1980 Census data are used. In most cases, this link is based on a match of the location of our observations to the relevant Census tract or block numbering area (67.8 percent for 1970 and 71.5 percent for 1980). For years 1971 to 1979, a weighted combination of the 1970 and 1980 Census data are used. The weights linearly reflect the distance from 1970 and 1980. For example, the matched value for 1972 equals [(.8 × 1970 value) + (.2 × 1980 value)].

link, we are able to include in our data information describing a variety of social and economic characteristics of rather narrowly defined areas for each family in our sample, based on their residence in each of the years from 1968 to 1985. These characteristics include racial composition, measures of family income and its distribution (including the proportion of families with incomes below $10,000 and those above $15,000), the proportion of persons living in poverty, the proportion of young adults who are high school dropouts, the adult and male unemployment rates, the proportion of families that are female headed, the proportion of those in the labor force in managerial (professional) occupations, and an underclass count (see Rickets and Sawhill 1988).

From these data we can also observe a number of measures of "attainment when a young adult" for each of the children in our sample. We concentrate on three such outcomes:

- *High School Graduation,* measured by a dummy variable indicating whether the individual completed high school by age 20;
- *Years of Completed Schooling,* measured as of age 21;
- *Teen Nonmarital Childbearing,* measured for the females in our sample by a dummy variable indicating whether or not the individual gave birth out of wedlock during ages 15 to 18.

We have selected six variables to describe the neighborhood conditions and influences that existed during the childhood of these youths that could affect the choices they make, and hence their attainments. These neighborhood variables, in each case measured as an average over the child's ages 6–15, are:

- *Percent of households with low income (less than $10,000, in 1979 dollars);*
- *Percent of households with high income (more than $15,000, in 1979 dollars);*
- *Percent of persons who are white;*
- *Percent of the young adults who are high school dropouts;*
- *Percent of the families that are headed by a female;*
- *Average adult unemployment rate.*

In an extended set of neighborhood variables we also include the *ratio of the income of the child's family to the median income of the neighborhood* in which the family lives, again averaged over the child's ages 6–15. Appendix Table A1 provides descriptive statistics on all of the variables included in our models.

Our selection of neighborhood variables was based on several considerations. The two income-based measures describe different attributes of the income distribution in the neighborhood in which the children grew up. These neighborhood economic variables have been found to be significant determinants of children's outcomes in a number of the studies described in Table 1 (for example, Brooks-Gunn et al. 1993; Duncan 1994; Duncan, Brooks-Gunn, and Klebanov 1994). The prevalence of white families describes the extent of racial diversity in the neighborhood, and serves as

a proxy for the racial composition of neighborhood schools. Both the percent of young adults who are high school dropouts and the percent of families that are headed by a female represent characteristics of persons older than those being studied, but who are living in the same neighborhoods. They are related to the schooling and the childbearing outcomes, respectively. Choosing social context variables that are related to the outcomes is recommended by Manski (1993) when the reflection problem may create potential biases. In addition, we selected a measure of local labor market opportunities, the average neighborhood adult unemployment rate.

The correlations among these neighborhood variables are presented in Appendix Table A2. Four of the 21 correlation coefficients among the included variables exceed .7.[15] Simple probit/OLS estimates of each of the dependent variables on the six neighborhood variables studied are shown in Appendix Table A3. In each case, the estimated relationship is statistically significant in the expected direction; no t-statistic is less than 5.

IV. The Robustness of Neighborhood Effects: Empirical Results

In assessing the robustness of the effects of neighborhood characteristics on children's outcomes to alternative specifications of family characteristics, we statistically relate the characteristics of the neighborhoods in which the children have grown up to the three outcome variables. We move from sparse probit/OLS regressions that control for either none or a very limited number of family background variables, to regressions that control for increasingly comprehensive descriptions of the characteristics of the families in which the children lived during their ages 6–15. The specification of these models is described in Table 2. In Tables 3–6, we present four sets of neighborhood variable robustness tests based on the statistical significance of neighborhood variables moving from the sparse specification of family variables to more comprehensive specifications. Tables 7–9 present analogous robustness tests based on simulated quantitative effects of neighborhood variables.[16]

15. We also explored correlations with additional neighborhood variables that are available in our data set, such as male unemployment rate, a variety of measures related to the proportion below the poverty line, underclass indices, other racial composition variables and occupational status. The correlation between each of these variables and one of the included variables exceeds .84, suggesting the need to constrain the number of neighborhood measures included in the analysis.

16. A potential concern is the endogeneity that would result if individuals in our sample are included in a small neighborhood group used to calculate the values of our neighborhood variables. This is not likely to be a problem in our estimates. All of the observations are too young to be included in the 1970 Census data from which the neighborhood variables are constructed; most are also too young to be included in the 1980 data. Moreover, the number of relevant observations in a Census tract—about 4,000—is sufficiently large as to be unaffected by the inclusion of even a few of our sample observations. [See Solon, Page, and Duncan (1996) who use the cluster nature of the initial sample to test for correlations between neighborhood children. Attempting to identify neighbors, they find an average of 2.6 families per neighborhood (Census tract) as of 1968–69. Given geographical mobility, the number per neighborhood is likely to have decreased over time.]

Table 2
Structure of Four Models Estimated

	Model 1	Model 2	Model 3	Model 4
Neighborhood variables	X	X	X	X
Race (African-American = 1)		X	X	X
Gender (female = 1)		X	X	X
Average number of siblings			X	X
Grandparents poor = 1			X	X
Firstborn = 1			X	X
Mom is a high school graduate = 1			X	X
Mom is more than a high school graduate = 1			X	X
Dad is a high school graduate = 1			X	X
Dad is more than a high school graduate = 1			X	X
Average ratio of income to needs, ages 6–15			X	X
Years lived with a disabled parent, ages 6–15			X	X
Practices religion = 1				X
Years lived with one parent, ages 6–15				X
Years mother worked, ages 6–15				X
Years lived in SMSA, ages 6–15				X
Number of parental separations, ages 6–15				X
Number of parental remarriages, ages 6–15				X
Number of household moves, ages 6–15				X
Number of years on AFDC, ages 6–15				X
Father foreign born = 1				X

Note: Variables measured over ages 6–15.

