

THE EFFECTS OF POVERTY ON CHILD HEALTH AND DEVELOPMENT

J. Lawrence Aber and Neil G. Bennett

Columbia University School of Public Health, National Center for Children in Poverty,
154 Haven Avenue, New York 10032; e-mail, nb91@columbia.edu

Dalton C. Conley

Robert Wood Johnson Foundation Scholars in Health Policy Research Program,
School of Public Health, 140 Warren Hall, Berkeley, California 94720-7360

Jiali Li

Columbia University School of Public Health, National Center for Children in Poverty,
154 Haven Avenue, New York 10032

KEY WORDS: poverty, infant mortality, child morbidity, cognitive development, poverty measurement

ABSTRACT

Poverty has been shown to negatively influence child health and development along a number of dimensions. For example, poverty—net of a variety of potentially confounding factors—is associated with increased neonatal and post-neonatal mortality rates, greater risk of injuries resulting from accidents or physical abuse/neglect, higher risk for asthma, and lower developmental scores in a range of tests at multiple ages.

Despite the extensive literature available that addresses the relationship between poverty and child health and development, as yet there is no consensus on how poverty should be operationalized to reflect its dynamic nature. Perhaps more important is the lack of agreement on the set of controls that should be included in the modeling of this relationship in order to determine the “true” or net effect of poverty, independent of its cofactors. In this paper, we suggest a general model that should be adhered to when investigating the effects of poverty on children. We propose a standard set of controls and various measures of poverty that should be incorporated in any study, when possible.

Introduction

In the late 1970s, the British government commissioned a study on social inequality and health status. A major conclusion of this research, known as the Black Report, was that “biological programming” of adult health status occurs to a great extent during the fetal and infant stages of development (86). Public health scholars have since paid increasing attention to the health consequences of poverty and social inequality early in the life course. Since the report was issued, research studies on the effects of poverty (or low socioeconomic status) on child health and development have mushroomed. From 1980 to 1985, only 128 articles matched jointly to the words “poverty” and “child” in the Medline data base; between 1990 and 1995, that number had increased dramatically, to 506.

Despite the rapid growth in the literature on the effects of child poverty on health and development, there has been no consensus on how to operationalize *poverty*. This is an important issue because how we characterize the effects of poverty on child health and development depends on how we define the term *poverty*.

One difficulty in operationalizing poverty is that *income poverty* is correlated with a host of other social conditions that themselves have been shown to be detrimental to children. In practice, it may often prove difficult to disentangle the effect of poverty per se and the disadvantageous family structures common in poor families. It is also difficult to disentangle poverty from the low levels of education and occupational security that often accompany poverty status.

The first half of this review focuses on research that addresses how we define poverty and how we separate its effect from other social conditions. The second half synthesizes the literature that attempts to decompose the effects of poverty on children with respect to a variety of health and developmental outcomes.

How Poor is Poor?

In 1995, the official Federal poverty threshold was \$12,158 for a family of three and \$15,569 for a family of four. According to the United States Census Bureau (84), in 1995 (the most recent year for which data are available), approximately 36.4 million people in the United States were poor. Of that number, 14.7 million were children under the age of 18, and 5.8 million were children under the age of six—which accounts for 21 percent and 24 percent of all children in their respective age groups. This percentage of young children in poverty is higher than that of any other industrialized nation except Australia (TM Smeeding & L Rainwater, unpublished manuscript). Before delving into the consequences of poverty, we briefly discuss exactly what it means to be poor.

The Federal poverty measure, created in the 1960s, consists of a series of dollar amounts—called thresholds—representing minimum standards of economic resources for families. Thus, as currently conceived, poverty is an absolute

measure. Under this definition, poverty would be eliminated if every family were guaranteed an income over the preset threshold. This concept differs from *relative poverty*, which is rooted in the distribution of income. Half of median family income, for example, is one typically cited threshold of relative poverty. The difference is important since some studies have shown that social inequality (i.e. relative poverty) per se has negative health consequences for individuals regardless of their absolute economic level (86).

In the United States, the official poverty measure was based on several studies conducted by Mollie Orshansky for the Social Security Administration. Orshansky set about creating a measure of need that had a “scientific” basis. At the time, however, scientific norms for family needs existed only for food consumption (61). Accordingly, the poverty measure was originally defined using figures for a minimally adequate diet developed by the US Department of Agriculture. To obtain the poverty threshold, these figures were multiplied by three, based on the assumption that food typically represented about one third of total family expenditures and that remaining funds would prove adequate to cover other basic expenses (68). Poverty thresholds differ by family size and are adjusted annually for changes in the average cost of living in the United States.

Where the poverty line is drawn is important because of its use in policy formation. In 1965, for example, the Office of Economic Opportunity adopted the Federal poverty thresholds for program planning and statistical use. In 1969, the US Bureau of the Budget (now the Office of Management and Budget) gave the poverty thresholds official status throughout the Federal government. In 1996, more than two dozen government programs based their eligibility standards on the official poverty threshold. There were numerous proposals introduced during the 104th Congress to eliminate Federal eligibility thresholds for many of these programs and to devolve authority to the state level. However, Federal programs such as Medicaid, Head Start, the Special Supplemental Food Program for Women, Infants, and Children (WIC) still utilize Federal eligibility thresholds.

Despite widespread use of the Federal poverty threshold, this measure can be considered arbitrary in distinguishing between the poor and non-poor in at least two ways.

First, among “poor” families, there are vast differences in resources. Nearly half of poor young children live in households with incomes less than one half of the poverty line (59). Recent research suggests that this “extreme” poverty, especially if it occurs early in life (under five years of age), has especially detrimental effects on children’s future life chances (31, 73). Alarming, extreme poverty among our nation’s youngest children appears to be increasing faster than the overall rate of poverty among all children, and appears less sensitive than poverty or near-poverty to cyclical changes in the economy (59).

Second, in addition to those who are officially poor, many families are “near-poor”—that is, they have incomes between 100 and 185 percent of the poverty line. Because they may be ineligible for certain government programs, the near-poor, despite having higher incomes, may have equal or more difficulty than officially poor families in providing food, shelter, and medical care, as well as other basic goods and services. For example, in many states Medicaid is available currently only to those families with incomes below 133 percent of poverty, leaving those children whose families have low incomes, but above 133 percent of the poverty threshold, in the potentially most tenuous situation with respect to health care access.

Assessing the Current Measure of Poverty

Scholars suggest that an ideal measure of poverty should meet two basic criteria: public acceptability and statistical defensibility. The measure should be consistent with a generally accepted notion of what constitutes poverty, and the statistics used to calculate poverty should accurately capture the concepts that they are meant to measure. The methodology used to determine the official poverty measure has been criticized on both grounds.

