Articles

Growing Up in Poor Neighborhoods: How Much Does It Matter?

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This article is a review of research on how much the life chances of children are affected by the socioeconomic and racial mix of their schools and neighborhoods. The social mix of a high school has little effect on students' chances of attending college or on white students' academic achievement. Evidence about the effect of the socioeconomic mix of schools or neighborhoods on achievement of elementary school students, on graduation rates of high school students, on teenage crime, and on early labor market experience is weak. Growing up in poor neighborhoods seems to increase black teenage pregnancy rates.

A NUMBER OF SOCIAL SCIENTISTS, NOTABLY WILSON (*1*), have argued that poor children living in overwhelmingly poor neighborhoods find it harder to escape from poverty than poor children living in more affluent neighborhoods. If this were true, reducing economic segregation, both in residential neighborhoods and schools, would improve poor children's chances of escaping poverty. Increases in economic segregation, such as those that occurred in many U.S. cities between 1970 and 1980 (*2*), would in turn reduce poor children's chances of escaping poverty.

The idea that economic segregation makes it hard for children to escape from poverty is closely related to the idea that racial segregation makes it hard for black children to advance in a society dominated by whites. Indeed, the two concepts are often empirically indistinguishable because the poorest urban neighborhoods are almost all black or Hispanic.

Those who favor economic and racial desegregation usually make two empirical claims about the way neighborhoods affect children's life chances: (i) affluent neighbors substantially improve the life chances of poor children, especially poor minority children, and (ii) poor neighbors do not significantly influence the life chances of more affluent children. Those who oppose economic and racial desegregation tend to deny both claims. This article reviews the available evidence about these propositions.

We reviewed all of the research we could find that examined the effect of the socioeconomic or racial mix of neighborhoods or schools on children's educational attainment, cognitive skills, teenage crime, sexual behavior, and eventual success in the labor market. Sociologists use the term socioeconomic status (SES) to denote an individual or family's overall rank in the social and economic hierarchy, but they do not agree on how it should be measured. Almost all of the studies we reviewed used some combination of parental education, occupation, and income to measure SES. Researchers used the mean value of these or similar measures for all the families in a neighborhood or school to measure its mean SES. They then tried to estimate the separate effects of parental SES and mean neighborhood or school SES on a particular outcome.

Broadly speaking, there are currently four schools of thought about how neighborhoods affect behavior.

1) *Disadvantaged neighbors are a disadvantage.* Most social scientists seem to espouse what we call the "contagion model" of neighborhood effects. According to this model, if children grow up in a community where a lot of their neighbors commit crimes, have children out of wedlock, or drink too much, the children will be more likely to do these things themselves. Conversely, if the children grow up in a neighborhood where most others "set a good example," the children will tend to follow that example. Undesirable behavior is more common in low SES neighborhoods; thus, according to the contagion model, children reared in low SES neighborhoods will behave worse than those raised in higher SES neighborhoods, regardless of their own family background (*3*).

A minor variation on this theme is the "social control" model in which high SES adults are portrayed as "enforcers" who keep poor children from running wild on the streets, call the police when trouble occurs, and help maintain public order. High SES adults also act as role models, whose existence proves that success is possible if one works hard and behaves prudently (*1*).

2) *Advantaged neighbors are a disadvantage.* According to this "relative deprivation" model, high SES neighbors provoke resentment among the poor (*4*). As a result, the poor may feel more need to create a deviant subculture if they live near the affluent than if they live near each other.

Affluent neighbors can be a liability for other reasons as well. For instance, high SES students tend to find schoolwork easier than their low SES counterparts. As a result, high SES schools tend to be more academically demanding than low SES schools. This means that a student moving from a low to a high SES school is likely to rank lower in the class and get lower grades (*5, 6*).