A. Statistical Significance Robustness Tests

1. Models Including Six Neighborhood Variables: Entire Sample

Table 3 presents estimates of the *t*-statistics for each of six neighborhood variables for four models for each outcome variable.[17]

In the high school graduation probits, the only neighborhood variables that are statistically significant at a five percent level across all of the specifications are the prevalence of youths in the neighborhood who are dropouts and the prevalence of white persons (taken as a proxy for racial diversity in the schools of the neighborhood). The *t*-statistic for the neighborhood high school dropout characteristic ranges from −2.7 to −4.6 across the models; that for the prevalence of whites from 2.1 to 2.4. The other neighborhood variables with statistical significance in some of the specifications are the average adult unemployment rate (where the *t*-statistic exceeds −2.0 in the first three models) and the prevalence of high income households (where the *t*-statistic is −2.8 or more in Models 3 and 4, consistent with "competition" hypothesis (Cutler and Glaeser 1997). The likelihood ratio value, indicating the joint significance of the set of neighborhood variables, falls monotonically in moving from

17. Detailed estimation results are available from the authors.

Table 3
Estimated t*-Statistics and Likelihood Ratio Test Statistics of Neighborhood Variables in Alternative Model Specifications*

	Model 1	Model 2	Model 3	Model 4
High school graduation				
Percent youths who are dropouts	−4.486	−4.572	−3.107	−2.746
Percent female heads	−1.121	−1.136	−1.553	−1.266
Percent persons who are white	2.437	2.117	2.309	2.309
Percent households with high income	−0.191	−0.110	−2.801	−2.819
Percent households with low income	0.413	0.512	1.733	1.204
Average adult unemployment rate	−2.361	−2.270	−2.088	−0.976
Log likelihood ratio	141.40	82.09	54.74	29.05
Log likelihood critical values (1% level of significance)	16.812	16.812	16.812	16.812
N = 2,609				
Years of Completed Schooling				
Percent youths who are dropouts	−5.062	−5.189	−3.438	−3.129
Percent female heads	−1.199	−1.227	−1.815	−1.293
Percent persons who are white	2.374	2.143	2.476	2.425
Percent households with high income	1.467	1.563	−1.746	−1.826
Percent households with low income	1.332	1.463	2.901	2.219
Average adult unemployment rate	−0.542	−0.419	−0.227	0.688
F-test	21.18	12.43	7.39	4.14
F-test critical values (1% level of significance)	2.802	2.802	2.802	2.802
N = 2,609				
Teen Nonmarital Birth				
Percent youths who are dropouts	1.000	0.843	0.277	0.054
Percent female head	0.757	1.421	1.522	0.623
Percent persons who are white	−2.776	0.916	0.680	0.822
Percent households with high income	−2.288	−1.880	−0.946	−0.861
Percent households with low income	−1.077	−1.305	−2.017	−1.145
Average adult unemployment rate	0.751	1.189	1.020	1.079
Log likelihood ratio	82.13	14.70	7.10	3.24
Log likelihood critical values (1% level of significance)	16.812	16.812	16.812	16.812
N = 1,169				

the sparse to the more comprehensive models, but is statistically significant at the .01 level in all of the specifications.

The pattern of neighborhood effects in the regression estimates for years of schooling also indicates that the prevalence of youths who are dropouts and the prevalence of whites in the neighborhood are statistically significant in all of the models. The pattern of results for the two income distributional variables are unexpected. In Models 3 and 4 the percent of households with low income is *positively* and significantly related to the years of schooling outcome, and the prevalence of high income households is *negatively* and significantly related to the extent of education though at a

lower level of statistical significance. Apparently, the effect of these variables on this outcome is unexpectedly altered when additional family characteristics, some of which are correlated with these neighborhood income distributional variables, are added to the models.[18] The test statistic for joint significance of the neighborhood variables again falls monotonically from Model 1 through Model 4, but is statistically significant in all of the models.

The pattern of neighborhood effects in the teen nonmarital birth models differs from the education results. Of the 24 neighborhood variable coefficients estimated in the four models that include all of the neighborhood variables, only three coefficients—the prevalence of white and of high income households in Model 1, and the prevalence of low income households in Model 3—are statistically significant at traditional levels. The coefficients on two of these neighborhood variables (prevalence of high school dropouts and white families) change sign across the various specifications. As in the years of schooling estimates, the sign on the low income prevalence variable is unexpectedly *negative*. As the number of family characteristics included in the specification increases, the likelihood ratio test statistic for the joint significance of all of the neighborhood variables again falls monotonically, and is significant at the .01 level only in the Model 1 specification.

2. *Models Including Six Neighborhood Variables: Black Sample*

We estimated these same models over the subset of black observations in our sample; the results are shown in Table 4.[19] Few neighborhood variables are statistically significant. In the high school graduation estimates, only the prevalence of high income households is statistically significant in any of the models; it is *negatively* related to this outcome in all of the models consistent with the "competition" models of children's attainments discussed above. Unlike the full sample estimates in Table 3, none of the prevalence of high school dropouts, the prevalence of whites, or the adult unemployment rate are significantly related to the probability of high school graduation for black youths. The same pattern of generally insignificant results is present in the years of schooling regressions, although the proportion of white persons living in the neighborhood is statistically significantly related to the years of completed schooling; the negative sign on the proportion of neighborhood families with high incomes is insignificant. In the nonmarital childbearing estimates none of the neighborhood variables are significant in any of the models. The test statistics for joint significance fail to exceed the critical value in all of the Model 4 estimates;

18. The −0.773 correlation between these income distributional variables is itself high. In additional estimations we found that the inclusion of family income tended to change the sign and/or significance of the neighborhood variables: when family income is not included these neighborhood variables had the expected sign but when this family resource value is included the neighborhood income distributional variables tended to have the unexpected sign. These estimated results are available from the authors. In general, it should be noted that if family residential (and other) choices are a product of neighborhood characteristics, the possibility of diluting the measured effects of neighborhood variables increases as additional family characteristics are added to the models. If the additional family characteristics are not fully endogenous, neighborhood effects could have an effect through these characteristics in ways that we are unable to uncover with our data. We thank an anonymous reviewer for this insight.