Since the 1960s, when the Federal poverty line was first established, there have been considerable changes in the American economy, society, and governmental policies (17). Still based on the original ratios of food to other expenditures, the poverty line does not adequately account for the fact that housing and job-related expenses (e.g. commuting and child care costs) have taken up an increasingly large share of poor families' incomes and, conversely, food a much smaller portion of the total. Of particular interest is the fact that over the past 40 years, health care costs have increased considerably. In the 1980s, health care expenditures consumed six percent of an average consumer's overall budget as compared to less than five percent in the 1950s (46). For these reasons, the decision to multiply food budgets by three no longer appears sensible.

Not only is the poverty threshold criticized for how it conceives of expenses, it has also been challenged on its accounting of resources. Since its inception, poverty status has been based on pretax or taxable income. On its own, however, taxable income does not give an accurate picture of the resources available to a given family. Federal policy initiatives have significantly altered families' disposable income. Increases in the Social Security Payroll Tax, for instance, have reduced the disposable income of many low-wage workers. On the other hand, this indicator also fails to account for in-kind (noncash) government benefits. In the case of the poor, such benefits include food stamps, subsidized lunch programs, and housing and energy assistance. In addition, because annual income fluctuates greatly from year to year for many families, even if we accept cash income as an accurate measure of family resources at a given time, it is not necessarily an accurate measure of the economic well-being

of a family over time (41, 42). Further, delayed marriage and the rise in the co-residence of nonrelated individuals have altered the make-up of American families and households (JA Selzer, unpublished manuscript). In keeping with these changes, some have argued that the poverty thresholds should take into account all of the wage earners and dependents in a child's household (S Mayer & C Jencks, unpublished manuscript). Finally, families bear different costs depending on where they live. For example, the 1996 fiscal year fair market rent and utilities for a two-bedroom apartment in Birmingham, Alabama, was \$447 compared to \$817 in New York City (85). A poverty measure that accommodates—and not simply averages—price differences across geographic areas would more accurately assess the costs that families bear.

The Varying Experiences of Poverty

Whether or not we accept the definition of poverty offered by the government, being poor can mean many different things. Some individuals dip into poverty because of a temporary spell of economic deprivation as a result of divorce or unemployment (21). Others, especially minorities, may be poor for the duration of their childhood (30), with little upward mobility over the course of their development. These individuals may face concentrated neighborhood poverty as well as family-level hardship (27).

The transitory poor are those who briefly fall into poverty, but after a spell are able to climb back out. Many more children come into sporadic contact with poverty than experience persistent poverty. One nationally representative study that selected children under the age of four in 1968 and studied their poverty patterns for the subsequent 15 years found that one third experienced poverty for at least one year (30). Substantial fluctuations in income may, for example, force a family to change its residence. Income volatility also often creates emotional stress for parents, which can in turn lead them to be less nurturing and more punitive with their children than are parents with greater income stability (58).

The persistently poor are those who are poor over an extended period of time. The number of children who experience persistent poverty is far from insignificant. The same study of 15-year poverty patterns found that just under five percent of all children experienced poverty during at least two thirds of their childhood years, and an additional seven percent were poor for between five and nine years during their youth (30). Some groups were more likely to experience persistent poverty than others. Black children had a much higher risk of being poor over the long-term than did white children. Whereas the average black child in the study spent 5.5 years in poverty, the average non-black child spent 0.9 years (30). Only a small proportion of black children—fewer than one in seven—lived above the poverty line for the entire period under study. Most of the children who were poor for at least 10 of the 15 years study—90 percent—were

black. Another study using the same sample found that 55 percent of black children born into poverty were likely to remain poor for at least six of the first ten years of their lives. These longer spells may help to account for ethnic differences in child development measures that remain when poverty is measured only at a single point in time (12).

Children who are persistently poor are at higher risk for many adverse health outcomes. When compared to the non-poor, the long-term poor show large deficits in cognitive and socioemotional development; the long-term poor score significantly lower on tests of cognitive achievement than do children who are not poor. These deficits are still measurable even after many of the characteristics associated with poverty have been accounted for—such as negative household environment and exposure to prenatal risks (48). Further, as the number of years that children spend in poverty increases, so too do the cognitive deficiencies that they experience (JE Miller & S Korenman, unpublished manuscript). Children who experience short-term poverty are only slightly worse off than children who are never poor.

However, even among those families who are consistently poor, incomes may fluctuate greatly from year to year (29, 74); thus static measures of the economic resources available to children may be inadequate. Even multiple time-point measures of dichotomously measured “poverty status” do not reflect the dynamic situations that many poor families experience; families whose incomes fluctuate greatly may remain consistently over or under the somewhat arbitrary poverty line (6). Despite evidence for great variation in the income levels of families over time, most studies examining the effects of poverty on child health and development have used unreliable retrospective reports, queried at a single point in time (28).

To capture the dynamic nature of poverty, several recent studies have used long-term longitudinal data to determine the “true” effects of income. By controlling for average income over a five-year period after a particular event or marker, some researchers have shown that prior income remains significant and therefore provides an accurate assessment of the “true” effect (S Mayer & C Jencks, unpublished manuscript). This method attempts to control for the unobserved, confounding factors that may artificially bolster the estimated effect of income. However, this method may produce an underestimate of the effect of income since each coefficient for pre- and post-event income reflects only its unique contribution to the model and not the shared component. Other researchers have tried to control for unobserved correlates of family income by using sibling comparisons. This approach, called the fixed effects model, determines the net effect of income at various points in child development (31). As yet, this technique has not been used to assess the effect of income on child health outcomes.

Longitudinal studies may be ideal, but they are often more costly and difficult to execute than cross-sectional studies. However, one alternative to measuring income over time is to measure both income and wealth. Although this approach does not solve the problem of unobserved correlates of poverty, it does provide a more robust measure of the economic resources of the family.

Income, of course, is the money that flows into a family over the course of a year; wealth represents the resources available to a family at any given point in time. Wealth is often expressed in terms of net worth: the total value of assets minus liabilities or debts. If income is a stream of dollars, wealth can be seen as akin to a reserve pool (75). While wealth is measured at one point in time, it has been shown to be very effective in capturing families' economic trajectories. Further, it has been shown to predict family stability and the educational attainment of children, both of which are correlated with child development measures (20).

