

Boosting Family Income to Promote Child Development

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Summary

Poor children tend to be less healthy, achieve less, and exhibit more problem behaviors than children reared in more affluent families. As they grow up, moreover, poor children earn less, suffer worse health, and are more likely to commit crimes and have non-marital births than their more fortunate peers. Would boosting the incomes of poor families promote the healthy development of poor children? If so, income support policies might constitute worthy two-generation programs.

We review theories and evidence to assess the possible benefits of supplementing the family incomes of poor children. Where possible, we look beyond correlational studies to determine the causal impact of childhood poverty on child and adolescent well-being. We pay particular attention to how poverty's harmful effects may differ as children age, since cognitive and socioemotional development may be most sensitive to conditions very early in life. At the other end of childhood, outcomes such as college attendance and graduation may depend most on economic conditions in adolescence.

A considerable body of rigorous, mostly experimental, evidence has linked income increases to more school learning in middle childhood and years of completed schooling in late adolescence; similarly strong evidence on the consequences of economic deprivation in the first several years of life is virtually nonexistent. However, nonexperimental evidence suggests that poverty early in childhood may reduce adult earnings and work hours. When it comes to adult problem behaviors there is little evidence pointing to lasting impacts of early poverty.

Existing evidence suggests that the amount of income transferred by policies such as the Earned Income Tax Credit and Child Tax Credit matters for the development of children in low-income families. Expansions of these benefits appear to have boosted school success. An untested implication is that cutting these programs would have the opposite effect. Moreover, the likely impact of income changes on children from low-income families seems to vary depending on the age of the child – income in the early school years matters more for school achievement, while income in adolescence makes more of a difference for overall educational attainment, including high school completion and enrollment in college. Correlational evidence links income during pregnancy and infancy to lower lifetime earnings – a striking result in need of further research.

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Introduction

Using a poverty line of about \$23,000 for a family of four, the U.S. Census Bureau counted more than 16 million U.S. children – more than one in five – living in poor families in 2011.¹ Poor children begin school well behind their more affluent peers and may even lose ground during the school years. On average, poor U.S. children have lower levels of kindergarten reading and math skills than their more fortunate peers (Figure 1). Moreover, when compared with individuals whose families had incomes of at least twice the poverty line during their early childhood, adults who were poor as children completed two fewer years of schooling, earned less than half as much, worked far fewer hours per year, received more in food stamps, and were nearly three times as likely to report poor overall health (Table 1).² Poor boys were more than twice as likely to be arrested later in life and poor girls were five times as likely to bear a child out of wedlock before age 21.

[Insert Figure 1 and Table 1 about here]

Poverty is associated with a cluster of disadvantages that may be harmful to children, including low levels of parental education and living with a single parent. To determine whether children would be helped by a policy that increased family incomes but did nothing else, we focus on distinguishing the effects of family income from those of other sources of disadvantage. In policy terms, this approach enables us to answer the following question: To what extent would child and adult development be affected by policies that provide low-income parents with more income, but do not directly target other characteristics of parents or family environments? In other words, would increasing family income through policies such as the Earned Income Tax

Credit, Food Stamps, or the Child Tax Credit lead to better child outcomes? Depending on the magnitude of the benefits relative to the costs, income support programs for parents might constitute a wise two-generation investment.

Few studies of the effects of poverty have been able to focus on the *timing* of economic hardship across childhood and adolescence, in part because studies rarely include children across a variety of childhood stages. Emerging research in neuroscience and developmental psychology suggests that poverty early in a child's life may be particularly harmful. Not only does the astonishingly rapid development of young brains leave children sensitive and vulnerable to environmental conditions, but the family context (as opposed to schools or peers) dominates their everyday lives. To the extent possible, our summary of the evidence on income effects pays attention to the timing of economic deprivation.

After a review of possible mechanisms and both experimental and nonexperimental evidence linking poverty with childhood outcomes, we highlight emerging research based on newly available data that include both poverty measures as early as the prenatal year and adult outcomes measured in the fourth decade of life. The strongest evidence, drawn from social experiments, has linked family income increases to higher school achievement in middle childhood and greater school attainment (e.g., high school completion) in adolescence and early adulthood. Although experimental evidence on the consequences of economic deprivation in the first several years of life is virtually nonexistent, nonexperimental evidence suggests that poverty early in childhood may reduce adult earnings and work hours.

We conclude with thoughts about how social policy attention might focus on poverty occurring across childhood. The weight of the evidence indicates that income does indeed matter for children's successful development, although the likely impact of changes to the family

incomes of low-income children appears to vary depending on the age of the child and the form (cash vs. in-kind) of the income change. Emerging discoveries in neuroscience suggest that the development of very young children is most sensitive to economic deprivation, and evidence from studies that follow children from birth into adulthood supports this conclusion. It has not yet been tested in experimental studies.

Although discussions of the policy implications of income support policies often emphasize the potential benefits of increasing the incomes of low-income families, and studies of policy changes typically focus on expansions of income support, some of the evidence we review has focused on the possible consequences for children and youth of income *changes*, both positive and negative. The effects might be expected to cut both ways, with reductions in the generosity of programs such as the Earned Income Tax Credit and food stamps likely to result in declines in children's achievement and attainment.

Why Poverty May Hinder Healthy Development

We use the terms “poverty” and “low income” synonymously in this chapter. The official U.S. poverty thresholds designate a set of income levels below which families are considered “poor” and above which they are not considered poor. These thresholds are important for consistently tracking how poverty rates change over time and as a basis for determining program eligibility, but there is no evidence that these dollar thresholds meaningfully differentiate families' economic needs. Indeed, evidence indicates that improving the incomes of families both just below and just above the poverty line will have similarly positive effects. But it is also clear from studies considering links between income and children's development across a larger spectrum of the income distribution that income changes matter more for low- than higher-

income children.³ Accordingly, our review focuses on evidence on the effects of low family incomes on children, rather than on how differences in income affect middle class or wealthy families.

What are the consequences of growing up in a poor household? Economists, sociologists, developmental psychologists, and neuroscientists emphasize different pathways by which poverty may influence children's development. The three main theoretical frameworks describing these processes are: family and environmental stress, resources and investment, and cultural. Each framework is grounded in a different disciplinary background and differs in the extent to which it focuses on socioeconomic status (SES) in general rather than on income, poverty, or any other particular component of SES (e.g. income, parental education, occupational prestige). Nevertheless, these frameworks overlap and are complementary. Although developed primarily in the U.S., each theory has cross-national and cross-cultural applications.

Family and Environmental Stress Perspective. As explained in Shonkoff (this volume), economically disadvantaged families experience higher levels of stress in their everyday environments than more affluent families, and these disparities may affect children's development. The family stress model was first developed by Glen Elder to document the influence of economic loss during the Great Depression.⁴ According to this perspective, poor families face significant economic pressure as they struggle to pay bills and purchase important goods and services, and are forced to cut back on daily expenditures. This economic pressure, coupled with other stressful life events that are more prevalent in the lives of poor families, creates high levels of psychological distress, including depressive and hostile feelings, in poor parents.⁵

This perspective has been broadened by recent behavioral economics work showing that conditions of poverty and scarcity not only create psychological distress, but also deplete important cognitive resources.⁶ Studies, most of which have been conducted in developing countries, find that making economic decisions under conditions of scarcity reduces adults' subsequent behavioral self-control and renders them less able to regulate their own behavior in order to pursue less immediate goals.