19. Detailed estimation results are available from the authors.

Table 4
Estimated t-statistics and Likelihood Ratio Test Statistics of Neighborhood Variables in Alternative Model Specifications—Blacks Only

	Model 1	Model 2	Model 3	Model 4
High School Graduation				
Percent youths who are dropouts	−0.940	−1.059	−0.639	−0.249
Percent female heads	−1.511	−1.469	−1.510	−1.330
Percent persons who are white	0.977	1.010	1.676	1.731
Percent households with high income	−1.839	−1.696	−2.233	−1.807
Percent households with low income	−0.732	−0.651	0.297	−0.030
Average adult unemployment rate	−1.132	−1.068	−1.236	0.084
Log likelihood ratio	32.61	31.34	33.21	13.45
Log likelihood critical values (1% level of significance)	16.812	16.812	16.812	16.812
N = 1,236				
Years of Completed Schooling				
Percent youths who are dropouts	−1.032	−1.143	−0.665	−0.315
Percent female heads	−1.121	−1.065	−1.360	−1.597
Percent persons who are white	1.380	1.443	2.085	2.154
Percent households with high income	−1.339	−1.170	−1.755	−1.438
Percent households with low income	−0.786	−0.728	0.755	0.846
Average adult unemployment rate	0.647	0.750	0.329	0.872
F-test	2.81	2.74	3.81	2.61
F-test critical values (1% level of significance)	2.802	2.802	2.802	2.802
N = 1,236				
Teen Nonmarital Birth				
Percent youths who are dropouts	0.169	—	−0.091	−0.040
Percent female heads	1.356	—	1.338	0.224
Percent persons who are white	1.032	—	0.681	1.179
Percent households with high income	−1.142	—	−1.092	−0.943
Percent households with low income	−0.928	—	−1.606	−0.667
Average adult unemployment rate	0.938	—	0.697	0.791
Log likelihood ratio	7.47	—	4.21	2.68
Log likelihood critical values (1% level of significance)	16.812	—	16.812	16.812
N = 560				

for the teen nonmarital birth outcome, the test statistic is insignificant in all of the models.

3. Models Including Proximate Neighborhood Variables: Entire Sample

Table 5 presents estimates when only those neighborhood variables that are, a priori, most closely related to the outcome being studied are included in the model specifications. (Detailed estimates for these models are shown in Appendix Table A4.) The a priori linked relationship of the neighborhood variables to the outcome variables

Table 5
Estimated t*-Statistics and Likelihood Ratio Test Statistics of Proximate Neighborhood Variables in Alternative Model Specifications*

	Model 1	Model 2	Model 3	Model 4
High School Graduation				
Percent of youths who are dropouts	−5.727	−5.822	−2.034	−1.624
Percent persons who are white	7.205	5.064	4.255	2.762
Log likelihood ratio	129.60	71.14	25.20	11.88
Log likelihood critical values (1% level of significance)	9.21	9.21	9.21	9.21
Years of Completed Schooling				
Percent of youths who are dropouts	−6.416	−6.520	−1.871	−1.614
Percent persons who are white	5.831	4.048	3.456	1.941
F-test	61.38	35.11	8.89	3.82
F-test critical values (1% level of significance)	4.6052	4.6052	4.6052	4.6052
Teen Nonmarital Birth				
Percent female heads	4.830	1.650	1.289	0.064
Percent in neighborhood with a high income	−3.323	−2.007	0.197	−0.363
Log likelihood ratio	71.17	10.12	1.69	0.19
Log likelihood critical values (1% level of significance)	9.21	9.21	9.21	9.21

leads us to prefer this test to the previous estimates including six neighborhood variables.

The two sets of schooling regressions include two schooling-related neighborhood variables—the prevalence of high school dropouts in the neighborhood, and the prevalence of white families (which serves as proxy for racial diversity in the neighborhood schools). For both the high school graduation and years of schooling outcomes, both neighborhood variables are statistically significant in Models 1–3. However, as the set of family variables is expanded in moving to Model 4, the neighborhood variables retain their expected signs, but the proportion of dropouts variable becomes statistically insignificant. Both the *t*-statistics and the coefficient values fall in moving from the sparse Model 2—which contains only race and gender in addition to the neighborhood variables—to Models 3 and 4, which contain an extensive set of family characteristics.

In the teen nonmarital childbearing models, the prevalence of female headed households (a proxy for the stigma of giving birth out of wedlock) and high income households (a proxy for the presence of models of economic success in the neighborhood as well as proxy for the perceived economic opportunity cost of giving birth)

are selected as the two proximate neighborhood variables. In the sparse Model 1, both of the coefficients on the neighborhood variables are statistically significant at the .01 level. However, the coefficients on the neighborhood variables fall to insignificance as the family-based information included in the estimation becomes more extensive. As Appendix Table A4 indicates, the value of the estimated coefficients on the neighborhood variables falls dramatically with the addition of the variables describing family characteristics and circumstances.[20]

4. *Models Including Proximate Neighborhood plus Relative Family Income: Entire Sample*

Table 6 presents a final set of estimates of the effect of neighborhood variables on these schooling and nonmarital childbearing outcomes. In this case, a hybrid variable that contains elements of both family and neighborhood characteristics—the income of the child's family relative to that of its neighbors—is added to each of the specifications described in Table 2. Inclusion of this variable provides insight regarding the claim that neighborhood income distributional variables (prevalence of high and low income families in the neighborhood) are the most important and robust of the neighborhood characteristics. (See Brooks-Gunn et al. 1993; Duncan 1994; Duncan, Brooks-Gunn, and Klebanov 1994 in Table 1.)

For both of the schooling outcomes, the coefficient on this variable is positive and significant in all of the models, suggesting that growing up in a family with income that is high relative to its neighbors' has a positive effect on schooling attainment. When this relative income variable is included in the specification, the two proximate neighborhood variables retain statistical significance, even in the Model 4 specification that includes the most extensive set of family variables.