The distribution of wealth in the United States is far more disparate than that of income. Wealth reflects long-term, intergenerational dynamics of inheritance, as well as historical and geographic differences affecting family savings and property accumulation. Despite income deficits, some poor families may nonetheless enjoy additional assets, whereas others may not. Conversely, debt, especially long-term unpaid bills, may create stress in families beyond that predicted by family income (39). Such family wealth or debt may have a profound impact on the lives of poor children, both directly, in their receipt of goods and services, and indirectly, through the attitudes and behaviors of parents. The measure of assets may be particularly important to health researchers concerned with inequality since large medical expenses may need to be financed out of savings or intergenerational transfers rather than current family income. One additional reason why wealth should be considered when evaluating the effect of economic resources on the health and development of children relates to racial-ethnic differences. Due to racial segregation and credit market discrimination, there exist vast differences in wealth levels by race (20). Overall, black families suffer from a median net worth one twelfth that of white families. Even when broken down by monthly income, black and Hispanic median net worths are dramatically lower than those of whites (see Table 1 below). This wealth inequity has been suggested as one potential, yet unexplored explanation for health differences between blacks and whites (84).

The Cumulative and Ecological Effects of Poverty on Children

Once the methodological and conceptual issues surrounding the definition of poverty have been addressed, perhaps the clearest way to consider the effects of poverty on children's health and development is within a cumulative and

Table 1 Median net worth, by race and Spanish origin, and monthly household income¹

Monthly income \$	Race/ethnicity				Ratio: white/Spanish	Total \$
	White \$	Black \$	Ratio: white/black	Spanish origin \$		
<900	8443	88	95.9	453	18.6	5080
900–1999	30,714	4218	7.3	3677	8.4	24,647
2000–3999	50,529	15,977	3.2	24,805	2.0	46,744
>3999	128,237	58,758	2.2	99,492	1.3	123,474
<i>Total</i>	39,135	3397	11.5	4913	8.0	32,667

¹Source: 1984 Survey of Income and Program Participation.

ecological framework. As mentioned earlier, some studies have shown that the earlier poverty strikes in the developmental process, the more deleterious and long-lasting its effects. Further, initial developmental problems engendered by child poverty can often be exacerbated by subsequent poverty; in this sense, the effects of poverty can be said to be cumulative.

In addition to this temporal dimension, poverty (defined as very low family income) also affects the multiple ecologies of a child's life (11). These include:

- the microcontext of the interactions between parents and other adults,
- the microcontext of interactions between parents and children,
- the macrocontext of the neighborhood one lives in and the availability of basic educational and health services for children,
- the macrocontext of neighborhood and job opportunities for adults, and
- the macrocontext of formal and informal social networks to which adults have access.

With both these spatial and temporal issues in mind, we present the effects of poverty in a cumulative and ecological framework, starting with its effects on birth outcomes.

Birthweight and Infant Mortality

An important indicator of a society's development is the mortality rate among infants. Trends in infant mortality in the United States clearly reflect the existence of two societies. The mortality rate among black infants (15.8 per 1000) in 1994 was well over twice that among white and Hispanic babies (6.6 and 6.5 per 1000, respectively) (72). There also exists variation in infant mortality rates within the Hispanic population: Puerto Ricans exhibit the highest rate (8.7), compared to Mexicans (6.6) and Cubans (4.5) (72).

Over the course of the twentieth century, infant mortality has steadily declined, largely as a result of reductions in the postneonatal (ages 2–12 months) death rate. Since the 1980s, this decline has stagnated because of two factors: the increased incidence of low birthweight (LBW, under 2500 grams) and a lack of improvement in birthweight-specific mortality rates (63). Birthweight is central to any further substantial reductions in the infant mortality rate. Death rates for the neonatal period (first month of life) are largely dependent on birthweight (53). In 1991, medical complications associated with LBW and preterm delivery were the primary cause of death among black infants and the third leading cause for white infants. Studies have demonstrated that when the percentage of LBW births is reduced, an even greater reduction in the percentage of infant deaths occurs (34). Reducing the rate of LBW among blacks will narrow the gap between black and white infant mortality that has been in existence for the past 25 years (63).

Historically, race differentials in LBW and mortality rates have been far easier to ascertain than socioeconomic differentials. Therefore, we have not been able to address with sufficient rigor the question of whether race effects are an artifact of minorities' greater likelihood of living in poverty. Classification of deaths and birthweight by race (for the numerator) is readily available from vital registration data; race for the population is available from decennial census data (for the denominator). Unfortunately, few useful socioeconomic covariates appear on birth or death certificates. Studies that have provided a desirable depth of analysis have focused on local areas (88), which allows for a level of probing that cannot be matched in a nationwide survey owing to prohibitive costs. However, findings from local studies are limited in their generalizability; because they are unlikely to be representative of all areas, they are of limited use in inferring the character of relationships at the national level.

Many studies examine aggregate data (24, 80), for example determining the statistical link between county-level poverty rates and the corresponding percentages of LBW babies and infant mortality rates (83). Although these ecological studies add to our knowledge base, their construct does not allow for assessment of the direct relationship between family-level poverty and infant mortality.

Occasionally we see a study that advances our knowledge significantly. One such analysis is that of Gortmaker (37). He estimated models for infant mortality based on data collected by the National Center for Health Statistics in the National Natality and National Infant Mortality Surveys, which provide information beyond that available from birth and death certificates. These data enabled Gortmaker to examine the link between infant mortality and a variety of important factors, such as poverty status, birthweight, hospital care during the neonatal period, parental educational attainment, maternal age, and birth order of the child. Further, he was able to explore distinctions in relationships that

might exist for neonatal mortality versus post-neonatal mortality, since different mechanisms might be at play for each. Gortmaker found net of parental educational level, maternal age, pregnancy experience, and hospitalization that being poor significantly increased the odds of neonatal and post-neonatal mortality, both directly and through increased incidence of LBW.

The role of poverty in determining the risk for low birthweight and infant mortality is not altogether clear. Gortmaker's study laid the groundwork for modeling the effect of poverty on birthweight and infant mortality. One limitation of his analysis is that he did not consider differences by race. Starfield et al (78) found that poverty increases the incidence of low birthweight for whites but that for blacks it is insignificant (although blacks have a higher risk of being LBW at all socioeconomic levels). In fact, the greatest race differences are among the non-poor. This suggests complex mechanisms of race and class at work that cannot be captured adequately by a simple economic model. For instance, the failure of increased income to positively affect the outcomes of black infants may suggest that income itself is not enough. Perhaps due to residential segregation black families cannot achieve upward residential mobility, and consequently income gains cannot "buy" them better pregnancy outcomes. If a middle-income family is trapped in a poor community, its higher income may mean little if the household members are exposed to the same environmental risks and must utilize the same medical services as its poor neighbors. Some recent research has demonstrated that such neighborhood effects influence birthweight (31).

The relationship between poverty and LBW is a subtle one in other ways, as well. Collins & Shay (16) find that for Hispanics, urban poverty is associated with lower birthweight "only when the mother is Puerto Rican or a U.S.-born member of another subgroup" (p. 184). These findings for the Hispanic population highlight the importance of unobserved behavioral and cultural factors that may exert important effects beyond poverty alone.