Psychological distress spills over into marital and co-parenting relationships. As couples struggle to make ends meet, their interactions tend to become more hostile and conflicted, and this leads them to withdraw from each other.⁷ Parents' psychological distress and conflict, in turn, are linked with parenting practices that are on average more punitive, harsh, inconsistent, and detached, as well as less nurturing, stimulating, and responsive to children's needs. Such lower-quality parenting is likely to elevate children's physiological stress responses, and ultimately harms children's development.⁸

To fully understand environmental stress as a pathway through which poverty may affect individuals, it is important to go beyond the family environment to consider other sources of everyday stress that poor children encounter. Compared with their more affluent peers, poor children are more likely to live in housing that is crowded, noisy, and characterized by structural defects (e.g. leaky roof, rodent infestation, inadequate heating).⁹ Poor families are more likely to reside in neighborhoods characterized by high rates of crime and such other neighborhood risk factors as boarded-up houses, abandoned lots, and inadequate municipal services.¹⁰

The schools that low-income children attend are more likely to be overcrowded and have structural problems (e.g. issues with noise, lighting, and ventilation) compared with the schools attended by more affluent children.¹¹ Economically disadvantaged children also tend to be

exposed to higher levels of air pollution from parental smoking, traffic, and industrial emissions.¹² These environmental conditions create physiological and emotional stress in the lives of low-income children that may impair socio-emotional, physical, cognitive, and academic development. For example, childhood poverty heightens a child's risk for lead poisoning, which has been linked to health, behavior, and neurological problems that may persist into adolescence and beyond.¹³

The field of cognitive neuroscience has produced evidence that the experience of chronic elevated physiological stress may interfere with the development of poor children's stress response system and health, as well as the regions of the brain responsible for self-regulation. Researchers have documented the harmful effects of such stress on animal brain development. Exposure to stress and the elevation of stress hormones, such as cortisol, negatively influence animals' cognitive functioning, leading to impairments in brain structures such as the hippocampus, which is of central importance for memory.¹⁴

What empirical evidence is there to support the Family Stress theory? Non-experimental studies have found that low-income children have significantly higher levels of stress hormones than their more advantaged counterparts and that early childhood poverty is associated with increased allostatic load, a measure of physiological stress.¹⁵ These higher levels of physiological stress have been linked to poorer cognitive as well as immunological functioning, and the latter has long-term implications for a host of inflammatory diseases later in life.¹⁶ For example, recent work has linked the body's stress system to brain regions that support cognitive skills, such as executive functioning and self-regulation. It has also found that heightened salivary cortisol, an indicator of an elevated stress response, partially accounts for the association between poverty, on the one hand, and parenting and children's executive functioning on the

other.¹⁷ Thus, disparities in stress exposure and related stress hormones may explain to some extent why poor children have lower levels of cognitive ability and achievement as well as poorer health later in life.¹⁸

Although the biological links between low income and stress are compelling, no methodologically strong studies have linked poverty and elevated and prolonged stress reactions in children. Some strong studies have examined these connections in mothers. One of these linked expansions of the Earned Income Tax Credit to data from the National Health Examination and Nutrition Survey.¹⁹ Between 1993 and 1996, the generosity of the Earned Income Tax Credit increased sharply, and particularly for mothers with two or more children. If income matters for maternal stress, we should therefore see a bigger improvement for children and mothers in two-child low-income families than in single-child low-income families. And indeed, the study found that when compared with mothers with just one child, low-income mothers with two or more children experienced larger reductions in risky biomarkers and self-reported better mental health. A study of the impacts of increases in the Canadian Child Benefit also found improvements in maternal mental health. Studies of the impacts of other welfare and anti-poverty programs that increased both income and maternal employment did not show similar improvements in mental health.²⁰

Overall, the Family Stress perspective has seen major conceptual and empirical advances in recent years. On the conceptual side, a narrow focus on parental mental health and parenting has been broadened by neurobiological evidence on the importance of maintaining tolerable levels of stress for both parents and children, and by a cognitive psychological perspective on links among stress, information processing, and decision-making. Increasingly sophisticated studies suggest linkages between income support and maternal stress. We expect that this

research will continue to benefit from an explosion in neuroscience-based findings shedding light on connections between poverty, stress, behavior, and development.

Resource and Investment Perspective. Household production theory has played a central role in how economists conceive of family influences on child development. Gary Becker's *A Treatise on the Family* (1991) posits that child development is "produced" from a combination of endowments and parental investments. Endowments include genetic predispositions and the values and preferences that parents instill in their children. Parents' preferences, such as the importance they place on education and their orientation toward the future, combined with their resources, shape parental investments.

Economists argue that time and money are the two basic resources that parents invest in their children. For example, investments in high-quality child care and education, housing in good neighborhoods, and rich learning experiences enhance children's development, as do investments of parents' time. Links among endowments, investments, and development appear to differ by the domain of development under consideration (e.g. achievement, behavior, health). Characteristics of children also affect the level and type of investments that parents make in their offspring.²¹ For example, if a young child is talkative and enthusiastic about learning, parents are more likely to purchase children's books or take the child to the library.²²

Household production theory suggests that children from poor families lag behind their economically advantaged counterparts in part because their parents have fewer resources to invest in them.²³ Compared with more affluent parents, poor parents are less able to purchase inputs for their children, including books and educational materials at home, high-quality child care settings and schools, and safe neighborhoods. Economically disadvantaged parents may also have less time to invest in their children, owing to higher rates of single-parenthood, nonstandard

work hours, and less flexible work schedules.²⁴ This too may have negative consequences for children. Evidence suggests that the amount of cognitive stimulation in the home environment varies with changes in family income.²⁵

Forty years ago, low-income families spent about \$850 (in 2011 dollars) on child enrichment resources such as books, computers, high-quality child care, summer camps, and private school tuition, while higher-income families spent more than \$3,500, already a substantial difference (Figure 2).²⁶ By 2005-2006, low-income families had increased their expenditures to over \$1,300, but high-income families had increased theirs much more, to over \$9,000 per child. The differences in spending between the two groups had almost tripled in the intervening years. The largest spending differences were for activities such as music lessons, travel, and summer camps.²⁷

[Insert Figure 2 here]

Non-experimental studies suggest that differences in the quality of the home environments of poor and more advantaged children account for a substantial portion of the association between poverty and children's educational achievement.²⁸ This is unsurprising, given the known influence of environmental enrichment on the structure and functioning of a wide range of brain areas in animals.²⁹ Disparities in the cognitive development of low- and middle-SES children are most pronounced in brain regions that are important for language, memory, and cognitive control.³⁰ These differences may, in part, stem from differences in exposure to enriching environments and corresponding effects on brain development.³¹

All in all, the resource and investment perspective provides conceptual linkages among family income, what parents spend to enrich their children's home learning environments, and the development of brain structures associated with learning as well as behavior-based measures

of brain functioning. In light of sharp increases in both income inequality and the gap between poor and higher-income parents in spending on child enrichment, these findings suggest that there is ample reason to expect a further increase in the gap in school readiness between poor and higher-income children.

Cultural Perspectives. Sociological theories about how the norms and behavior of poor families and communities affect children were described by Oscar Lewis's "culture of poverty" model.³² Drawing from field work with poor families in Latin America, he argued that the poor were economically marginalized and had no opportunity for upward mobility. Individuals responded to their marginalized position with maladaptive behavior and values. The resulting culture of poverty was characterized by weak impulse control and an inability to delay gratification, as well as feelings of helplessness and inferiority. These adaptations manifested in high levels of female-headed households, sexual promiscuity, crime, and gangs. Although it was acknowledged that these behaviors emerged in response to structural factors, such values and behaviors were thought to be transmitted to future generations, and therefore became a cause of poverty:

"By the time slum children are age six or seven they have usually absorbed the basic values and attitudes of their subculture and are not psychologically geared to take full advantage of changing conditions or increased opportunities."³³

Cultural explanations for the effects of poverty on children suggested that high levels of nonmarital childbearing, joblessness, female-headed households, criminal activity, and welfare dependency among the poor were likely to be transmitted from parents to children. In the mid-1980s and 1990s, scholars expanded the scope of this

argument by paying closer attention to the origins of cultural and behavioral differences. For example, some emphasized the role of individual choice in the face of the liberal welfare state's perverse incentives that reward single-mother households and joblessness among men.³⁴ Others have stressed the importance of structural and economic factors: the concentration of neighborhood poverty, the social isolation of poor inner-city neighborhoods, and the deindustrialization of urban economies.³⁵ They contend that these structural factors negatively affect community norms and influence the behavior of inner-city adults and their children.

A common criticism of culture of poverty explanations is that they fail to differentiate the behavior of individuals from their values and beliefs.³⁶ Evidence suggests that disadvantaged individuals hold many middle-class values and beliefs, but circumstances make it difficult for them to behave accordingly. For example, one study showed that poor women value marriage and recognize the benefits of raising children in a two-parent household.³⁷ However, their low wages as well as black men's high rates of unemployment and incarceration lead poor women to conclude that marriage is out of their reach. Traditional notions of a culture of poverty do not account for this sort of disconnect between values and behaviors.