This pattern is not present for the teen nonmarital birth outcome. The relative income variable has the expected sign and is statistically significant in Models 1 and 2. However, when detailed family characteristic variables are added to the specification in Models 3 and 4, both this variable and the two proximate neighborhood variables become statistically insignificant.[21]

This pattern of effects adds to our critique of the view that neighborhood income distribution is the most persistent and important of the several potential neighborhood variables. When taken in conjunction with the unexpected signs and lack of statistical

20. Model 4 of the high school graduation outcome passes the test for joint statistical significance of the neighborhood variables at the .01 level but it does not in the Model 4 years of schooling estimates. The likelihood ratio tests for the teen nonmarital childbearing models indicate that only in Models 1 and 2 are these proximate neighborhood variables jointly significant.

21. The set of neighborhood variables (including the relative income variable) is jointly significant in all of the models for both of the schooling outcomes. In neither Model 3 nor 4 of the teen nonmarital birth outcome estimates is the set of neighborhood variables jointly statistically significant. In additional estimates (available from the authors), we introduced average total family income and neighborhood median income separately into the models. The family variable has the strongest effect and remains statistically significant in all of the models. (Note that the family income-to-needs ratio is also included in the estimation.) The neighborhood income variable has a smaller quantitative effect, and becomes statistically insignificant in the models with more extensive family characteristics.

Table 6
Estimated t-Statistics and Tests of Joint Significance of Proximate Neighborhood Variables Plus Relative Family Income in Alternative Model Specifications

	Model 1	Model 2	Model 3	Model 4
High School Graduation				
Percent of youths who are dropouts	−5.402	−5.603	−3.468	−2.468
Percent persons who are white	6.107	5.942	5.441	3.755
Family income relative to neighborhood income	9.328	9.639	6.099	3.622
Log likelihood ratio	225.00	173.16	62.94	25.13
Log likelihood critical values (1% level of significance)	11.345	11.345	11.345	11.345
Years of Completed Schooling				
Percent of youths who are dropouts	−5.983	−6.269	−3.487	−2.773
Percent persons who are white	4.562	5.225	4.867	3.498
Family income relative to neighborhood income	11.766	12.060	7.062	5.129
F-test	89.22	40.34	22.66	11.34
F-test critical values (1% level of significance)	3.7816	3.7816	3.7816	3.7816
Teen Nonmarital Birth				
Percent female heads	4.477	1.856	1.515	0.116
Percent in neighborhood with a high income	−3.096	−2.055	−0.630	−0.412
Family income relative *t* neighborhood income	−4.691	−3.743	−1.308	−0.202
Log likelihood ratio	95.88	25.43	3.36	0.23
Log likelihood critical values (1% level of significance)	11.345	11.345	11.345	11.345

significance of the income distributional variables shown in Table 3,[22] these results suggest that the income of the family relative to that of its neighbors—rather than the extent to which the neighborhood is populated by high (low) income families—may be the more relevant consideration.

B. Simulated Quantitative Effects Tests of Robustness

In order to measure the robustness of the quantitative effect of the neighborhood variables on children's outcomes over varying specifications of family background

22. As we noted above, the coefficient, sign and significance of these neighborhood income distribution variables are very sensitive to the inclusion of family income in the model.

characteristics, we present a series of simulations. Estimates that include the full set of neighborhood variables, only the proximate neighborhood variables, and the proximate variables plus the relative income variables are used in the simulations. For each of our four models, for each of the three outcomes, we increase each neighborhood characteristic by one standard deviation, and record the aggregate percentage response in the dependent variable. The results are reported in Tables 7–9, which are analogous to the robustness tests of statistical significance in Tables 4–6.[23]

Table 7 presents results when the six neighborhood variables are included in the estimation; the pattern is complex. Consider, first, the schooling outcomes. For both the high school graduation and years of completed schooling outcomes, both of the proximate variables (prevalence of youth dropouts and white families) are statistically significant in all four models. For both outcomes, the quantitative effect of the youth dropout variables decreases substantially as family and background characteristics are added in moving from Model 1 to Model 4; the quantitative effect of the prevalence of white families variables remains virtually constant over the models.[24] For the remaining eight neighborhood variables in the education outcome estimates, four are virtually constant, one decreases substantially, two change sign, and one increases substantially.[25] For the six neighborhood variables in the teen nonmarital birth outcome (none of which are statistically significant in Model 4), three decrease substantially, two increase substantially, and one variable changes sign in moving from the sparse Model 1 to the comprehensive Model 4.

Table 8 presents simulation results for estimates in which only the two proximate neighborhood variables are included. For both proximate neighborhood variables, the effect decreases substantially as the extensiveness of family and individual characteristic variables is increased in moving from Model 1 to Model 4. The largest changes in moving to more extensive specifications of individual and family characteristics are recorded for the teen birth outcome. For example, the effect of the prevalence of female headed families variable decreases from a 46 percent response to a one standard deviation change in Model 1 to an effect of less than one percent in Model 4.

Table 9 presents similar simulation results to those in Table 8, but includes the relative family income variable along with the two proximate neighborhood variables. As in Table 8, the effects of both the neighborhood variables and the hybrid relative income variable decrease substantially in moving from the sparse specification in Model 1 to the extensive Model 4 specification.

23. Similar simulation estimates based on relationships estimated for the black population only are available from the authors.

24. We consider the effect of a variable to have "decreased substantially" if the percentage change indicator moves toward zero from Model 1 to Model 4, and the difference in the indicator between these models is greater than .5. For example, the percentage change indicator for the dropout prevalence variable in the high school graduation models changes from −5.438 in Model 1 to −2.844 in Model 4, a change of 2.594 percentage points toward zero. Any measured change less than .5 percentage points in moving from Model 1 to Model 4 is considered to be no substantial change, and the effect is described as being "virtually constant." A third category reflects a "substantial change with a switch in sign," and a fourth category indicates that the effects of a variable has "increased substantially" in moving from Model 1 to Model 4.