Further, in examining the role of income/poverty, Gortmaker was not able to determine the intervening effects of maternal behavior. For example, work-related psychological stress (44), as well as physical exertion on the job (43), have been shown to be significant in predicting preterm delivery. Both factors are correlated with poverty. Furthermore, prenatal behavioral factors such as alcohol or drug consumption have been shown to be correlated with poverty and long have been known to be risk factors for LBW (22). Smoking also is a well-documented risk for LBW (5).

Further complicating the issue of risk factors for LBW is the interaction of socioeconomic status and behavioral variables. For example, the negative effect of smoking has been found to be exacerbated by pregravid underweight. One study found that low pregravid weight (<50 kgs) doubles the risk of LBW, but

that smoking combined with low pregravid rate quadruples the risk (5). Some researchers have marshaled evidence that weight gain during pregnancy may partially mitigate the effect of smoking. Although LBW may not be a direct effect of poverty per se, each of the above-mentioned factors is mediated by family poverty. Thus, determining the net effect of poverty on LBW is not a straightforward process. For example, one recent study that examined the odds of hospitalization of infants (which is associated with LBW and infant mortality) born to young mothers (ages 14–25) found that poverty alone had no effect when controlling for other factors (81).

Birthweight and the Lingering Effects of Poverty on Children

We have already seen that the risk of LBW is higher for infants born to poor mothers; however, the effect of poverty through birthweight is not limited to infant mortality rates. For those children who survive past the first year of life, birthweight and its interaction with subsequent poverty is an important predictor of multiple measures of development (9). Most notable are the neurological deficits that LBW babies experience (82). Minor neurological abnormalities have been detected in LBW babies (58, 67). Subnormal head circumference is quite common up to 7 months of age, with catch-up evident between the seventh and eighth months (71). The development of language comprehension skills has been shown to be significantly related to birthweight and gestational age, although expressive skills were less affected by these factors (4). Visual recognition acuity has also been shown to be deficient in LBW babies (25).

Preterm and LBW infants also suffer in their psychological and intellectual development. Holding other cofactors constant, there is a clear inverse relationship between gestational age at birth and developmental scores in a variety of tests at multiple ages (9, 12). One study found that at age three only 12 percent of premature babies living in high-risk situations (poverty) functioned at the normal cognitive level (8). At age four and a half years, LBW children have been shown to perform poorly on the British ability scales (an IQ test) (25). Additional research has shown that even at ages 8.7 to 11.2 years, LBW children demonstrated consistently lower scores on the Wechsler Intelligence Scale for Children (WISC) and the Bruininks-Oseretsky test of motor proficiency than non-LBW children (70). Finally, even controlling for current poverty, LBW babies exhibited greater classroom behavior problems than those born of normal weight (47).

In addition to neurological and psychological developmental problems, children who were preterm births are more likely to demonstrate other health-related problems such as iron deficiencies (7) and reduced stature (26). The entire family of some LBW children may experience negative psychological stresses, particularly if the child is rehospitalized (36). Further, there is evidence that

poverty plays a role in the sequelae of low birthweight. Bradley et al (8) write that, "Overall, premature LBW children born into conditions of poverty have a very poor prognosis of functioning within normal ranges across all the dimensions of health and development assessed" (p. 346).

Child Health

Whether or not a child was LBW, poverty alone can induce serious health risks including mortality. Increased mortality risks for poor children are not eliminated when they reach 12 months of age. Mare (54) has documented increased mortality among children of lower socioeconomic status, primarily due to increased risk of accidental death.

Research based on the individual-level data of the 1981 National Health Interview Study Child Supplement showed that poverty status was correlated with increased number of children's bed days and school absences, and decreased maternal rating of child health (55). However, this study left some unanswered questions. For example, it predicted health measures such as number of bed days and the maternal rating of child health while controlling for chronic health conditions. However, the level of chronic health conditions in children living in poverty may be part of the causal pathway, considering that their rate for acute illness is higher than that for non-poor children (77). Given that children's health problems tend to cluster in affected children (77), a scale of morbidity combining various measures of McGaughey & Starfield (55) may yield further insight. The use of a morbidity scale would be effective in controlling for this "clustering" effect in poor children.

Although some studies have found no racial differences in the effects of socioeconomic status on children's health and development (56), other studies have found such differences. These studies have found that, for whites, poverty status based on family income is what negatively affects child development; for blacks, conditions associated with poverty, such as low maternal education, rather than a lack of income per se is what produces significant handicapping effects on children (55).

Researchers generally agree that poor children exhibit higher morbidity rates as a result of two factors. These include (a) lower odds of early intervention, and (b) increased risk of accidents and illness (89). Lack of early intervention stems from two factors: (a) lack of coverage by Medicaid, or (b) Medicaid coverage with inadequate access for poor children versus non-poor counterparts. For example, one study showed that only 56 percent of poor children with Medicaid coverage received routine care in physicians' offices versus 82 percent of children living above the poverty threshold (76). Lower rates of physician use and immunization increase the likelihood for serious illnesses (60). One study showed that among Latino children the "number of financial

difficulties reported” was negatively associated with the odds of being up-to-date in immunizations at three months of age (90). At the municipal level, poor children have been shown to endure higher rates of hospitalization for illness or injury. High hospital rates are generally an indication of inadequate primary care (14, 64). Another sign that poor children do not receive timely care is their increased incidence of otitis media (middle ear infections). This difference may explain the higher incidence of hearing loss among poor children (89).

In terms of heightened risk factors, it has been shown that young children living in poverty experience higher blood lead levels (10, 66), even after controlling for urbanity, educational level of the parent, race/ethnicity, and a host of other demographic factors (10). Disadvantaged children have also been documented to be at increased risk for asthma (33) and lower respiratory illness (23). However, this research used either occupation or education of the parent rather than family income/poverty as the indicator of socioeconomic status. Finally, children from disadvantaged backgrounds have been shown to be at greater risk for injuries resulting from accidents or physical abuse/neglect. Most of these studies also based their measurement of socioeconomic status on parental education or occupation, thus not determining the net effect of income on children’s risks (49).

Cognitive Development

In addition to its indirect effect on child development through child morbidity, poverty has indirect effects on child development through causal mechanisms such as stress, parenting behavior, and family processes such as divorce/separation. Duncan et al (28) found that “among SES measures available in [their] data, family income is a far more powerful correlate of age-five IQ than more conventional SES measures such as maternal education, ethnicity, and female headship” (pp. 311–312). They also found that family income is the best predictor of two behavioral problems indices. This is a striking finding since much of the socialization literature suggests that maternal education is the strongest predictor. Therefore, we must ask why income is so predictive of children’s mental health and cognitive development.