Annette Lareau's qualitative study of family management strategies identifies other differences in the cultural childrearing repertoires of high- and low-income families, including the degree to which middle-class parents "manage" their children's lives, while working class and poor parents leave children alone to play and otherwise organize their activities on their own:³⁸

In the middle class, life was hectic. Parents were racing around from one activity to another...Because there were so many activities, and because they were accorded such

importance, child's activities determined the schedule for the entire family... [In contrast, in working class and poor families,] parents tend to direct their efforts toward keeping children safe, enforcing discipline, and, when they deem it necessary, regulating their behavior in certain areas. ... Thus, whereas middle-class children are often treated as a project to be developed, working class and poor children are given boundaries for their behavior and then allowed to grow. (pp. 35, 66-7)

The middle-class patterns are called “concerted cultivation,” and involve providing stimulating learning activities and social interactions that parents believe will promote their children’s social and cognitive development. In contrast, the “natural growth” perspective of working-class and poor parents often stops at providing basic supports (e.g., food, shelter, comfort). Such differences in cultural repertoires provide a distinct advantage to middle-class children and contribute to the intergenerational transmission of social class.

These cultural theories extend the resource and investment perspective discussed above. Class-related differences in the parenting practices of Lareau’s families arise, in part, from income differences that enable some to support a much broader repertoire of activities for their children. But some of the differences arise from fundamentally divergent beliefs about how children succeed and the best kinds of parenting practices for children. Once these beliefs are adopted they are unlikely to change in response to policy-relevant changes in family income.

Why Early Poverty May Matter the Most

The timing of economic disadvantage during childhood and adolescence may matter. Emerging evidence from human and animal studies highlights the critical importance of early childhood for brain development and for establishing the neural functions and structures that will

shape future cognitive, social, emotional, and health outcomes.³⁹ Two recent neuroscience studies show strong correlations between socioeconomic status and important aspects of brain function in young children.⁴⁰

Cunha and Heckman posit a cumulative model of the production of human capital that allows for the possibility of differing childhood investment stages as well as roles for the past effects and future development of both cognitive and socio-emotional skills.⁴¹ In this model, children have endowments at birth of cognitive potential and temperament that reflect a combination of genetic and prenatal environmental influences. The Cunha and Heckman model highlights the interactive nature of skill building and investments from families, preschools and schools, and other agents. It suggests that human capital accumulation results from “self-productivity” – skills developed in earlier stages bolster the development of skills in later stages – as well as the dynamic complementary process that results when skills acquired prior to a given investment increase the productivity of that investment. These two principles are combined in the hypothesis that “skill begets skill.” This model predicts that economic deprivation in early childhood creates disparities in school readiness and early academic success that widen over the course of childhood.

The idea that children’s early years are a fruitful time for intervention to improve educational and achievement outcomes for low-income and disadvantaged children is supported by evidence from intensive programs aimed at providing early care and educational experiences for high-risk infants and toddlers. The best known are the Abecedarian program, a full-day, center-based, educational program for children who were at high risk for school failure, starting in early infancy and continuing until school entry, and the Perry Preschool program, which provided one or two years of intensive center-based education for preschoolers.⁴² Both of these

programs generated long-term improvements in subsequent education, criminal behavior, and employment that are strongly associated with poverty, although the general pattern of effects from other early childhood education programs is more modest.

Although early income may matter the most for early brain development, income increases may also be beneficial for low-income adolescents, particularly when used to help pay for post-secondary schooling. The sticker price of college has more than doubled in the last twenty years.⁴³ Although Pell Grants and other sources of financial aid drive down the net costs of college for low-income students, costs of enrollment in public four-year colleges have increased faster than grants have. In contrast, the cost of attendance at a public community college has not increased over the last two decades for students from very low-income families because the amount of aid has expanded to cover the higher price. Of course, many low-income students and their parents either lack awareness of the extent to which aid is available or are discouraged by the extremely complex federal financial aid application form.⁴⁴

Assessing Causal Impacts of Poverty: Methods and Results

Studies aimed at estimating the influence of income on child development differ in their methodological rigor. At one end are correlational studies that analyze associations between family income and child outcomes, with few adjustments for confounding factors. These studies are common, particularly in neuroscience, but likely to be plagued by biases that lead to overestimates of the causal impacts of income. On the other end are experiments, in which families are randomly assigned to receive additional income. If implemented correctly, experiments provide unbiased estimates of income effects. But experimental studies are exceedingly rare and sometimes condition income support on behavior such as full-time work,

which may exert its own influence on child development. Almost as trustworthy as experiments are “quasi-experiments” in which income changes are beyond the control of the families involved. Examples are policy changes that increase the generosity of programs like the Earned Income Tax Credit.

Our review of the literature on the impacts of increases in family income on children and youth distinguishes among achievement-related, behavioral, and health outcomes. Readers should bear in mind that the policy implications of income support programs rest on collective impacts across all of these domains. Small impacts in several different domains of child functioning could add up to a total benefit that exceeds costs, even if no single component of child outcomes shows such a level of benefit.

School achievement, attainment, and behavior. The strongest evidence in the literature relates income increases to children’s school achievement and attainment. The only large-scale randomized interventions to alter family income directly were the U.S. Negative Income Tax Experiments, which were conducted between 1968 and 1982 with the primary goal of identifying the influence of guaranteed income on parents’ labor force participation. Three of the sites (Gary, Indiana, and rural areas in North Carolina and Iowa) measured impacts on achievement gains for children in elementary school; two of the three found significant impacts.⁴⁵ In contrast, no achievement differences were found for adolescents. Impacts on school enrollment and attainment for youth were more uniformly positive, with both the Gary and the New Jersey sites reporting increases in school enrollment, high school graduation rates, or years of completed schooling. Second- through eighth-grade teachers rated student “comportment” in the two rural sites; results showed income-induced improvements in one of the sites but not the other.

Taken together, these studies appear to suggest that income is more important for the school achievement of pre-adolescents and for the school attainment of adolescents. None of the results from the Negative Income Tax experiments bear on the “early is better” hypothesis, because none tracked the possible achievement impacts for children who had not yet entered school when the income “treatment” was being administered.

Experimental welfare reform evaluation studies undertaken during the 1990s incentivized parental employment by providing income supports to working-poor parents through wage supplements. Moreover, some measured the test scores of at least some children who had not yet entered school when the programs began. One study analyzed data from seven random-assignment welfare and antipoverty policies, all of which increased parental employment, while only some of them increased family income.⁴⁶

The combined impacts of higher income and more maternal work on children’s school achievement varied markedly by the children’s age (Figure 3). Treatment-group children between the ages of four and seven when the programs took effect, many of whom made the transition into elementary school during the programs, scored significantly higher on achievement tests than their control group counterparts. A sophisticated statistical analysis of the data on these younger children suggests that a \$3,000 annual income boost is associated with a gain in achievement scores of about one-fifth of a standard deviation.⁴⁷ In contrast, there were no impacts on either teacher- or parent-reported behavior problems.⁴⁸

[Insert Figure 3 here]

The achievement of children age eight to eleven did not appear to be affected by the programs, and the achievement of children who were 12 and 13 during the programs seemed to be hurt by the programs’ efforts to increase family income and parental employment. Another

study using these same data examined very young children and found positive impacts for some ages but not others.⁴⁹

Along the lines of the maternal stress study discussed above, another recent study took advantage of the increasing generosity of the U.S. EITC between 1993 and 1997 to compare children's test scores before and after it was expanded.⁵⁰ Most of the children in this study were between the ages of 8 and 14 and none was younger than 5. The authors found improvements in low-income children's achievement in middle childhood that coincided with the EITC expansion.

A second study, conducted in Canada, took advantage of variations in the generosity of the National Child Benefit program across Canadian provinces to estimate income impacts on child achievement.⁵¹ Among children age 6 to 10 residing in low-income families, policy-related income increases had a positive and significant association with math scores and a negative link with the likelihood of a child receiving a diagnosis of a learning disability. For 4- to 6-year-olds, the income increases were associated with higher scores on a test of receptive vocabulary for boys, but not for girls. Turning to behavior, higher benefits led to less aggression among 4- to 10-year-olds, but did not appear to affect other behavioral dimensions assessed in the study.