3) *Disadvantaged neighbors are irrelevant.* Some strong individualists—especially economists—assume that people base their decisions entirely on their own circumstances and long-term interests, not on their neighbors' ideas about what is sensible, desirable, or acceptable. Most anthropologists and sociologists reject this view, arguing that rational behavior is usually restricted to choosing among familiar alternatives. But even if anthropologists and sociologists are right about the limits of rationality, neighborhoods need not exert a significant impact on children's perceptions of the alternatives available to them. Even in the poorest neighborhoods a teenager can find some friends who stay out of trouble, finish high school, go to college, and get good jobs. Conversely, even the most affluent neighborhoods provide teenagers with some role models who hate schoolwork, reject adult standards of behavior, and get into trouble with those in authority. As long as both kinds of role models exist, their relative numbers may not matter much.

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4) *Neighbors do not matter but neighborhoods do.* Even if neighbors do not affect behavior, neighborhood institutions and resources may. Almost everyone assumes, for example, that schools in affluent neighborhoods have better teachers than schools in poor neighborhoods and that this is bound to have some effect on how much students learn (*7*). Almost everyone also assumes that the police treat delinquents differently in rich and poor neighborhoods and that this affects a teenager's chances of being arrested (*8*). This means that a neighborhood's mean SES can affect children's life chances even if neighbors per se are irrelevant.

The studies that we reviewed seldom tried to distinguish the effects of neighborhoods from the effects of neighbors. Most employed a "black box" model in which no assumptions are made about how a neighborhood or a school's mean SES influenced individual behavior.

Problems in Studying the Effect of Neighborhoods

Because social scientists cannot control where people live, they cannot conduct actual experiments to estimate the effects of neighborhoods. The next best alternative would be to follow individuals who moved voluntarily from one neighborhood to another, but in practice there are not good data of this kind either. In order to estimate the effect of neighborhood characteristics, social scientists have largely relied on surveys that measure family characteristics and neighborhood characteristics simultaneously. Making causal inferences from such surveys poses a number of well-known problems.

Controlling exogenous factors. The people who move into different neighborhoods differ before they arrive, and the people who remain in a given neighborhood differ from those who leave. The "standard" indicators for parental SES are mother's and father's education, father's occupation, and family income. All four of these measures appear to exert independent effects on children's life chances (*9*), but the studies we reviewed seldom controlled for all four. Race, religion, and family size also vary by neighborhood and affect the outcomes that concern us, independent of SES. If investigators do not control (or if they mismeasure) any of these factors, the apparent effect of mean SES is likely to be inflated because the neighborhood mean will be a partial proxy for unmeasured differences in individual SES. Almost all of the studies that we reviewed are subject to this bias.

Measures of neighborhood composition. The measures that investigators use to rank neighborhoods and schools also vary from study to study. They typically include one or more of the following: mean family income, mean education of one or both parents, percentage of families on welfare, percentage of family heads with white collar jobs, and percentage of families receiving welfare. Many investigators combine several of these neighborhood characteristics into a single composite index. We describe all these measures as indicators of a neighborhood's "mean SES," regardless of how they are constructed. Although the measures used in different studies are likely to be highly correlated with one another, they are not perfect substitutes for one another. Differences among investigators' measures of mean SES undoubtedly affect their substantive findings, but we do not know how they do so.

What We Have Learned

Mean SES and educational attainment. By "educational attainment" we mean the number of years of school that an individual completes. A large and convincing body of research shows that if we compare high school graduates who had the same test scores in 9th or 10th grade and came from families of the same SES but attended different high schools, the mean SES of the school has almost no effect on their chances of planning to attend college, actually attending college, or graduating from college (*10, 11*). This result reflects two offsetting factors. Meyer (*6*) showed that attending a school with a high mean SES had a positive effect on a student's chances of planning to attend college, but that attending school with students who scored high on standardized tests had a negative effect. Because the mean test scores and mean SES of schools were highly correlated, the net effect of attending a high SES school was small. Subsequent studies have almost all supported this finding (*10*).

Nonetheless, teenagers who live in high SES neighborhoods attain more schooling than teenagers from similar families who live in lower SES neighborhoods (*12–14*). There are at least three plausible explanations for this apparent paradox:

1) There is some evidence that attending elementary school with high SES classmates raises children's test scores (*15, 16*). If this effect persists over time, it would raise the eventual educational attainment of children who live in high SES neighborhoods.