While income directly influences the availability of food, health care, and housing, financial strain also hinders child development through distinct mechanisms. Because of economic limitations, poor parents have more difficulty providing intellectually stimulating facilities such as toys, books, adequate day-care, or preschool education that are essential for children’s development (93, 94). In this vein, researchers have found that the home environment and parent-child interaction, as measured by the HOME Scale (8), explain some of the differences between poor and non-poor children’s cognitive outcomes (28).

Additionally, family poverty may be disadvantageous to children's development via poor parenting behavior; this relationship is captured to some extent in the HOME Scale. Research results suggest that owing to the chronic stress of poverty, parents are more likely to display punitive behaviors such as shouting, yelling, and slapping, and less likely to display love and warmth through cuddling and hugging (18, 19, 32, 45, 51, 56). This is especially true when poor parents themselves feel they receive little social support (40).

Since a supportive and stable home environment is important for children's mental health and development (8), receipt of long-term harsh treatment results in an insecure emotional attachment of children to their parents and subsequent behavioral problems (19, 52, 57, 69), poor goal orientation, low levels of self-confidence and social competence, and a greater tendency towards inconsistent conduct and behavior (32). Homeless poor children experience such behavior problems at an even greater rate than housed poor children. One study found that 30 percent of homeless children in Los Angeles exhibited behavior problems and/or school failure compared with 18 percent of housed poor children (91).

Many explanations are given for why parents experiencing economic difficulties tend to have difficult relationships with their children. The most notable factors related to parenting behavior are depression, stress, and marital/relationship satisfaction. People living in poverty are more likely to endure stress due to financial insecurity, or interruption of employment (57), or a perceived or actual lack of social support, either financially or emotionally. In addition, economic pressure may increase marital conflict, as well as conflict between parents and children over money (19). High levels of family conflict, anxiety, and concerns over the family financial situation decrease marital satisfaction and general life happiness. This negatively influences quality of parenting behavior; therefore, an indirect negative impact is exerted on child development. For example, McLeod & Shanahan (56) found that: "The direct effects of current poverty on internalizing symptoms or externalizing symptoms are not significant, while the indirect effects [through harsh and unresponsive parenting behaviors] are significant and positive" (p. 359).

These cumulative interactions may help account for why researchers have found that the duration of children's poverty experience has a significant, deleterious influence on their development over and above current poverty. McLeod & Shanahan (56) summarize: "As the length of time spent in poverty increases, so too do children's feelings of unhappiness, anxiety, and dependence" (p. 360). These findings highlight the need to consider the temporal, cumulative, and interactional aspects of poverty with respect to other ecological subsystems (11). Beyond persistence of poverty, researchers should also consider more closely income changes among consistently poor families. We have already seen that poor families often experience radical fluctuations in their

standard of living due to variable employment or living arrangements (29). It is important for researchers to separate out the effects of economic deprivation per se from the role of a fluctuating economic climate in creating a stressful household environment. That is, the anormative atmosphere caused by a rising and falling standard of living may be particularly disadvantageous to children's cognitive development via instability in the developmental subsystems that surround the child (11). A continually changing mismatch between resource expectations and resource availability may have a detrimental effect over and above the effect of deprivation itself. This effect may be anticipated under the operant conditioning model, which suggests that intermittent reinforcement leads to learned helplessness and is therefore not conducive to positive developmental outcomes (65). A similar depressive effect of variable resource levels is suggested by the findings of Andrews & Rosenblum (3) who found insecure attachment in variable-demand environments. Sociological models of stress would suggest the same deleterious effect of economic instability (87). For example, at the community-level Catalano & Serxner (13) found that unexpected threats to employment result in higher incidences of LBW among the population. There should be reason to anticipate similar effects on the level of the household with respect to cognitive and mental health outcomes.

Despite the importance of household climate and parenting behavior on children's cognitive development, few comprehensive studies have examined the relationship between poverty and parenting styles. Rather, most research in this vein has focused on racial/ethnic differences. For instance, blacks have been found to be less supportive in their parenting styles than whites, and Hispanics, less punitive than both blacks and whites (40). Much qualitative research has been conducted documenting differences in parenting styles by ethnic group. For example, white mothers found infant cries more urgent and "sick-sounding" than did black mothers (92). Their responses varied, as well. Whites were less likely to give a pacifier and more likely to pick up and cuddle their infant than either Cuban-American or black mothers (92). Steward & Steward (79) documented differences in teaching-learning interaction between mothers and children by ethnicity. They found that white mothers gave the largest number of instructional loops at the fastest pace to their children while Chinese-American mothers provided the most detailed instructions and the most positive feedback. Chicano mothers did not provide as many feedback loops and exhibited the slowest pacing. The Chicano participants explained that they saw their primary mission as mother, not as educator (which they thought was the job of the schools). Laosa (50) found that Chicano mothers praised their children less often and used more nonverbal cues than white mothers.

One limitation of these studies was that they did not control for social class differences. Thus, some of the effects described as ethnic differences

may be related to poverty. Field & Widmayer (35) found that among Latinos, Cuban mothers (the wealthiest Hispanic group) talked the most to their children whereas Puerto Ricans (the poorest) showed more infant-like behavior and played more social games with them. In their study, Field & Widmayer (35) documented different goals for ethnic groups. Cubans, for example, claimed that their primary objective was to educate their children, while blacks did not want to spoil their children with too much attention. Although this research is invaluable in fleshing out cultural differences in parenting styles, the studies have been conducted with small samples in specific localities, without control of social class and social structure, and without eventual outcome variables (15). Thus, there remains the need for future researchers to examine the role of economic deprivation in determining parenting styles and ultimate child outcomes.

Beyond family-level influences such as these parenting style differences, the neighborhood has been shown to exert an important effect on the psychological development of children. Poor children are more likely to be exposed to a variety of environmental hazards within their residential area such as violence, crime, and drug abuse. This exposure exerts a damaging impact on development (1, 2, 38, 62). Duncan et al (28) have shown that the proportion of neighbors with incomes over \$30,000 positively affects the IQ of five year-olds as well as negatively affects the likelihood of dropping out of high school and/or having a premarital birth net of family-level poverty status.

Conclusions

As stated in the introduction, increasing attention has been paid to issues of socioeconomic inequality early in the life-course. Poverty occurring early in childhood (or prenatally) may cause developmental damage that affects its victims for years to come. Despite the recognition of this problem, the ever-increasing base of literature on the subject suffers from some general methodological limitations. Although most scholars believe that there is a negative influence of poverty on children's health status and cognitive development, there is no clear consensus on how poverty should be operationalized. Researchers are beginning to recognize that poverty is not a single variable, but rather, can (and should) be represented in a variety of ways with respect to the resources it takes into consideration (e.g. considering wealth as well as income) and the period over which it is measured (e.g. multiple year averages).