25. Recall that the income distributional variables have unexpected, or difficult to interpret, signs.

Table 7

Simulated Absolute and Percentage Change in Outcomes Associated with a One Standard Deviation Increase in a Neighborhood Characteristic: All Neighborhood Variables

	Absolute Change				Percentage Change			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
High School Graduation								
Base predicted probability	0.7962	0.7955	0.8139	0.8157				
Percent youths who are dropouts	−0.043	−0.044	−0.027	−0.023	−5.438	−5.531	−3.268	−2.844
Percent female heads	−0.019	−0.019	−0.024	−0.021	−2.399	−2.439	−2.949	−2.513
Percent persons who are white	0.031	0.035	0.034	0.034	3.881	4.400	4.128	4.107
Percent of households with high income	−0.003	−0.001	−0.037	−0.037	−0.314	−0.176	−4.583	−4.573
Percent of households with low income	0.006	0.008	0.023	0.017	0.779	0.981	2.814	2.023
Average adult unemployment rate	−0.025	−0.024	−0.020	−0.009	−3.115	−2.992	−2.433	−1.116
Years of Completed Schooling								
Base predicted years	11.925	11.924	11.985	11.991				
Percent youths who are dropouts	−0.147	−0.150	−0.095	−0.086	−1.233	−1.258	−0.793	−0.717
Percent female heads	−0.064	−0.065	−0.093	−0.070	−0.537	−0.545	−0.776	−0.584
Percent persons who are white	0.098	0.120	0.133	0.131	0.822	1.006	1.110	1.092
Percent of households with high income	0.056	0.060	−0.068	−0.071	0.470	0.503	−0.567	−0.592
Percent of households with low income	0.063	0.069	0.132	0.107	0.528	0.579	1.101	0.892
Average adult unemployment rate	−0.018	−0.014	−0.007	0.002	−0.151	−0.117	−0.058	0.183
Teen Nonmarital Births								
Base predicted probability	0.0897	0.0791	0.0763	0.078				
Percent youths who are dropouts	0.009	0.007	0.002	0.000	10.256	8.976	2.752	0.513
Percent female heads	0.012	0.022	0.022	0.009	13.378	27.434	28.440	11.667
Percent persons who are white	−0.030	0.015	0.010	0.012	−33.556	18.458	12.844	15.641
Percent of households with high income	−0.033	−0.025	−0.013	−0.012	−36.343	−30.973	−16.514	−15.000
Percent of households with low income	−0.015	−0.016	−0.023	−0.014	−17.057	−20.607	−29.751	−18.462
Average adult unemployment rate	0.007	0.010	0.008	0.009	7.804	12.895	10.747	11.538

Table 8

Simulated Absolute and Percentage Changes in Outcome Associated with a One Standard Deviation Increase in a Neighborhood Characteristic: Two Proximate Neighborhood Variables

	Absolute Change				Percentage Change			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
High School Graduation								
Base predicted probability	0.7989	0.7971	0.8151	0.8165				
Percent youths who are dropouts	−0.048	−0.048	−0.015	−0.012	−5.946	−6.072	−1.877	−1.482
Percent persons who are white	0.051	0.058	0.044	0.031	6.346	7.239	5.410	3.797
Years of Completed Schooling								
Base predicted years	11.925	11.923	11.986	11.991				
Percent youths who are dropouts	−0.161	−0.163	−0.047	−0.040	−1.350	−1.367	−0.392	−0.334
Percent persons who are white	0.146	0.165	0.135	0.081	1.224	1.384	1.126	0.676
Teen Nonmarital Births								
Base predicted probability	0.0984	0.0775	0.0747	0.0763				
Percent female heads	0.045	0.013	0.009	0.001	45.630	17.032	12.718	0.786
Percent households with high income	−0.034	−0.018	0.002	−0.004	−34.654	−23.355	2.677	−5.111

Table 9

Simulated Absolute and Percentage Changes in Outcome Associated with a One Standard Deviation Increase in a Neighborhood Characteristic: Two Proximate Neighborhood Variables Plus Relative Family Income

	Absolute Change				Percentage Change			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
High School Graduation								
Base predicted probability	0.8101	0.8047	0.8157	0.8169				
Percent youths who are dropouts	−0.042	−0.044	−0.027	−0.019	−5.222	−5.505	−3.359	−2.338
Percent persons who are white	0.041	0.064	0.056	0.043	5.086	7.916	6.902	5.313
Family income relative to neighborhood income	0.065	0.070	0.063	0.041	8.061	8.649	7.711	5.031
Years of Completed Schooling								
Base predicted years	11.965	11.950	11.985	11.99				
Percent youths who are dropouts	−0.146	−0.152	−0.089	−0.070	−1.220	−1.272	−0.743	−0.584
Percent persons who are white	0.112	0.209	0.194	0.153	0.936	1.749	1.619	1.276
Family income relative to neighborhood income	0.269	0.279	0.250	0.196	2.248	2.335	2.086	1.635
Teen Nonmarital Births								
Base predicted probability	0.0914	0.076	0.0752	0.0764				
Percent female heads	0.038	0.014	0.012	0.001	42.013	18.947	15.559	1.309
Percent households with high income	−0.030	−0.018	−0.008	−0.006	−32.713	−23.684	−10.372	−7.330
Family income relative to neighborhood income	−0.034	−0.024	−0.018	−0.003	−36.980	−31.316	−24.069	−4.450

V. Conclusion

The tests of robustness that we have presented convey a mixed message. The coefficients on the neighborhood variables tend to fall in value and lose statistical significance as the specification of family variables becomes more complete in moving from Model 1 to Model 4. Although the simulated impacts of the change in the neighborhood variables are often reduced as the set of family control variables is expanded, a number of other changed effect patterns are also observed. The test statistic for the tests of joint significance of the neighborhood variables decreases monotonically as model specification is expanded, and often indicates statistical insignificance in the Model 4 specification. This general description holds for all three of the outcome variables, and for specifications including all six of the neighborhood variables, the two most proximate of the neighborhood variables, and the two most proximate neighborhood variables plus the relative income variable.

The lesson is clear: although neighborhood characteristics may affect children's outcomes, the reliability of estimates of these impacts may be an artifact of the degree to which family background is characterized in model specification. Some of the estimated neighborhood effects appear to be a result of biased coefficients due to omitted variables, but in other cases neighborhood effects appear to be robust irrespective of the richness in the characterization of family characteristics. It appears that the more closely the neighborhood factor is tied to the outcome under study—as is the case for the proximate neighborhood high school dropout and racial diversity variables in the schooling models—the more likely the neighborhood variable is to be significant, and to remain significant as the domain of *unobserved* family background variables is reduced. At a minimum, confidence that a reported significant neighborhood effect reveals a true relationship requires a model specification that is comprehensive in describing the full range of family and individual background that may also influence children's attainments. Caution is required in interpreting the coefficients on neighborhood variables in models of children's attainments such as those described in Table 1; not all variables with coefficients showing asterisks have significant effects.