2) Attending high school with affluent classmates may also increase a student's chances of graduating (*12, 17*).

3) Growing up in a high SES neighborhood may lead high school graduates to get more education, even though attending a high SES high school does not.

Racial mix and educational attainment. High school students were more likely to drop out of predominantly black than predominantly white high schools in the early 1980s, even with the students' own race and socioeconomic background controlled (*17*). However, this could conceivably be because students attending predominantly black schools have lower test scores than students of the same race and SES who attend predominantly white schools.

Blacks in the northern United States who attended all-black high schools during the 1960s and early 1970s were more likely to plan on attending college than those who attended racially mixed schools (*18*), but they were slightly less likely to enter college and far less likely to remain in college (*19*). The same was true for blacks who graduated from high school in the 1940s and 1950s (*20*).

In 1972, when school desegregation was just beginning in the South, attending a racially mixed southern high school reduced both the chance that black students would enter college and the chance that they would remain there (*19*). No data on this point are available for more recent years. We do not know how racial mix affected educational attainment of white students in the North or South.

Mean SES and cognitive skills. By cognitive skills we mean performance on any standardized test of mental skill or information. Studies of how a school's mean SES affects its students' cognitive skills yield mixed results, depending on students' race and grade level.

A high school's mean SES has a small effect on how much the "average" student learns after the 9th or 10th grade. This conclusion is supported by an analysis of longitudinal data from the 1960–63 Project Talent Survey (*11*), an analysis of the 1980–82 High School and Beyond data (*21*), and a reanalysis of the 1965 Equality of Educational Opportunity Survey (EEOS) (*15*).

One study (*15*) suggests that a high school's mean SES has more impact on the cognitive skills of black students than the cognitive skills of white students. Another (*17*) suggests that a high school's mean SES has a greater effect on high SES students than on low SES students. The first finding argues for racial desegregation. The second argues against economic desegregation. Neither study is altogether convincing.

The evidence on whether an elementary school's mean SES exerts

a substantial effect on how much students learn is even less satisfactory. Two studies (*15, 16*) report what could be sizable effects, but neither properly controls for skills of students when they enter school.

Racial composition and cognitive skills. Data collected in 1965 and 1972 suggested that northern blacks learned more in predominantly white schools than in predominantly black schools, even with family background controlled (*15, 19*). A school's racial composition had virtually no relation to black students' performance in the South in 1972 (*19*). We found no relevant studies of the South in which researchers used more recent data.

None of these studies includes information on how long schools had been racially mixed. There is, however, a large body of research suggesting that the first year of desegregation usually has a small positive effect on reading skills of black elementary school students. These studies provide no evidence that the first year of desegregation affects math skills, and they provide no evidence on the long-term effects of desegregation (*22*).

Most experts contend that a school's racial mix does not affect white students' achievement. Gamoran's (*21*) results support this view at the high school level. The evidence for earlier grades (*15, 18*) is contradictory and has such serious methodological problems that we cannot put much weight on it.

Crime. Despite the existence of many complex theories about the ways in which neighborhoods affect teenage crime, we found only two studies that allowed us to estimate the effect on teenage crime of growing up in a low SES neighborhood.

White Nashville-area teenage boys were more likely to have been arrested for serious crimes in the 1950s if they attended school with low SES classmates than if they attended school with high SES classmates (*23*). Low SES boys were especially sensitive to a school's mean SES(*15*). The Nashville study probably overestimated the effect of school composition, however, because it controlled only one exogenous parental characteristic, namely, father's occupation.

A study of Chicago teenagers in the early 1970s (*4*) that pooled blacks and whites and controlled a broader array of background characteristics than the Nashville study found that middle SES boys reported committing more serious crimes if they lived in low SES rather than higher SES neighborhoods. This is consistent with the Nashville results. But in contrast to the Nashville results and with what most people assume about the effects of concentrated poverty, poor Chicago teenagers reported committing fewer serious crimes if they lived in poor neighborhoods.