Beyond measuring poverty in a more comprehensive way, there remain other thorny methodological issues in the child health and development literature. First and foremost is the lack of a standard set of control variables. Some researchers control for occupation, education level, and family structure, whereas others do not; until a common set of controls is used in the vast majority of

BASIC MODEL

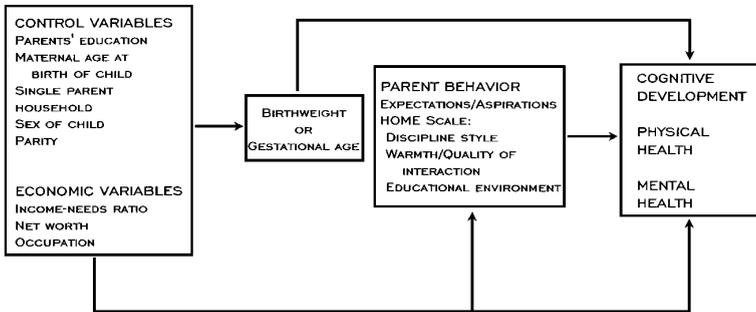


Figure 1 Basic model for investigating the effects of poverty on child outcomes.

studies, study comparison and meta-analyses will be futile. In order to take the next step—decomposing the causal pathways by which poverty affects child outcomes—the literature must first converge on a standard for statistical controls to determine the “true” effect of poverty. While some research that uses sibling comparisons or other fixed effects models automatically controls for poverty correlates (even generally unobserved ones), most child health studies lack even a complete set of control variables—let alone a way to factor out unobserved correlates of poverty.

Figure 1 presents a suggested model for investigating the effects of poverty on child outcomes. As may be evident, there is room for a great degree of variation in mechanisms analyzed while maintaining a core set of controls. For example, occupation may include prestige scores and current work status (for one or more parents). Single parenthood, for instance, can be conceived as a measure at a single point in time or using a richer, time-varying formulation that takes into account the dynamic nature of contemporary family life. Convergence on the usage of a standard set of control variables may not be easy to achieve in the near future given the interdisciplinary nature of child health and development research. However, the need for adequate controls (even if there is some variance on how they are operationalized) is something that each researcher designing his/her study should keep in mind from the survey and sampling stage to the final analysis and presentation of results. This is not to suggest that in the meantime research should not be conducted unless it corresponds to the model presented here (or one like it), but merely that researchers should be cautious in assigning explanatory value in child outcome

measures to “poverty” rather than, for example, low educational levels of parents.

Once a convergence is reached on the net and correlation effects of poverty on a variety of indicators, the task ahead is to decompose this effect further and to explore the interaction of poverty with other disadvantageous conditions and behavioral variables (again see Figure 1). This may lead to studies ranging from participant observation in poor communities to continued survey and epidemiological research to laboratory experiments attempting to uncover the effects of social inequality on biochemistry and immune response.

ACKNOWLEDGMENTS

The authors thank the Smith Richardson Foundation for its generous funding of this research. Lisa Melilli and Valli Rajah provided excellent research assistance. All authors contributed equally in the preparation of this article.

Visit the *Annual Reviews* home page at
<http://www.annurev.org>.

Literature Cited

1. Aber JL. 1994. Poverty, violence, and child development: untangling family and community level effects. In *Threats to Optimal Development: Integrating Biological, Psychological, and Social Risk Factors*, ed. CA Nelson, 27:229–72. Minn. Symp. Child Psychol. Hillsdale, NJ: Erlbaum
2. Aber JL, Brooks-Gunn J, Gephart M. 1997. The effects of neighborhoods on children, youth and families: a developmental contextual framework. See Ref. 27. In press
3. Andrews MW, Rosenblum LA. 1991. Attachment in monkey infants raised in variable- and low-demand environments. *Child Dev.* 62:686–93
4. Anonymous. 1994. Active and passive tobacco exposure: a serious pediatric health problem. A statement from the Committee on Atherosclerosis and Hypertension in Children, Council on Cardiovascular Disease in the Young, American Heart Association. *Circulation* 90:2581–90
5. Bakketeig LS, Jacobsen G, Hoffman HJ, Lindmark G, Bergsjø P, et al. 1993. Pregnancy risk factors of small-for-gestational age births among parous women in Scandinavia. *Acta Obstet. Gynecol. Scand.* 72:273–79
6. Bane MJ, Ellwood DT. 1989. One fifth of the nation's children: Why are they poor? *Science* 245:1047–53
7. Barker DJ. 1994. Outcome of low birthweight. *Horm. Res.* 42:223–30
8. Bradley RH, Whiteside L, Mundfrom DJ, Casey PH, Kehheher KJ, Pope SK. 1994. Early indications of resilience and their relation to experiences in the home environments of low birthweight, premature children living in poverty. *Child Dev.* 65:346–66
9. Breslau N, DelDotto JE, Brown GG, Kumar S, Ezhuthachan S, et al. 1994. A gradient relationship between low birth weight and IQ at age 6 years. *Arch. Pediatr. Adolesc. Med.* 148:377–83
10. Brody DJ, Pirkle JL, Kramer RA, Flegal KM, Matte TD, et al. 1994. Blood lead levels in the U.S. population. *JAMA* 272:277–83
11. Bronfenbrenner U. 1979. *The Ecology of Human Development*. Cambridge, MA: Harvard Univ. Press
12. Brooks-Gunn J, Klebanov P, Duncan GJ. 1996. Ethnic differences in children's intelligence test scores: role of economic deprivation, home environment, and maternal characteristics. *Child Dev.* 67:396–408
13. Catalano R, Serxner S. 1992. The effect of ambient threats to employment on low birthweight. *J. Health Soc. Behav.* 33:363–77
14. Center for Health Economics Research.