Appendix

Table A1
Descriptive Statistics[a]

	Mean	Standard Deviation	N
Dependent variables			
Graduated high school: yes = 1, no = 0	0.741	0.438	2,609
Teen out-of-wedlock birth (ages 15–18): yes = 1, no = 0	0.143	0.350	1,169
Years of completed schooling	11.778	1.205	2,609
Neighborhood variables			
Average percent youths who are dropouts, ages 6–15	16.793	9.161	2,609
Average percent female heads, ages 6–15	19.764	13.292	2,609
Percent of persons who are white, ages 6–15	63.429	35.806	2,609
Percent of households with low income, ages 6–15	27.893	15.047	2,609
Percent of households with high income, ages 6–15	17.462	13.034	2,609
Average adult neighborhood unemployment rate, ages 6–15	7.180	4.131	2,609
Family income relative to neighborhood income	1.128	0.567	2,609
Other independent variables			
Race (African-American = 1)	0.474	0.499	2,609
Gender (female = 1)	0.495	0.500	2,609
Average number of siblings, ages 6–15	2.499	1.612	2,609
Grandparents poor = 1	0.527	0.499	2,609
Firstborn = 1	0.231	0.421	2,609
Mom is a high school graduate = 1	0.369	0.483	2,609
Mom is more than a high school graduate = 1	0.134	0.340	2,609
Dad is a high school graduate = 1	0.245	0.430	2,609
Dad is more than a high school graduate = 1	0.159	0.365	2,609
Average ratio of income to needs, ages 6–15	2.320	1.680	2,609
Years lived with disabled parent, ages 6–15	0.173	0.282	2,609
Practices religion = 1	0.920	0.271	2,609
Years lived with one parent, ages 6–15	0.285	0.397	2,609
Years mother worked, ages 6–15	0.566	0.359	2,609
Years lived in SMSA, ages 6–15	0.725	0.419	2,609
Number of parental separations, ages 6–15	0.238	0.477	2,609
Number of parental remarriages, ages 6–15	0.151	0.405	2,609
Number of household moves, ages 6–15	0.164	0.179	2,609
Number of years on AFDC, ages 6–15	0.143	0.273	2,609
Father foreign born = 1	0.026	0.159	2,609

[a] Statistics are unweighted.

Table A2
Correlation Matrix of Neighborhood Variables

	Percent Youths Who Are Dropouts	Percent Female Head	Percent Persons Who Are White	Percent Households with Low Income	Percent Households with High Income	Average Adult Unemployment Rate	Family Income Relative to Neighborhood Income
Percent youths who are dropouts	1.000						
Percent female head	0.412	1.000					
Percent persons who are white	−0.389	−0.840	1.000				
Percent households with low income	0.542	0.736	−0.658	1.000			
Percent households with high income	−0.565	−0.497	0.477	−0.773	1.000		
Average adult unemployment rate	0.403	0.704	−0.576	0.563	−0.413	1.000	
Family income relative to neighborhood	−0.103	−0.131	0.148	−0.104	0.071	−0.108	1.000

Table A3
Simple Probit Coefficient Estimates (t-Statistics in parentheses)

	Percent Youths Who Are Dropouts	Percent Female Head	Percent Persons Who Are White	Percent Households with Low Income	Percent Households with High Income	Average Adult Unemployment Rate
Graduated high school = 1	−0.025	−0.020	0.007	−0.015	0.015	−0.058
	(−8.781)	(−10.087)	(9.818)	(−8.507)	(6.694)	(−9.313)
Years of completed schooling	−0.024	−0.015	0.006	−0.012	0.014	−0.041
	(−9.362)	(−8.783)	(8.964)	(−7.898)	(7.638)	−(7.209)
Teen birth = 1	0.026	0.025	−0.010	0.021	−0.032	0.063
	(5.314)	(7.682)	(−8.116)	(6.768)	(−6.055)	(6.152)

Table A4
Models of Determinants of High School Graduation, Completed Schooling, and Teen Nonmarital Birth (standard errors in parentheses)

	Model 1	Model 2	Model 3	Model 4
High School Graduate Probits				
Percent youths who are dropouts, ages 6–15	−0.018	−0.018	−0.007	−0.006
	(0.003)	(0.003)	(0.003)	(0.004)
Percent persons who are white	0.006	0.007	0.006	0.004
	(0.001)	(0.001)	(0.001)	(0.001)
Race (African-American = 1)		0.078	0.370	0.278
		(0.094)	(0.102)	(0.109)
Gender (female = 1)		0.244	0.284	0.274
		(0.054)	(0.056)	(0.058)
Average number of siblings			−0.034	−0.015
			(0.020)	(0.021)
Grandparents poor = 1			0.039	−0.042
			(0.060)	(0.062)
Firstborn = 1			0.192	0.306
			(0.075)	(0.078)
Mom is a high school graduate = 1			0.391	0.414
			(0.069)	(0.072)
Mom is more than a high school graduate = 1			0.467	0.519
			(0.111)	(0.114)
Dad is a high school graduate = 1			0.228	0.238
			(0.081)	(0.083)
Dad is more than a high school graduate = 1			0.361	0.323
			(0.116)	(0.118)
Average ratio of income to needs, ages 6–15			0.066	0.026
			(0.027)	(0.028)
Years lived with disabled parent, ages 6–15			−0.427	−0.272
			(0.099)	(0.105)
Practices religion = 1				0.038
				(0.106)
Years lived with one parent, ages 6–15				−0.117
				(0.108)
Years mother worked, ages 6–15				0.246
				(0.088)
Years lived in SMSA, ages 6–15				−0.078
				(0.081)
Number of parental separations, ages 6–15				0.018
				(0.074)
Number of parental remarriages, ages 6–15				−0.101
				(0.085)

Table A4 (*continued*)