Results of the Nashville study imply that economic desegregation would slightly reduce the overall crime rate. The Chicago study implies that desegration would slightly increase the crime rate.

Teenage sexual behavior. Only one study (*24*) has examined the effect of neighborhood SES on teenage sexual behavior. It found that when family background was controlled, the pregnancy rate among black teenagers living in a low SES Chicago neighborhood increased by a third. There was little difference in pregnancy rates among those living in middle and high SES neighborhoods. This study did not include whites.

One other study (*25*) found that 67% of black 15- and 16-year-olds who were in classrooms in which more than four-fifths of the other students were black reported having had sexual intercourse, compared to only 40% of blacks of the same age who were in classrooms in which less than four-fifths of the other students were black. Controlling mother's education had little effect on these results. There were not enough whites in predominantly black classrooms to assess the effect of such classrooms on the sexual experience of white students.

Mean SES and labor market success. Among men who were in the 9th grade in 1960, a high school's mean SES had little effect on either their occupational status or their career plans 5 years after high school graduation (*11*).

Racial composition and labor market success. Growing up in racially mixed neighborhoods and attending racially mixed schools appear to improve black men's labor market opportunities. Young blacks who lived in racially mixed neighborhoods in the late 1960s had higher hourly wages and worked more hours in the 1970s than blacks who grew up in predominantly black neighborhoods. But racially mixed neighborhoods appear to have decreased wages and hours worked for whites (*13*). Because of small sample size, however, these findings must be treated cautiously.

Attending a racially mixed northern high school before 1963 had a negligible effect on the earnings of black men in 1966 (*26*). This finding is not easy to reconcile with Datcher's (*13*) finding that blacks who lived in racially mixed neighborhoods in the late 1960s had higher earnings in the 1970s than blacks who lived in predominantly black neighborhoods. One possible explanation is that when job opportunities for blacks improved in the late 1960s, blacks who had had contact with whites in school were especially likely to benefit. Alternatively, the two studies may differ because neighbors matter more than high school classmates or because the two studies used different statistical procedures to estimate compositional effects.

Blacks who attended racially mixed schools in the suburbs of Hartford, Connecticut, in the late 1960s were more than twice as likely as similar blacks who attended predominantly black inner-city Hartford schools to work in white-collar occupations in 1982 (*27*). We do not know whether blacks who attended suburban schools earned more money as a result, but suburban schooling did not affect black unemployment.

How We Can Learn More

The federal government might spend substantial sums of money for low-income housing during the 1990s. If policy-makers try to save existing public housing projects, residential segregation will be maintained or increased. If scattered-site housing is built or if housing vouchers are provided, then residential segregation may be reduced, but there may also be less low-income housing. Social scientists currently know little about how changes in residential segregation would affect children or adults (*15*). For future research to have relevance to policy questions of this kind, social scientists will have to make several changes in prevailing research practices.

Nonlinear effects of socioeconomic mix. In most of the studies we have reviewed it is assumed that a neighborhood's mean SES has linear effects. If this assumption is correct, economic desegregation will neither raise nor lower the national mean on the outcomes that concern us. This assumption needs to be tested.

Recent discussions of the "underclass" and "concentrated poverty" have focused on the effects of living in the worst 5% or 10% of all neighborhoods. Only two of the studies we reviewed (*12, 24*) separate out such neighborhoods for special attention. One (*24*) found that living in the worst third of black Chicago neighborhoods substantially increased an unmarried black girl's chances of becoming pregnant. The difference between the middle third and the best third of black neighborhoods was trivial. This finding suggests that if economic segregation were reduced so that the mean SES of all black neighborhoods approximated the citywide mean for blacks, black teenage pregnancy would be reduced.

Whites almost never live in neighborhoods as bad as the worst third of black neighborhoods. Thus, if this study (*24*) had collected data on all Chicago residents and had estimated neighborhood effects with the use of a linear model, it would not have found that a

neighborhood's mean SES had much effect on teenage pregnancy. Because most of the studies we reviewed applied a linear model to a representative sample, the fact that a neighborhood or school's mean SES usually appears to have a small effect cannot be taken as evidence that the worst schools or neighborhoods have small effects.