1993. *Access to Health Care: Key Indicators for Policy*. Waltham, MA: Cent. Health Econ. Res.
15. Coll CTG. 1990. Developmental outcome of minority infants: a process-oriented look into our beginnings. *Child Dev.* 61:270-89
 16. Collins JW Jr, Shay DK. 1994. Prevalence of low birthweight among Hispanic infants with United States-born and foreign-born mothers: the effect of urban poverty. *Am. J. Epidemiol.* 139:184-92
 17. Committee on National Statistics. 1995. *Measuring poverty: a new approach. A report from the NAS panel on poverty and family assistance: concepts, information needs, and measurement methods*. Rep. Comm. Natl. Stat., Panel Poverty Fam. Assist. Washington, DC: Natl. Assoc. Stat.
 18. Conger RD, Conger KJ, Elder GH, Lorenz FO, Simons RL, Whitbeck LB. 1992. A family process model of economic hardship and adjustment of early adolescent boys. *Child Dev.* 63:526-41
 19. Conger RD, Ge X, Elder GH, Lorenz FO, Simons RL. 1994. Economic stress, coercive family process, and developmental problems of adolescents. *Child Dev.* 65:541-61
 20. Conley D. 1996. *Being black, living in the red: wealth and the cycle of racial inequality*. PhD thesis, Columbia Univ., New York
 21. Corcoran M, Duncan GJ, Gurin G, Gurin P. 1985. Myth and reality: the causes and persistence of poverty. *J Policy Anal. Manage.* 4:516-36
 22. Cornelius MD, Taylor PM, Geva D, Day NL. 1995. Prenatal tobacco and marijuana use among adolescents: effects on offspring gestational age, growth, and morphology. *Pediatrics* 95:738-43
 23. Coultas DB, Gong H, Grad R, Handler A, McCurdy SA, et al. 1994. Respiratory diseases in minorities of the United States. *Am. J. Respir. Crit. Care Med.* 150:290
 24. Davis RA. 1988. Adolescent pregnancy and infant mortality: isolating the effects of race. *Adolescence* 23:899-907
 25. Dobson B. 1994. A WIC primer. *J Hum. Lactation* 10:199-202
 26. Dombrowski MP, Wolfe HM, Brans YW, Saleh AA, Sokol RJ. 1992. Neonatal morphometry. Relation to obstetric, pediatric, and menstrual estimates of gestational age. *Am. J. Dis. Child.* 146:852-56
 27. Duncan GJ, Aber JL. 1996. Neighborhood conditions and structure. In *Neighborhood Poverty: Context and Consequences for Child and Adolescent Development*, ed. GJ Duncan, J Brooks-Gunn, JL Aber. New York: Russell Sage. In press
 28. Duncan GJ, Brooks-Gunn J, Klebanov PK. 1994. Economic deprivation and early childhood development. *Child Dev.* 65:296-318
 29. Duncan GJ, Hill MS, Hoffman SD. 1988. Welfare dependence within and across generations. *Science* 239:467-71
 30. Duncan GJ, Rodgers W. 1988. Has children's poverty become more persistent? *Am. Soc. Rev.* 56:538-50
 31. Duncan GJ, Yeung W-J, Brooks-Gunn J, Smith J. 1996. *Does childhood poverty affect the life chances of children?* Presented at Annu. Meet. Popul. Assoc. Am., May 9
 32. Elder GH, Van Nguyen T, Caspi A. 1995. Linking family hardship to children's lives. *Child Dev.* 56:361-75
 33. Ernst P, Demissie K, Joseph L, Locher U, Becklake MR. 1995. Socioeconomic status and indicators of asthma in children. *Am. J. Respir. Crit. Care Med.* 152:570-75
 34. Escobar GJ, Littenberg B, Pettitt DB. 1991. Outcome among surviving very low birthweight infants: a meta-analysis. *Arch. Dis. Child.* 66:204-11
 35. Field TM, Widmayer SM. 1981. Mother-infant interactions among lower SES black, Cuban, Puerto Rican, and South American immigrants. In *Culture and Early Interactions*, ed. TM Field, AM Stostck, P Vietze, PH Leiderman. Hillsdale, NJ: Erlbaum
 36. Gennaro S. 1996. Family response to the low birthweight infant. *Nurs. Clin. North Am.* 31:341-50
 37. Gortmaker SL. 1979. Poverty and infant mortality in the United States. *Am. Soc. Rev.* 44:280-97
 38. Hampton RL, Newberger EH. 1985. Child abuse incidence and reporting by hospitals: significance of severity, class and race. *Am. J. Public Health* 75:56-60
 39. Hanson TL, McLanahan A, Thomson E. 1995. *Economic resources, parental practices, and child well-being*. Presented at Conf. Consequences Grow. Up Poor. Sponsored by Natl. Acad. Sci., Washington, DC, Feb.
 40. Hashima PY, Amato PR. 1994. Poverty, social support and parental behavior. *Child Dev.* 65:394-403
 41. Haveman R. 1992. Changing the poverty measure: pitfalls and potential gains. *FOCUS* 13:24-29
 42. Haveman R. 1993. Changing the poverty measure: pitfalls and potential gains. *Brookings Rev.* 11:24-27
 43. Homer CJ, Berresford SA, James SA, Siegel E. 1990. Work-related physical exertion and risk of preterm, low birthweight delivery. *Paediatr. Perinat. Epidemiol.* 4:161-74