	Model 1	Model 2	Model 3	Model 4
Number of household moves, ages 6–15				−1.256
				(0.175)
Number of years of AFDC, ages 6–15				−0.345
				(0.140)
Father foreign born = 1				0.307
				(0.192)
Constant	0.617	0.413	−0.195	0.111
	(0.088)	(0.140)	(0.178)	(0.228)
Years of Education Regressions				
Percent youths who are dropouts, ages 6–15	−0.018	−0.018	−0.005	−0.004
	(0.003)	(0.003)	(0.003)	(0.003)
Percent persons who are white	0.004	0.005	0.004	0.002
	(0.001)	(0.001)	(0.001)	(0.001)
Race (African-American = 1)		0.046	0.369	0.304
		(0.081)	(0.082)	(0.084)
Gender (female = 1)		0.249	0.265	0.256
		(0.046)	(0.044)	(0.043)
Average number of siblings			−0.050	−0.033
			(0.016)	(0.016)
Grandparents poor = 1			−0.038	−0.087
			(0.047)	(0.047)
Firstborn = 1			0.081	0.149
			(0.055)	(0.055)
Mom is a high school graduate = 1			0.355	0.368
			(0.055)	(0.055)
Mom is more than a high school graduate = 1			0.476	0.497
			(0.079)	(0.078)
Dad is a high school graduate = 1			0.208	0.219
Dad is more than a high school graduate = 1			0.275	0.247
			(0.081)	(0.080)
Average ratio of income to needs, ages 6–15			0.076	0.065
			(0.018)	(0.018)
Years lived with a disabled parent, ages 6–15			−0.327	−0.198
			(0.083)	(0.085)
Practices religion = 1				0.031
				(0.081)
Years lived with one parent, ages 6–15				−0.077
				(0.086)
Years mother worked, ages 6–15				0.177
				(0.066)
Years lived in SMSA, ages 6–15				−0.118
				(0.058)

Table A4 (*continued*)

	Model 1	Model 2	Model 3	Model 4
Number of parental separations, ages 6–15				−0.019
				(0.059)
Number of parental remarriages, ages 6–15				−0.104
				(0.068)
Number of household moves, ages 6–15				−0.852
				(0.136)
Number of years of AFDC, ages 6–15				−0.168
				(0.115)
Father foreign born = 1				0.487
				(0.140)
Constant	11.814	11.639	11.024	11.233
	(0.079)	(0.122)	(0.143)	(0.174)
Teen nonmarital birth probits average percent female heads, ages 6–15	0.018	0.007	0.006	0.000
	(0.004)	(0.004)	(0.004)	(0.006)
Percent households with high income	−0.019	−0.012	0.001	−0.003
	(0.006)	(0.006)	(0.007)	(0.007)
Race (African-American = 1)		0.676	0.481	0.499
		(0.129)	(0.146)	(0.158)
Average number of siblings			0.059	0.057
			(0.034)	(0.036)
Grandparents poor = 1			−0.332	−0.335
			(0.108)	(0.111)
Firstborn = 1			0.012	−0.107
			(0.133)	(0.140)
Mom is a high school graduate = 1			−0.251	−0.320
			(0.125)	(0.130)
Mom is more than a high school graduate = 1			−0.707	−0.784
			(0.251)	(0.255)
Dad is a high school graduate = 1			−0.197	−0.216
			(0.150)	(0.153)
Dad is more than a high school graduate = 1			−0.154	−0.153
			(0.235)	(0.241)
Average ratio of income to needs, ages 6–15			−0.171	−0.133
			(0.068)	(0.075)
Years lived with a disabled parent, ages 6–15			0.027	−0.089
			(0.170)	(0.187)
Practices religion = 1				−0.076
				(0.199)
Years lived with one parent, ages 6–15				0.110
				(0.191)

Table A4 (*continued*)

	Model 1	Model 2	Model 3	Model 4
Years mother worked, ages 6–15				0.237
				(0.161)
Years lived in SMSA, ages 6–15				0.223
				(0.152)
Number of parental separations, ages 6–15				0.313
				(0.126)
Number of parental remarriages, ages 6–15				−0.254
				(0.157)
Number of household moves, ages 6–15				0.717
				(0.310)
Number of years of AFDC, ages 6–15				0.318
				(0.237)
Father foreign born = 1				−0.290
				(0.514)
Constant	−1.179	−1.456	−0.949	−1.225
	(0.149)	(0.165)	(0.258)	(0.344)

Note: Regressions also include two variables indicating that mother or father's education information is missing.

References

Aaronson, Daniel. 1997. "Sibling Estimates of Neighborhood Effects." In *Neighborhood Poverty: Policy Implications in Studying Neighborhoods* Vol II, edited by J. Brooks-Gunn, G. Duncan, and L. Aber. New York: Russell Sage Foundation.

Becketti, Sean, William Gould, Lee Lillard, and Finis Welch. 1988. "The PSID after Fourteen Years: An Evaluation." *Journal of Labor Economics* 6(4):472–92.

Brock, William, and Steven Durlauf. Forthcoming. "Interactions Based Models." In *Handbook of Econometrics,* ed. J. Heckman and E. Leamer. Amsterdam: North Holland.

Bronfenbrenner, Uri. 1989. "Ecological Systems Theory." *Annals of Child Development* 6:187–249.

Brooks-Gunn, Jeanne, Greg Duncan, Pamela K. Klebanov, and Naomi Sealand. 1993. "Do Neighborhoods Influence Child and Adolescent Development?" *American Journal of Sociology* 99(2):353–95.

Brooks-Gunn, Jeanne, Greg Duncan, and J. Lawrence Aber, eds. 1997. *Neighborhood Poverty,* Vol. I, *Context and Consequences for Children;* Vol. II, *Policy Implications in Studying Neighborhoods.* New York: Russell Sage Foundation.

Case, Anne, and Lawrence Katz. 1991. "The Company You Keep: The Effects of Family and Neighborhood on Disadvantaged Youths." National Bureau of Economic Research Working Paper No. 3705.

Chase-Lansdale, Lindsay P., and Rachel A. Gordon. 1996. "Economic Hardship and the Development of Five- and Six-Year-Olds: Neighborhood and Regional Perspectives." *Child Development* 67(6):3338–68.

Clark, Rebecca. 1992. "Neighborhood Effects on Dropping Out among Teenage Boys." Urban Institute Working Paper PSC-DSC-UI-13. Washington, D.C.: Urban Institute.