Interactions between neighborhood SES and individual SES. Dispersing the poor to better neighborhoods will only command widespread support if most people assume not only that affluent neighbors will improve the life chances of the poor but also that poor neighbors will not appreciably harm the more affluent. The poor must, in other words, be more sensitive than the affluent to their neighborhood's socioeconomic mix. Only three of the studies we reviewed provided data on the validity of this assumption. Two of these studies deal with crime and reach contradictory conclusions, perhaps because one (*23*) covers only whites, whereas the other (*4*) pools blacks and whites. The third study (*17*) uses such a complex model that its findings are hard to interpret, but it suggests that math scores of advantaged students are influenced more by their high school's mean SES than are the scores of poor students.

None of the studies we reviewed presents separate estimates of neighborhoods' effects on poor blacks or Hispanics. Even if the average black or Hispanic gains more from economic or racial desegregation than the average white loses, it need not follow that poor blacks or Hispanics would gain more than the average white lost. Suppose schools in affluent white areas ignored the special problems of the poor or tracked them into "slow" classes. In such a world, middle-income blacks might gain a lot from school desegregation, but poor blacks might gain little. Were this the case, middle-income blacks might move to more affluent neighborhoods when the opportunity arose (as it did after 1965), but poor blacks might prefer to spend their limited resources in other ways. The result would be a decline in racial segregation and an increase in economic segregation. This is consistent with what occurred between 1970 and 1980 (*2, 28*).

Dynamic versus static models. Social scientists with an interest in neighborhoods have not checked the results of their cross-sectional studies by following families who moved. This has been as true for ethnographic researchers as for those who rely on survey data.

Dynamic models are less subject than static models to the biases caused by nonrandom variation in unmeasured exogenous parental characteristics. If moving to a better neighborhood lowers the arrest rates of poor black teenagers relative to those of older siblings who grew up in a worse neighborhood, for example, we can have more confidence that this is a true neighborhood effect than if we merely find that poor black teenagers who live in good neighborhoods commit fewer crimes than those who live in bad neighborhoods.

Dynamic models of this kind do not eliminate all of the biases introduced by exogenous family characteristics. If a father drinks to excess, loses his job, and is unable to pay the rent, for example, the family may move to a cheaper neighborhood and the children may start misbehaving. Unless researchers know about the drinking, they may erroneously impute the change in the children's behavior to the change in neighborhood. So far as we know, only one study has tried to look at the effects of changing neighborhoods, and it did not measure any of the outcomes discussed in this article (*29*).

Even without data on families who move, investigators could improve their cross-sectional models. Cross-sectional surveys could ask how long respondents had lived in their current neighborhood, and one could then determine whether a neighborhood's apparent effect depended on how long someone had lived there.

Estimating the overall effects of neighborhoods. We have not reviewed literature on whether features of a neighborhood or school other than SES or racial mix have significant effects on children's life chances. Before addressing this question we need to ask how much particular outcomes vary from one neighborhood or school to the next and how much of this variance persists when we eliminate the effects of exogenous differences among residents or students (*30*). Once we know this, we can ask whether the remaining variance is attributable to mean SES, racial composition, or other school or neighborhood characteristics.

We found no good estimates of neighborhoods' total effects and only a few estimates of schools' total effects. In the absence of such data, readers should realize that negative findings about the effects of mean SES or racial composition need not imply that other neighborhood or school characteristics are equally unimportant.

Conclusions

Our review suggests two tentative conclusions. First, the more we learn about a given outcome, the smaller the effects of mean SES usually look. We have learned a lot about the effects of attending a low SES high school on 12th graders' chances of attending college and on white students' academic achievement. These effects appear to be small. We know far less about the effects of socioeconomic mix on elementary school achievement or high school graduation rates. The evidence we have suggests that these effects could be fairly large, but the evidence is not good. Better evidence might lead us to revise our estimates downward. Studies of teenage crime, sexual activity, and early labor market success also suggest that neighborhoods may have appreciable effects, but here again the apparent effects may shrink as we learn more.