A third quasi-experimental study examined the impact of the opening of a casino by a tribal government in North Carolina, which distributed approximately \$6,000 annually to each adult member of the tribe.⁵² A comparison of Native American youth with non-Native American youth, before and after the casino opened, found that receipt of casino payments for about six years increased the school attendance and high school graduation rates of poor Native American

youth and reduced criminal behavior during their adolescence. Achievement test scores were not available in these data, nor were data available on children under the age of 9.

Several lessons emerge from these experimental and quasi-experiment studies. First, achievement gains are selective and depend at least in part on the children's age when income gains were received. Children making the transition to school and elementary school students generally enjoyed the most consistent achievement increases. For adolescents, the achievement changes were mixed, with various studies finding positive, null, and even negative impacts. Second, in the case of adolescents, income appears to affect educational attainments such as high school graduation and completed years of schooling rather than test scores. Given the high costs of post-secondary education, the effect of family income on completed schooling is not surprising. Third, we know far more about how poverty reduction affects achievement and schooling outcomes than we do about its effects on behavior problems including childbearing and criminal activity.

Virtually none of the experimental literature on income effects has been able to estimate the impacts of changes in family income during the very earliest years of a child's life – the time when children are developing rapidly and may be very sensitive to family and home conditions. Nor have these studies been able to examine the consequences of income changes during childhood for outcomes measured in adulthood. This is particularly unfortunate, since the goals of policies directed at children are often couched in terms of lifetime impacts – a middle-class standard of living or higher labor market earnings.

Two recent nonexperimental studies have linked early childhood income to adult outcomes.⁵³ Both use data from the Panel Study of Income Dynamics (PSID) on children born in the early years of the study, for whom adult outcomes were collected when these children were

in their 30s. The PSID measures income in every year of a child's life from the prenatal period through age 15, making it possible to measure poverty experiences and family income early in life (prenatal through the fifth year of life in one study, prenatal through the first year in the other) as well as later in childhood and in adolescence. The study found that for families with average early childhood incomes below \$25,000, an annual boost to family income during this time (birth to age 5) is associated with increased adult work hours and a rise in earnings, as well as with reductions in receipt of food stamps (but not AFDC/TANF for females). Family income in other childhood stages was never significantly related to the adult earnings and work hours outcomes. For the most part, behavior problems (arrests and incarcerations for males; nonmarital births for females) were not predicted by increments to low family income in any of the three childhood stages.

Health. As detailed by Glied and Oellerich (this volume), growing up in poverty is associated with a variety of worse health outcomes. Currie and Lin (2007) found that only 70% of poor children were reported by their mothers to be in excellent or very good health, compared with 87% of non-poor children. In Western industrialized nations, there is some evidence to suggest that economic disparities in general health ratings tend to increase from early childhood through adolescence.⁵⁴ This may be because income serves as a buffer, preventing early chronic health conditions from resulting in pervasive negative effects.⁵⁵ The finding that the association between income and health becomes stronger as children grow older, however, is not consistently replicated in the literature.⁵⁶

In the U. S., children from poor households also have higher rates of chronic health conditions, such as asthma, diabetes, and hearing, vision, and speech problems. About 32 percent of poor children, compared with 27 percent of non-poor children, report having at least one such

condition. Asthma is the most common chronic problem among poor children, followed by mental health and behavioral issues; in the latter category, attention deficit hyperactivity disorder is the most common diagnosis. Finally, poor children suffer from higher rates of health-related activity limitations and acute illness than their more affluent peers.⁵⁷

Simple associations between childhood poverty and health are also found later in life. By age 50, individuals who have experienced poverty in childhood are 46% more likely to have asthma, 75% more likely to be diagnosed with hypertension, 83% more likely to have been diagnosed with diabetes, 2.25 times as likely to have experienced a stroke or heart attack, and 40% more likely to have been diagnosed with heart disease, as compared with individuals whose incomes are 200% of the poverty line or greater. Economic disadvantage in adolescence has been linked to worse overall health status and higher rates of mortality in adulthood.⁵⁸ Adolescent poverty, measured between age 13 and 16, is associated with heightened risk for several chronic diseases in adulthood.⁵⁹

Some studies have employed stronger statistical methods to reduce possible confounding factors and produce more trustworthy estimates of income's unique associations with child health.⁶⁰ Specifically, two studies uncovered large and significant links between adolescent poverty and a variety of health outcomes in adulthood.⁶¹ However, their comparisons of the health of siblings who experienced different economic conditions produced much smaller associations. The associations between adolescent poverty and adult health status were robust in sibling models, but associations with a variety of diseases in adulthood (e.g. asthma, hypertension, and stroke or heart attack) were not. Again, however, the timing of income in childhood may be important for identifying links between childhood income and health, because income in the earliest year of childhood may be an especially influential factor for health

outcomes. None of the health studies mentioned above draw their income measures from early childhood.

An investigation of the associations between mean family income in early, middle, and later childhood and adult Body Mass Index (BMI) found that prenatal and birth-year income is negatively associated with adult BMI among low-income individuals, whereas family income later in childhood is not.⁶² A companion study also considered whether immune-mediated chronic diseases play a role in associations between poverty very early in life and adult economic outcomes.⁶³ Distinguishing between childhood stages – the prenatal year through age 2, ages 3 to 5, and ages 6 to 15 – and concentrating on families with incomes below \$25,000, it finds significant associations with earnings and work hours between ages 30 and 41 only for income between the prenatal year and age 2 (Figure 4). As for health outcomes, increases in family income measured in the prenatal year and the second year of life are related to reductions in limitations on activities of daily living, hypertension, and arthritis in adulthood. Income increases between ages 3 and 5 and between ages 6 and 15 were not protective for adult health. Moreover, associations between early family income and these three health outcomes partially explained links between early childhood poverty and labor force productivity (i.e. work hours and earnings).

[Insert Figure 4]

Despite recent research on links between income and child and adult health, it is difficult to draw causal conclusions, since far less rigorous study has been devoted to health than to achievement and behavior. Moreover, most studies seeking to link childhood family income with later health have measured income during children's adolescent years. Although a few studies

have suggested important associations between early-life income and later adult health, the pattern of conflicting results across studies produces more questions than answers.

Implications for policy

Several recent experimental, quasi-experimental, and nonexperimental studies suggest that childhood income does indeed matter for at least some key child, adolescent, and adult outcomes. A better understanding of the role of the timing of income in affecting children's development, across a wide range of outcomes, is important because policies that target specific stages of childhood or adolescence will be more efficient than those that do not.

If the evidence ultimately shows that poverty early in childhood matters the most for development during childhood and adolescence, then it may make sense to consider income transfer policies that provide more income to families with young children. In the case of work support programs like the Earned Income Tax Credit, this might mean extending more generous credits (or reallocating existing credits) to families with young children. In the case of refundable child tax credits, this could mean providing larger credits to families with young children.

Another step might be to ensure that sanctions and other regulations embedded within welfare policies do not deny benefits to families with very young children. Not only do young children appear to be most vulnerable to the consequences of poverty, but mothers with very young children are also least able to support themselves through employment in the labor market.

Several European countries gear time-limited benefits to the age of children in their assistance programs. In Germany, a modest parental allowance is available to a mother working fewer than 20 hours per week until her child is 18 months old. France guarantees a modest minimum income to most of its citizens, including families with children of all ages.

Supplementing this basic support is the Allocation de Parent Isolé (API) program for lone parents with children under age three. In effect, the API program acknowledges a special need for income support during this period, especially if a parent wishes to care for very young children and forgo income from employment. The state-funded child care system in France beginning at age three alleviates some of the child care problems associated with a parent's transition into the labor force.

One possible way to deliver additional cash assistance is through payments that depend on the behaviors of parents and children. The Earned Income Tax Credit program is such a program, because it conditions its payments on the employment of parents; unemployed parents do not receive a refundable tax credit. More elaborate examples are conditional cash transfer (CCT) programs, which have been implemented in a number of countries in the developing world.

Mexico pioneered the CCT movement with a program originally called Progresa and now known as Oportunidades. This program provides direct cash payments to parents linked to several positive behaviors, including their children's continued school attendance, attending preventive health care appointments, and adopting specific child nutrition practices.⁶⁴ Although poor households in the program were found to make more use of health and education services, the evidence on improvements in child health and education outcomes is somewhat mixed.⁶⁵ School enrollment improved, but achievement test scores did not. Since this program was introduced in Mexico, CCT programs have been widely adopted in other developing countries, and evaluations of these programs have found that some have improved such health outcomes as stunting and led to better nutrition, while others have not.