Coleman, James S., Ernest Q. Campbell, Carol J. Hobson, James McPartland, Alexander M. Mood, Frederic D. Weinfeld, and Robert L. York. 1966. *Equality of Educational Opportunity.* U.S. Department of Health, Education and Welfare, Office of Education. Washington, D.C.: GPO.

Coleman, James S. 1988. "Social Capital in the Creation of Human Capital." *American Journal of Sociology* 94 (Supplement): S95–S120.

Corcoran, Mary, and Terry Adams. 1997. "Race, Poverty, Welfare, and Neighborhood Influences on Men's Economic Outcomes." Preliminary Report, Ann Arbor, Michigan.

Corcoran, Mary, Roger Gordon, Deborah Laren, and Gary Solon. 1992. "The Association between Men's Economic Status and Their Family and Community Origins." *Journal of Human Resources* 27(4):575–601.

Crane, Jonathan. 1991. "The Epidemic Theory of Ghettos and Neighborhood Effects on Dropping Out and Teenage Childbearing." *American Journal of Sociology* 96(5):1126–59.

Crockett, Lisa J., and Ann C. Crouter. 1995. "Pathways through Adolescence: An Overview." In *Pathways through Adolescence: Individual Development in Relation to Social Contexts,* edited by L. J. Crockett and A. C. Crouter. Mahwah, N.J.: Lawrence Erlbaum Associates.

Cutler, David, and Edward Glaeser. 1997. "Are Ghettos Good or Bad?" *Quarterly Journal of Economics* 112(3):827–72.

Datcher, Linda. 1982. "Effects of Community and Family Backgrounds on Achievement." *Review of Economics and Statistics* 64:32–41.

Duncan, Greg. 1994. "Families and Neighbors as Sources of Disadvantage in the Schooling Decisions of White and Black Adolescents." *American Journal of Education* 1003: 20–53.

Duncan, Greg, Jeanne Brooks-Gunn, and Pamela Klebanov. 1994. "Economic Deprivation and Early-Childhood Development." *Child Development* 65(2):296–318.

Duncan, Greg, James R. Connell, and Pamela Klebanov. 1997. "Conceptual and Methodological Issues in Estimating Causal Effects of Neighborhoods and Family Conditions on Individual Development." In *Neighborhood Poverty: Context and Consequences for Children,* Vol. I, ed. J. Brooks-Gunn, G. Duncan, and L. Aber. New York: Russell Sage Foundation.

Duncan, Greg, and Deborah Laren. 1990. "Neighborhood and Family Correlates of Low Birthweight: Preliminary Results on Births to Black Women from the PSID-Geocode File." Mimeo, Survey Research Center. Ann Arbor: University of Michigan.

Durlauf, Steven. 1999. "The Case 'Against' Social Capital." *Focus* 20(3):1–5.

Evans, William, Wallace Oates, and Robert Schwab. 1992. "Measuring Peer Group Effects: A Study of Teenage Behavior." *Journal of Political Economy* 100(5):966–91.

Fitzgerald, John, Peter Gottschalk, and Robert Moffitt. 1998. "An Analysis of Sample Attrition in Panel Data: The Michigan Panel Study of Income Dynamics." *Journal of Human Resources* 33(2):251–99.

Gramlich, Edward M. 1993. "Poor People or Poor Places." Ann Arbor: University of Michigan. Mimeo.

Haveman, Robert, and Barbara Wolfe. 1994. *Succeeding Generations: On the Effects of Investments in Children.* New York: Russell Sage Foundation.

———. 1995. "The Determinants of Children's Attainments: A Review of Methods and Findings." *Journal of Economic Literature* 33(4):1829–78.

Haveman, Robert, Barbara Wolfe, and Kathryn Wilson. 1997. "Childhood Poverty and Adolescent Schooling and Fertility Outcomes: Reduced-Form and Structural Estimates." In

Consequences of Growing Up Poor, ed. Greg J. Duncan and Jeanne Brooks-Gunn. New York: Russell Sage Foundation.

Hill, Anne, and June O'Neill. 1993. "Underclass Behaviors in the United States: Measurement and Analysis of Determinants." Baruch College/City University of New York. Mimeo.

Jargowsky, Paul A. 1997. *Poverty and Place: Ghettos, Barrios, and the American City.* New York: Russell Sage Foundation.

Jencks, Christopher, and Susan Mayer. 1990. "The Social Consequences of Growing Up in a Poor Neighborhood." In *Inner-City Poverty in the United States,* ed. Larry Lynn and M. McGeary. Washington, D.C.: National Academy Press.

Lillard, Dean. 1993. "Neighborhood Effects on Educational Attainment." CEH Working Paper RP93-5. Cornell University, Ithaca, N.Y.

Lillard, Lee A., and Constantijn W. A. Panis. 1994. "Attrition from the PSID: Household Income, Marital Status, and Mortality." Santa Monica, Calif.: Rand Corporation.

Manski, Charles F. 1993. "Identification of Endogenous Social Effects: The Reflection Problem." *Review of Economic Studies* 60(3):531–42.

Plotnick, Robert, and Saul Hoffman. 1999. "The Effect of Neighborhood Characteristics on Young Adult Outcomes: Alternative Estimates." *Social Science Quarterly* 80(1):1–18.

Rickets, Erol, and Isabel Sawhill. 1988. "Defining and Measuring the Underclass." *Journal of Policy Analysis and Management* 7(2):316–25.

Sewell, William H., and J. Michael Armer. 1966. "Neighborhood Context and College Plans." *American Sociological Review* 31(2):159–68.

Solon, Gary, Marianne Page, and Greg Duncan. 1996. "Correlations Between Neighboring Children in Their Socioeconomic Status as Adults." University of Michigan. Mimeo.

Summers, Anita, and Barbara Wolfe. 1977. "Do Schools Make a Difference?" *American Economic Review* 67:639–52.

Wilson, Alan B. 1969. *The Consequences of Segregation: Academic Achievement in a Northern Community.* Berkeley, Calif.: The Glendessary Press.

Wilson, William J. 1987. *The Truly Disadvantaged: The Inner City, the Underclass, and Public Policy.* Chicago: University of Chicago Press.