44. Homer CJ, James SA, Siegel E. 1990. Work-related psychosocial stress and risk of preterm low birthweight delivery. *Am. J. Public Health* 80:173-77
45. Horowitz B, Wolock I. 1981. Material deprivation, child maltreatment, and agency interventions among poor families. In *The Social Context of Child Abuse and Neglect*, ed. L Pelton, pp. 137-84. New York: Hum. Sci. Press
46. Joint Economic Committee. 1989. Washington DC: US GPO
47. Klebanov PK, Brooks-Gunn J, McCormick MC. 1994. Classroom behavior of very low birth weight elementary school children. *Pediatrics* 94:700-8
48. Korenman S, Miller JE, Sjaastad JE. 1995. Long-term poverty and child development in the United States: results from the NLSY. *Child. Youth Serv. Rev.* 17:127-55
49. Kotch JB, Browne DC, Ringwalt CL, Stewart PW, Ruina E, et al. 1995. Risk of child abuse or neglect in a cohort of low-income children. *Child Abuse Neglect* 19:1115-30
50. Laosa LM. 1980. Maternal teaching strategies in Chicano and Anglo-American families: the influence of culture and education on maternal behavior. *Child Dev.* 49:1129-35
51. Lempers JD, Clark-Lempers D, Simons RL. 1989. Economic hardship, parenting, and distress in adolescence. *Child Dev.* 60:25-39
52. Loeber R, Stouthamer-Loeber M. 1986. Family factors as correlates and predictors of juvenile conduct problems and delinquency. In *Crime and Justice*, ed. M Tonry, N Morris, 7:29-149. Chicago, IL: Univ. Chicago Press
53. Luke B, Williams C, Minogue J, Keith L. 1993. The changing pattern of infant mortality in the U.S.: the role of prenatal factors and their obstetrical implications. *Int. J. Gynaecol. Obstet.* 40:199-212
54. Mare RD. 1982. Socio-economic status and child mortality. *Am. J. Public Health* 72:539-47
55. McGaughey PJ, Starfield B, Alexander C, Ensminger ME. 1991. Social environment and vulnerability of low birth weight children: a social-epidemiological perspective. *Pediatrics* 88:943-53
56. McLeod JD, Shanahan MJ. 1993. Poverty, parenting and children's mental health. *Am. Soc. Rev.* 58:351-66
57. McLoyd VC, Jayaratne TE, Ceballo R, Borquez J. 1994. Unemployment and work interruption among African American single mothers: effects on parenting and adolescent socioemotional functioning. *Child Dev.* 65:562-89
58. Michaelis R, Asenbauer C, Buchwald-Senal M, Haas G, Krageboh-Mann I. 1993. Transitory neurological findings in a population of at risk infants. *Early Hum. Dev.* 34:143-53
59. National Center for Children in Poverty. 1996. *One in Four: America's Youngest Poor*. New York: Columbia Sch. Public Health, Natl. Cent. Child. Poverty
60. Newacheck PW, Halfon N. 1986. Access to ambulatory care services for economically disadvantaged children. *Pediatrics* 78:813-19
61. Orshansky M. 1993. Measuring poverty. *J. Am. Public Welfare Assoc.* 51:27-28
62. Overspeck MD, Moss AJ. 1991. Children's exposure to environmental cigarette smoke before and after birth. *Advanced Data No. 202*. Vital Health Stat. Natl. Cent. Health Stat., US DHHS
63. Partin M, Palloni A. 1995. Accounting for the recent increases in low birth weight among African Americans. *FOCUS* 16:33-37
64. Perrin JM, Homer CJ, Berwick DM, et al. 1989. Variations in rates of hospitalization of children in three urban communities. *N. Engl. J. Med.* 320:1183-87
65. Peterson C, Maier SF, Seligman MEP. 1993. *Learned Helplessness: A Theory for the Age of Personal Control*. New York: Oxford Univ. Press
66. Quah R, Stark A, Meigs JW. 1982. Children blood levels in New Haven: a population-based information demographic profile. *Environ. Health Perspect.* 5:128-34
67. Robertson CM, Hrynchyshyn GJ, Etches PC, Pain KS. 1992. Population-based study of the incidence, complexity, and severity of neurologic disability among survivors weighing 500 through 1250 grams at birth: a comparison of two birth cohorts. *Pediatrics* 90:750-55
68. Ruggles P. 1992. Measuring poverty. *FOCUS* 14:1-5
69. Sampson R, Laub JH. 1994. Urban poverty and the family context of delinquency: a new look at structure and process in a classic study. *Child Dev.* 65:523-40
70. Seidman DS, Laor A, Gale R, Stevenson DK, Mashiach S, Danon YL. 1992. Catch-up head growth and motor performance in very-low-birthweight infants. *Obstet. Gynecol.* 79:543-46
71. Simon NP, Brady NR, Stafford RL. 1993. Catch-up head growth and motor performance in very-low-birthweight infants. *Clin. Pediatr.* 32:405-11
72. Singh GK, Kochanek KD, MacDorman MF. 1996. Advance report of final mortal-

- ity statistics, 1994. *Monthly Vital Stat. Rep.* 45(3), suppl. Hyattsville, MD: Natl. Cen. Health Stat.
73. Smith SS, Dixon RG. 1995. Literacy concepts of low- and middle-class four-year-olds entering preschool. *J. Educ. Res.* 88:243-53
 74. Solon G. 1992. Intergenerational income mobility in the United States. *Am. Econ. Rev.* 6:393-408
 75. Spilerman SN, Seymyonov M, Lewin-Epstein N. 1993. Wealth, intergenerational transfers and life chances. In *Social Theory and Social Policy*, ed. A Sorensen, S Spilerman, pp. 165-86. New York: Praeger
 76. St. Peter RF, Newacheck PW, Halfon N. 1992. Access to care for poor children: separate and unequal? *JAMA* 267:2760-64
 77. Starfield B. 1991. Childhood morbidity: comparisons, clusters, and trends. *Pediatrics* 88:519-26
 78. Starfield B, Shapiro S, Weiss J, Liang K-Y, Ra K, et al. 1991. Race, family income, and low birth weight. *Am. J. Epidemiol.* 134:1167-74
 79. Steward MS, Steward DS. 1974. Effect of social distance on teaching strategies of Anglo-American and Mexican-American mothers. *Dev. Psychol.* 10:797-807
 80. Stockwell EG, Goza FW, Roach JL. 1995. The relationship between socioeconomic status and infant mortality in a metropolitan aggregate, 1989-1991. *Sociol. Forum* 10:297-308
 81. Strobino DM, Ensminger ME, Nanda J, Kim YJ. 1992. Young motherhood and infant hospitalization during the first year of life. *J. Adolesc. Health* 13:553-60
 82. Teberg AJ, Pena I, Finello K, Aguilar T, Hodgeman JE. 1991. Prediction of neurodevelopmental outcome in infants with and without bronchopulmonary dysplasia. *Am. J. Med. Sci.* 301:369-74
 83. Tresserras R, Canela J, Alvarez J, Sentis J, Salleras L. 1992. Infant mortality, per capita income, and adult illiteracy: an ecological approach. *Am. J. Public Health* 82:435-38
 84. US Census Bureau. 1984. *Survey of Income and Program Participation*. Washington, DC: US Census Bur.
 85. US Dep. Manage. 1996. Fair Market Rates for the Sectors of Money Assistance Pay Program-Fiscal Year 1996. *Fed. Regist.* 61(35, pt. II):6690-747. Feb. 21
 86. Vagero D, Illsley R. 1995. Explaining health inequalities: beyond Black and Barker. *Eur. Soc. Rev.* 11:219-41
 87. Wheaton B. 1990. Life transitions, role histories and mental health. *Am. Soc. Rev.* 55:209-23
 88. Wise PH, Kotelchuck M, Wilson ML, Mills M. 1985. Racial and socioeconomic disparities in childhood mortality in Boston. *N. Engl. J. Med.* 313:360-66
 89. Wise PH, Meyers A. 1988. Poverty and child health. *Pediatr. Clin. North Am.* 35:1169-86
 90. Wood D, Donald-Sherbourne C, Halfon N, Tucker MB, Ortiz V, et al. 1995. Factors related to immunization status among inner-city Latino and African-American preschoolers. *Pediatrics* 96:295-301
 91. Wood DL, Valdez RB, Hayashi T, Shen A. 1990. Health of homeless children and housed, poor children. *Pediatrics* 86:858-66
 92. Zeskind PS. 1983. Cross-cultural differences in maternal perceptions of cries of low- and high-risk infants. *Child Dev.* 54:1119-28
 93. Zill N. 1988. Behavior, achievement, and health problems among children in step-families: findings from a national survey of child health. In *Impact of Divorce, Single Parenting, and Step Parenting on Children*, ed. EM Hetherington, JD Arasteh. Hillsdale, NJ: Erlbaum
 94. Zill N, Moore K, Smith E, Stief T, Coiro MJ. 1991. *The Life Circumstances and Development of Children in Welfare Families: A Profile Based on National Survey Data*. Washington, DC: Child Trends