Oportunidades inspired New York City's Family Rewards program, which operated in the city's highest-poverty communities. Begun in the fall of 2007, the program tied cash rewards to activities and outcomes related to children's education, families' preventive health care, and parents' employment.⁶⁶ As expected, the program reduced poverty and hardship and increased savings. However, it did not improve school attendance or overall achievement for its elementary and middle school students. Among high school students who had met proficiency standards, the program increased school attendance, course credits, grade advancement, and standardized test results.

Increased income support can also take the form of near-cash benefits such as food stamps or housing vouchers. One novel analysis took advantage of geographic variation in the timing of the roll-out of the Food Stamp program in the 1960s and 1970s to link program benefits around the time of birth to adult outcomes.⁶⁷ It appears that access to food stamps in early childhood leads to a significant reduction in the incidence of "metabolic syndrome" (obesity, high blood pressure, and diabetes) and, for women, an increase in economic self-sufficiency.

Experimental evidence does not suggest positive links between housing vouchers and most child outcomes. In the Moving to Opportunity demonstration, families residing in public housing were randomized to receive either conventional Housing Choice Vouchers, vouchers conditioned on moving to a low-poverty neighborhood, or to a control group. Housing vouchers boosted the incomes of families in the two treatment groups, although in this case the income changes were always accompanied by a residential move. Achievement test scores did not differ across the children in these groups.⁶⁸ Null effects were found even for children whose families started to receive the voucher payments in early childhood. The absence of income effects in

these housing studies is a sobering reminder that the case linking income and child outcomes is not completely settled. Policy must be guided by the available evidence, and analysts may disagree on the conclusions to be drawn from that evidence.

In emphasizing the potential importance of policies to boost income in early childhood, we are not suggesting that focusing on this area is the only policy path worth pursuing. Obviously, investments later in life and those that provide direct services to children and families may also be well advised. Regardless of the timing of the investment, economic logic requires a comparison of the costs and benefits of the various programs that seek to promote the development of disadvantaged children throughout the life course. In this context, expenditures on income-transfer and service-delivery programs should be placed side by side and judged by their benefits and society's willingness to pay for the outcomes they produce, relative to their costs.

We conclude by noting again that the literatures we have been reviewing have focused on the possible consequences for children and youth of income *changes*, and not just income increases. The wider discussion of policy has been cast in the optimistic light of benefits that might result from increasing the incomes of low-income families, particularly families with young children. It is important to remember, however, that reductions in the generosity of programs such as the Earned Income Tax Program can be expected to reduce children's success at school and increase the stress levels and mental health problems of their mothers. With achievement and attainment gaps between low and high income children larger than any time in the last 40 years, we should think twice about policy changes that would further increase these gaps.

Acknowledgment

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Table 1: Adult Outcomes (Age 30-37) by Poverty Status between the Prenatal Year and Age 5

	Income below the official U.S. poverty line	Income between one and two times the poverty line	Income more than twice the poverty line
	<i>Mean or %</i>	<i>Mean or %</i>	<i>Mean or %</i>
Completed schooling	11.8 yrs	12.7 yrs	14.0 yrs
Earnings (\$10,000)	\$17.9	\$26.8	\$39.7
Annual work hours	1,512	1,839	1,963
Food stamps	\$896	\$337	\$70
Poor health	13%	13%	5%
Arrested (men only)	26%	21%	13%
Nonmarital birth (women only)	50%	28%	9%

Note: Earnings and food stamp values are in 2005 dollars.

Source: Duncan et al. (2010)

ENDNOTES

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- ¹ “Income, Poverty and Health Insurance in the United States: 2011,” last modified September 12, 2012, <http://www.census.gov/hhes/www/poverty/data/incpovhlth/2011/index.html>.
- ² Greg J. Duncan, Kathleen M. Ziol-Guest, and Ariel Kalil, “Early childhood poverty and adult attainment, behavior, and health,” *Child Development* 81, no. 1 (2010): 306–325.
- ³ Katrine V. Loken, Magne Mogstad, and Matthew Wiswall. “What Linear Estimators Miss: The Effects of Family Income on Child Outcomes,” *American Economic Journal: Applied Economics* 4, no. 2 (2012): 1-35.
- ⁴ Glen H. Elder, *Children of the Great Depression*. (Chicago: University of Chicago Press, 1974); Glen H. Elder, Tri van Nguyen, and Avshalom Caspi. “Linking Family Hardship to Children’s Lives,” *Child Development* 56, no. 2 (1985): 361–375.
- ⁵ Ronald C. Kessler, and Paul D. Cleary, “Social Class and Psychological Distress,” *American Sociological Review* 45, no. 3 (1980): 463–478; Jane D. McLeod, and Ronald C. Kessler, “Socioeconomic Status Differences in Vulnerability to Undesirable Life Events,” *Journal of Health and Social Behavior* 31, no. 2 (1990): 162–172.
- ⁶ Dean E. Spears, “Economic Decision-Making in Poverty Depletes Behavioral Control,” *B E Journal of Economic Analysis & Policy* 11 no. 1 (2011).
- ⁷ Gene H. Brody et al., “Financial Resources, Parent Psychological Functioning, Parent Co-caregiving, and Early Adolescent Competence in Rural Two-Parent African-American Families,” *Child Development* 65 no. 2 (1994): 590 – 605; Rand D. Conger, and Glen H. Elder, Jr., *Families in Troubled Times: Adapting to Change in Rural America* (New York: Aldine de Gruyter, 1994).
- ⁸ Rand D. Conger et al., “Economic Pressure in African American Families: A Replication and Extension of the Family Stress Model,” *Developmental Psychology* 38 no. 2 (2002): 179 – 193; Vonnie C. McLoyd, “The Impact of Economic Hardship on Black Families and Children: Psychological Distress, Parenting, and Socioemotional Development,” *Child Development* 61, no. 2 (1990): 311 - 346.
- ⁹ Gary W. Evans, Heidi Saltzman, and Jana L. Cooperman, “Housing Quality and Children’s Socioemotional Health,” *Environment and Behavior* 33, no. 3 (2001): 389–399; Gary W. Evans, “The Environment of Childhood Poverty,” *American Psychologist* 59, no. 2 (2004): 77–92.
- ¹⁰ Evans, “The Environment of Childhood Poverty,” 77-92.
- ¹¹ Ibid.
- ¹² Ibid.
- ¹³ Kim M. Cecil et al., “Decreased brain volume in adults with childhood lead exposure,” *PLOS Medicine* 5 (2008): 741–750; Jack P. Shonkoff and Deborah Phillips, *From Neurons to*

Neighborhoods: The Science of Early Childhood Development (Washington, DC: National Academy Press, 2000).