Second, the effects of both socioeconomic and racial composition vary from one outcome to the next. On the basis of what we now know, we hazard two tentative hypotheses about these variations:

1) When neighbors set social standards for one another or create institutions that serve an entire neighborhood, affluent neighbors are an advantage.

2) When neighbors compete with one another for a scarce resource, such as social standing, good high school grades, or teenage jobs, affluent neighbors may be a disadvantage.

Because the balance between these two kinds of influence varies from one outcome to another, there is no general rule dictating that affluent neighbors will always be an advantage or a disadvantage (*31*).

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31. A detailed review of each study and lengthier discussions of the methodological issues raised in this article are in (*15*).

The First High-Energy Neutrino Experiment

MEL SCHWARTZ

This article describes the state of knowledge of weak interactions in 1960, the conception and implementation of the first high-energy neutrino experiment, and the not altogether unexpected result that the muon neutrino is different from the electron neutrino.

In the first part of my article I would like to tell you a bit about the state of knowledge of elementary particle physics as the decade of the 1960s began, with particular emphasis on the weak interactions. In the second part I will cover the planning, implementation, and analysis of the first high-energy neutrino experiment.

Historical Review

By the year 1960 the interactions of elementary particles had been classified into four basic strengths. The weakest of these, the gravitational interaction, does not play a significant role in the laboratory study of elementary particles and will be ignored. The others are strong, electromagnetic, and weak interactions.

Strong interactions. This class covers the interactions among so-called hadrons. Among the hadrons are the neutrons and protons that we are all familiar with, together with the pions and other mesons that tie them together into nuclei. Obviously, the interaction that ties two protons into a nucleus must overcome the electrostatic repulsion that tends to push them apart. The strong interactions are short range, typically acting over a distance of 10^{-13} cm, but at that distance are some two orders of magnitude stronger than electromagnetic interactions. In general, as presently understood, hadrons are combinations of the most elementary, strongly interacting particles, called quarks.

Electromagnetic interactions. You are all familiar with electromagnetic interactions from your daily experience. Like charges repel one another; opposite charges attract. The earth acts like a giant magnet. Indeed, matter itself is held together by the electromagnetic interactions among electrons and nuclei. With the exception of the neutrinos, all elementary particles have electromagnetic interactions either through charge, or magnetic property, or the ability to directly interact with charge or magnetic moment. In 1960 the only known elementary particles apart from the hadrons were the three leptons—electron, muon, and neutrino—and there was some suspicion that there might be two types of neutrinos. Both the electron and the muon are electromagnetically interacting.

Weak interactions. Early in the century it was discovered that some nuclei are unstable against decay into residual nuclei and electrons or positrons. There were two important characteristics of these so-called decays.

1) They were "slow." That is to say, the lifetimes of the decaying nuclei corresponded to an interaction that was much weaker than that characteristic of electromagnetism.

2) Energy and momentum were missing.

If one examined the spectrum of the electrons that were emitted, it was clear that to preserve energy, momentum, and angular momentum in the decay it was necessary that there be another decay product present. That decay product needed to be of nearly zero mass and to have half-integral spin. This observation was first made by Pauli. Fermi later gave this product the name neutrino.

With the development of the Fermi theory of weak interactions, more was learned about the properties of the neutrino. The neutrino has a spin of 1/2 and a very low probability of interacting in matter. The predicted cross section for the interaction of a β-decay neutrino with nucleons is about 10^{-43} cm^2. Thus one of these neutrinos would, on the average, pass through a light-year of lead without interacting at all.

The author is at Digital Pathways, Inc., Mountain View, CA 94043. This article is adapted from the lecture he delivered in Stockholm on 8 December 1988, when he received the Nobel Prize in Physics, which he shared with Jack Steinberger and Leon Lederman. The article is published here with permission from the Nobel Foundation. The articles by Dr. Steinberger and Dr. Lederman will be published in subsequent issues.