- ¹⁴ McEwen, Bruce S, “The Neurobiology of Stress: From Serendipity to Clinical Relevance,” *Brain Research* 886 (2000): 172–189.
- ¹⁵ Sonia J. Lupien et al., “Can Poverty Get Under Your Skin? Basal Cortisol Levels and Cognitive Function in Children from Low and High Socioeconomic Status,” *Development and Psychopathology* 13 (2001): 653–676; R. Jay Turner and William R. Avison, “Status Variations in Stress Exposure: Implications of Research on Race, Socioeconomic Status, and Gender,” *Journal of Health and Social Behavior* 44, no. 4 (2003): 488–505.
- ¹⁶ Gregory E. Miller, Edith Chen, and Karen J. Parker, "Psychological stress in childhood and susceptibility to the chronic diseases of aging: moving toward a model of behavioral and biological mechanisms," *Psychological bulletin* 137, no. 6 (2011): 959.
- ¹⁷ Clancy Blair et al., "Salivary cortisol mediates effects of poverty and parenting on executive functions in early childhood," *Child development* 82, no. 6 (2011): 1970-1984.
- ¹⁸ Martha J. Farah et al., “Childhood Poverty: Specific Associations with Neurocognitive Development,” *Brain Research* 1110 no. 1 (2006): 166–174.
- ¹⁹ William Evans, and Craig Garthwaite, “Giving Mom a Break: The Impact of Higher EITC Payments on Maternal Health,” Working Paper 16296 (National Bureau of Economic Research, Cambridge, MA, 2010).
- ²⁰ Kevin Milligan and Mark Stabile, "Child Benefits, Maternal Employment, and Children's Health: Evidence from Canadian Child Benefit Expansions," *The American Economic Review* 99, no. 2 (2009): 128-132; Greg J. Duncan, Lisa A. Gennetian, and Pamela Morris, “Parental Pathways to Self-Sufficiency and the Well-Being of Younger Children,” in *Making the Work-based Safety Net Work Better: Forward-looking Policies to Help Low-Income Families*, Carolyn Heinrich and John Karl Scholz (eds.) (New York: Russell Sage, 2009), 117-148.
- ²¹ Gary Becker, *A Treatise on the Family* (Cambridge, MA: Harvard University Press, 1991); Michael E. Foster. “How Economists Think about Family Resources and Child Development,” *Child Development* 73 no. 6 (2002): 1904–1914.
- ²² Helen Raikes et al., “Mother-Child Book Reading in Low-Income Families: Correlates and Outcomes During the First Three Years of Life,” *Child Development* 77 no. 4 (2006): 924–953.
- ²³ Becker, *A Treatise on the Family*.
- ²⁴ Eugene Smolensky and Jennifer A. Gootman, eds., *Working Families and Growing Kids: Caring for Children and Adolescents* (Washington, DC: National Academies Press, 2003).
- ²⁵ Elizabeth Votruba-Drzal, “Economic Disparities in Middle Childhood: Does Income Matter?” *Developmental Psychology* 42 no. 6 (2006): 1154–1167.

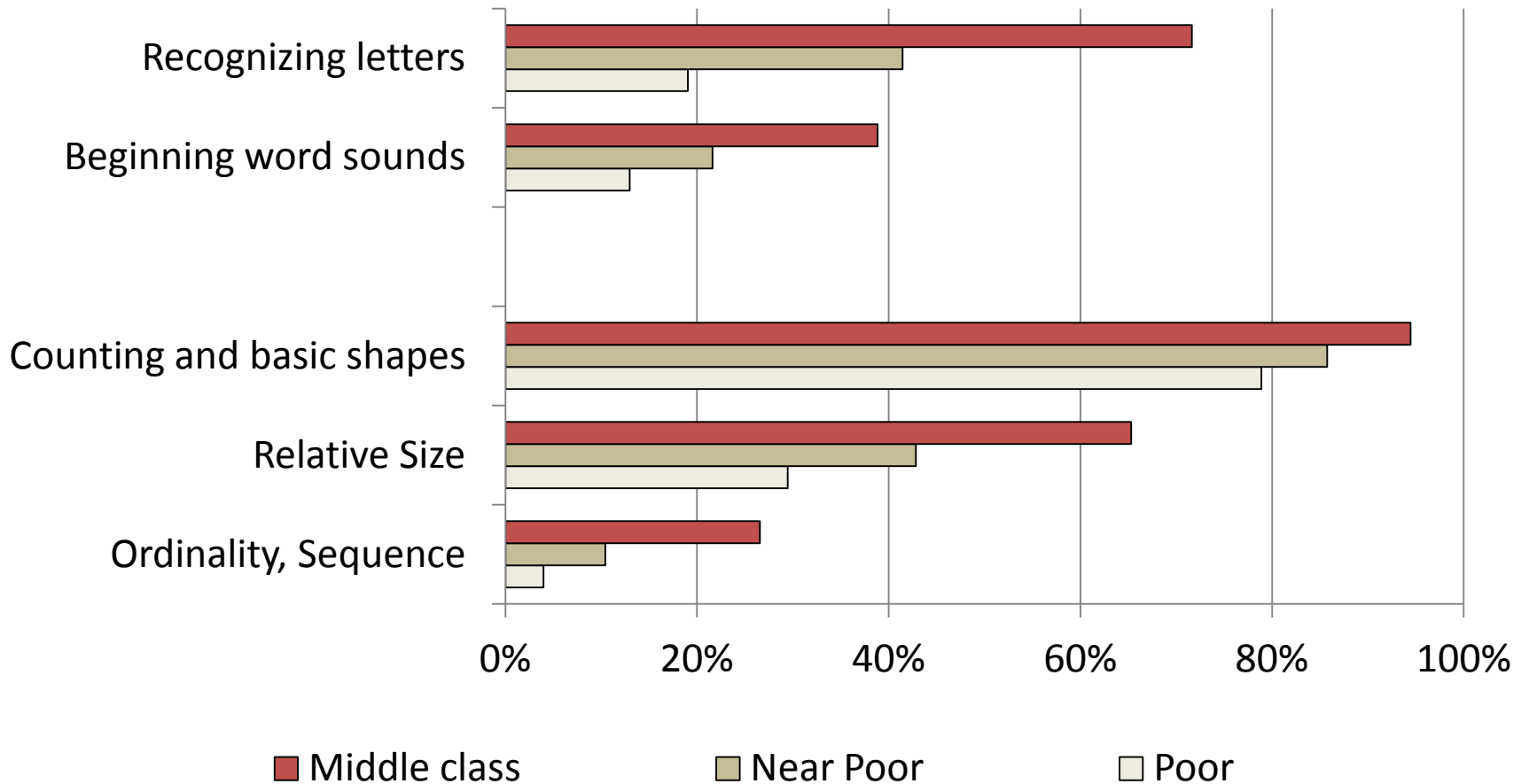
-
- ²⁶ Greg Duncan and Richard Murnane, "Introduction," in Greg J. Duncan and Richard J. Murnane (eds.), *Whither Opportunity: Rising Inequality, Schools, and Children's Life Chances* (New York: Russell Sage, 2011), 3-23.
- ²⁷ Neeraj Kaushal, Katherine Magnuson and Jane Waldfogel, "How is Family Income Related to Investments in Children's Learning?" in *Whither Opportunity? Rising Inequality, Schools, and Children's Life Chances*, eds. Greg J. Duncan and Richard J. Murnane (New York: Russell Sage and Spencer Foundations, 2011), 187-206.
- ²⁸ Greg J. Duncan and Jeanne Brooks-Gunn, "Family Poverty, Welfare Reform, and Child Development," *Child Development* 71, no. 1 (2000): 188–196.
- ²⁹ Henriette Van Praag, Gerd Kempermann, and Fred H. Gage, "Neural Consequences of Environmental Enrichment," *Nature Reviews: Neuroscience* 1 (2000): 191–198.
- ³⁰ Martha J. Farah et al., "Childhood Poverty," 166-174; Kimberly G. Noble, Bruce D. McCandliss, and Martha J. Farah. "Socioeconomic Gradients Predict Individual Differences in Neurocognitive Abilities," *Developmental Science* 10, no. 4 (2007): 464–480.
- ³¹ Martha J. Farah, "Environmental stimulation, parental nurturance and cognitive development in humans," *Developmental Science* 11, no. 5 (2008): 793-801.
- ³² Oscar Lewis, "The Culture of Poverty." In *On Understanding Poverty: Perspectives From the Social Sciences*, edited by Daniel P. Moynihan (New York: Basic Books, 1969).
- ³³ Oscar Lewis, *La Vida: A Puerto Rican Family in the Culture of Poverty – San Juan and New York* (New York, NY: Random House, 1966), xlv.
- ³⁴ Lawrence M. Mead, *Beyond Entitlement: The Social Obligations of Citizenship* (New York: The Free Press, 1986).
- ³⁵ Douglas S. Massey, "American Apartheid: Segregation and the Making of the Underclass." *American Journal of Sociology* 96, no. 2 (1990): 329-358; William Julius Wilson, *The Truly Disadvantaged: The Inner City, the Underclass, and Public Policy* (Chicago, IL: The University of Chicago Press 1987); William Julius Wilson, *When Work Disappears: The World of the New Urban Poor* (New York: Alfred A. Knopf, Inc., 1996).
- ³⁶ Michele Lamont and Mario Luis Small, "How Culture Matters for the Understanding of Poverty: Enriching our Understanding." In *The Colors of Poverty: Why Racial and Ethnic Disparities Persist*, edited by Ann Linn and David Harris (New York: Russell Sage Foundation 2008).
- ³⁷ Kathryn Edin and Maria Kefalas, *Promises I can keep: Why Poor Women Put Motherhood before Marriage* (Berkeley, CA: University of California Press, 2005).
- ³⁸ Annette Lareau, *Unequal Childhoods: Race, Class and Family Life* (Berkeley, CA: University of California Press, 2003).
- ³⁹ Robert M. Sapolsky, "Social status and health in humans and other animals," *Annual Review of Anthropology* (2004): 393-418; Eric I. Knudsen et al., "Economic, neurobiological, and behavioral perspectives on building America's future workforce," *Proceedings of the National Academy of Sciences* 103, no. 27 (2006): 10155-10162.

-
- ⁴⁰ Martha J. Farah et al., “Childhood Poverty,” 166-174; Mark Kishiyama et al., “Socioeconomic Disparities Affect Prefrontal Function in Children,” *Journal of Cognitive Neuroscience* (2009).
- ⁴¹ Flavio Cunha, and James Heckman. “The technology of skill formation,” Working Paper 12840 (National Bureau of Economic Research, 2007).
- ⁴² Greg J. Duncan and Katherine Magnuson, “Investing in Preschool Programs,” *Journal of Economic Perspectives* 27, no. 2 (2013): 109-132.
- ⁴³ “Trends in College Pricing,” College Board, last modified 2011, http://advocacy.collegeboard.org/sites/default/files/2011_College_Pricing_11b-3631_Final_Web.pdf.
- ⁴⁴ Eric Bettinger et al., "The Role of Application Assistance and Information in College Decisions: Results from the H&R Block FAFSA Experiment," *Quarterly Journal of Economics* 127, no. 3 (2012).
- ⁴⁵ Rebecca A. Maynard and Richard J. Murnane, “Effects of a Negative Income-Tax on School Performance - Results of an Experiment,” *Journal of Human Resources* 14, no. 4 (1979): 463-476; Rebecca Maynard, “The effects of the Rural Income Maintenance Experiment on the school performance of children,” *The American Economic Review* 67 no. 1 (1977): 370-375
- ⁴⁶ Pamela Morris, Greg J. Duncan, and Elizabeth Clark-Kauffman, “Child Well-Being in an Era of Welfare Reform: The Sensitivity of Transitions in Development to Policy Change,” *Developmental Psychology* 41, no. 6 (2005): 919-932.
- ⁴⁷ Greg J. Duncan, Pamela Morris, and Chris Rodrigues, “Does money matter? Estimating impacts of family income on young children’s achievement with data from random-assignment experiments,” *Developmental Psychology* 47, no. 5 (2011): 1263–1279.
- ⁴⁸ Greg J. Duncan, Lisa A. Gennetian, and Pamela Morris, “Parental Pathways to Self-Sufficiency and the Well-Being of Younger Children,” in *Making the Work-based Safety Net Work Better: Forward-looking Policies to Help Low-Income Families*, Carolyn Heinrich and John Karl Scholz (eds.) (New York: Russell Sage, 2009), 117-148.
- ⁴⁹ Heather D. Hill, and Pamela Morris, "Welfare policies and very young children: Experimental data on stage-environment fit," *Developmental Psychology* 44, no. 6 (2008): 1557.
- ⁵⁰ Gordon B. Dahl and Lance Lochner, "The Impact of Family Income on Child Achievement: Evidence from the Earned Income Tax Credit," *American Economic Review* 102 (2012): 1927-1956.
- ⁵¹ Kevin Milligan and Mark Stabile, “Do Child Tax Benefits Affect the Well-being of Children? Evidence from Canadian Child Benefit Expansions,” *American Economic Journal: Economic Policy* 3 (2011): 175–205.
- ⁵² Randall Akee et al., “Parents' incomes and children's outcomes: A quasi-experiment,” *American Economic Journal: Applied Economics* 2, no. 1 (2010):86–115
- ⁵³ Greg J. Duncan et al., "Early-Childhood Poverty and Adult Attainment, Behavior, and Health," *Child Development* 81 (2010): 306-325; Kathleen M. Ziol-Guest et al., “Early

-
- childhood poverty, immune-mediated disease processes, and adult productivity,” *Proceedings of the National Academy of Sciences of the United States of America* 109 (2012): 17289-17293.
- ⁵⁴ Anne Case, Darren Lubotsky, and Christina Paxson, “Economic Status and Health in Childhood: Origins of the Gradient,” *American Economic Review* 92 no. 5 (2002): 1308–1334; Janet Currie and Mark Stabile, “Socioeconomic Status and Child Health: Why is the Relationship Stronger for Older Children?” *American Economic Review* 93, no. 5 (2003): 1813 – 1823; Jason E. Murasko, "An evaluation of the age-profile in the relationship between household income and the health of children in the United States," *Journal of Health Economics* 27, no. 6 (2008): 1489-1502.
- ⁵⁵ Anne Case, Darren Lubotsky, and Christina Paxson, “Economic Status and Health in Childhood: Origins of the Gradient,” *American Economic Review* 92, no. 5 (2002): 1308–1334.
- ⁵⁶ Edith Chen, Andrew D. Martin, and Karen A. Matthews, “Understanding health disparities: the role of race and socioeconomic status in children's health,” *American Journal of Public Health* 96, no. 4 (2006): 702-708; Janet Currie and Wanchuan Lin, “Chipping Away at Health: More on the Relationship Between Income and Child Health,” *Health Affairs* 26 no. 2 (2007): 331 – 344; Rasheda Khanam, Hong Son Nghiem, and Luke B. Connelly, “Child health and the income gradient: evidence from Australia,” *Journal of Health Economics* 28, no. 4 (2009): 805–817; Carol Propper, John Rigg, and Simon Burgess, “Child health: Evidence on the roles of family income and maternal mental health from a UK birth cohort,” *Health Economics* 16, no. 11 (2007): 1245–1269; Steffen Reinhold and Hendrik Jürges. "Parental income and child health in Germany," *Health Economics* 21, no. 5 (2012): 562-579.
- ⁵⁷ Currie and Lin, “Chipping Away at Health,” 331-344.
- ⁵⁸ Anne Case, Angela Fertig, and Christina Paxson, “From Cradle to Grave? The Lasting Impact of Childhood Health and Circumstances,” *Journal of Health Economics* 24 (2005): 365 – 389.
- ⁵⁹ Rucker C. Johnson, and Robert F. Schoeni. "The influence of early-life events on human capital, health status, and labor market outcomes over the life course." Working Paper (2007).
- ⁶⁰ Rucker C. Johnson and Robert F. Schoeni, “Early-Life Origins of Adult Disease: The Significance of Poor Infant Health and Childhood Poverty,” Unpublished manuscript (2007); Rucker C. Johnson and Robert F. Schoeni, “The Influence of Early-Life Events on Human Capital, Health Status, and Labor Market Outcomes Over the Life Course,” *National Poverty Center Working Paper* (2007) Dalton Conley and Neil G. Bennett, “Is Biology Destiny? Birth Weight and Life Chances,” *American Sociological Review* 65 (2000): 458–67.
- ⁶¹ Johnson and Schoeni, “Early-Life Origins of Adult Disease;” Johnson and Schoeni, “The Influence of Early-Life Events.”
- ⁶² Kathleen M. Ziol-Guest, Greg J. Duncan, and Ariel Kalil, “Early childhood poverty and adult body mass index,” *American Journal of Public Health* 99, no.3 (2009): 527-532.

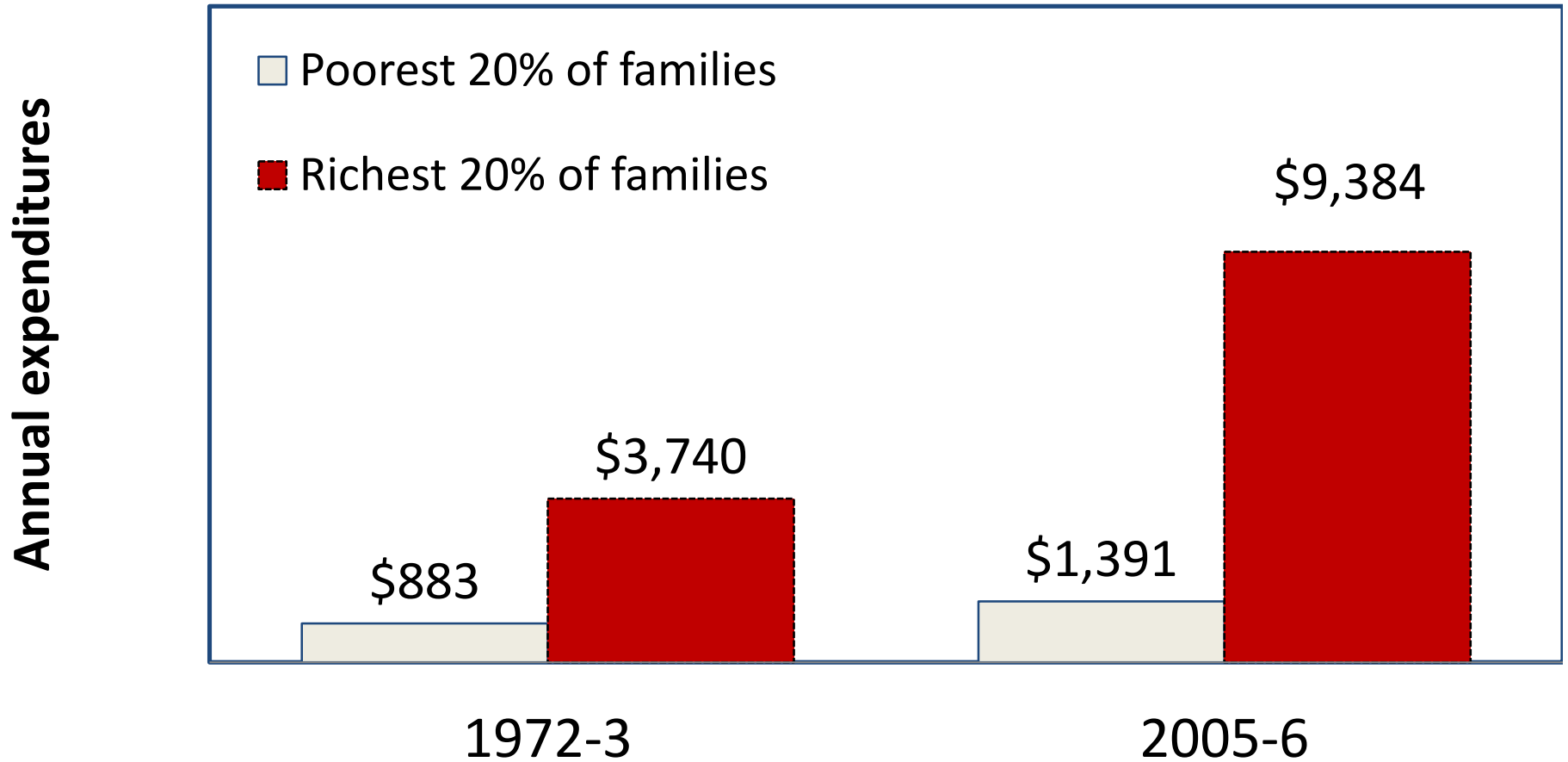
-
- ⁶³ Kathleen M. Ziol-Guest et al., "Early childhood poverty, immune-mediated disease processes, and adult productivity," *Proceedings of the National Academy of Sciences of the United States of America* 109 (2012): 17289-17293.
- ⁶⁴ Santiago Levy, *Progress Against Poverty; Sustaining Mexico's Progres-Oportunidades Program* (Washington, DC: Brookings Institution Press, 2006).
- ⁶⁵ Ariel Fiszbein, Norbert Schady, and Francisco Ferreira, *Conditional Cash Transfers: Reducing Present and Future Poverty* (Washington, DC: World Bank, 2009).
- ⁶⁶ James Riccio et al., "Toward reduced poverty across generations: Early findings from New York City's conditional cash transfer program," (New York: MDRC, March 2010).
- ⁶⁷ Hilary Hoynes, Diane W. Schanzenbach, and Douglas Almond, "Long Run Impacts of Childhood Access to the Safety Net," NBER Working Paper No. 18535.
- ⁶⁸ Lisa Sanbonmatsu et al., "Moving to Opportunity for Fair Housing Demonstration Program - Final Impacts Evaluation," U.S. Department of Housing & Urban Development, Office of Policy Development and Research (2011).

Figure 1: Rates of Kindergarten Proficiencies for Poor, Near Poor and Middle-class Children



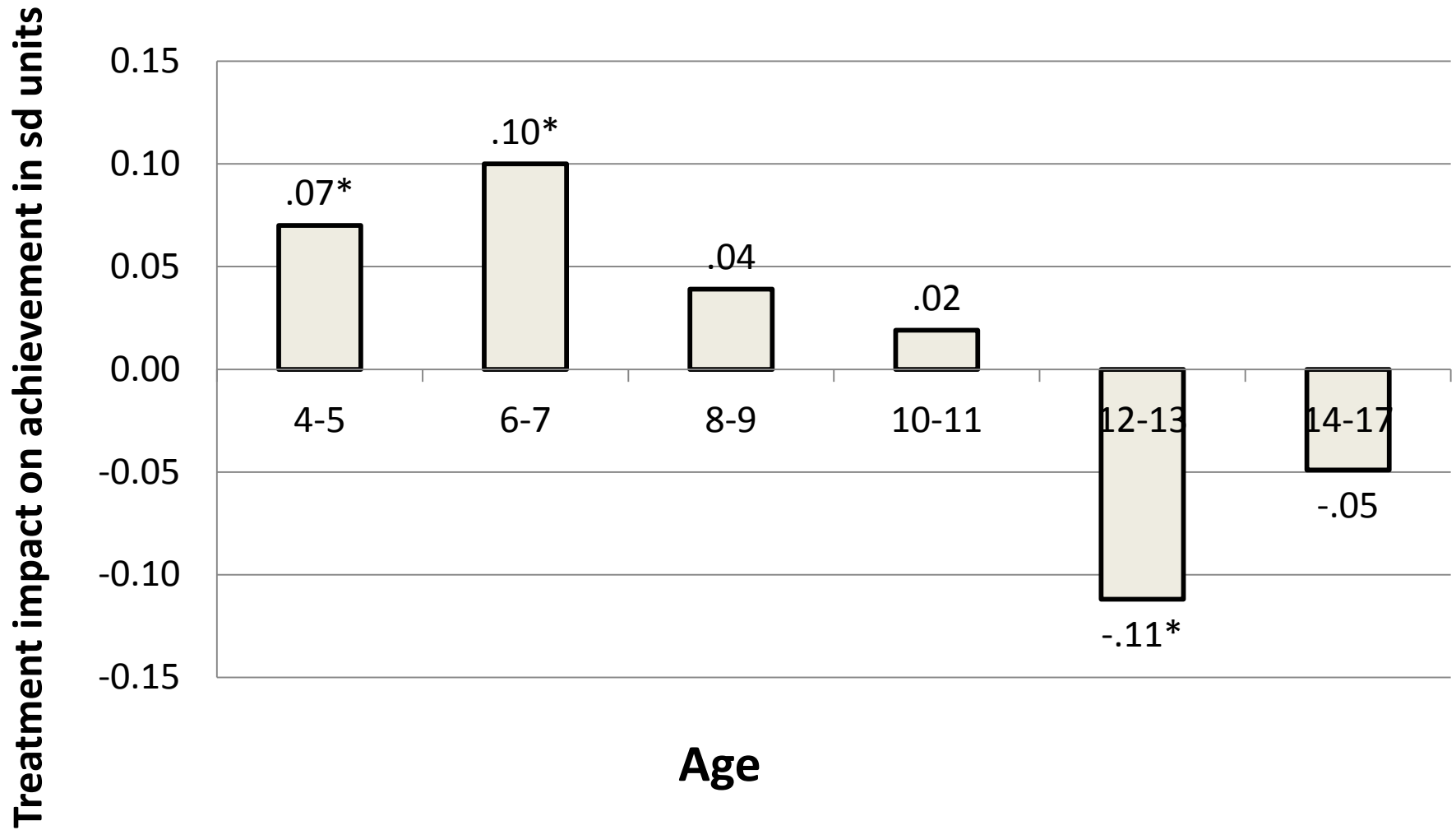
Source: Authors calculations from the ECLS-K. “Poor” is defined as income below the official U.S. poverty thresholds. “Near poor” is defined as income between 1 and 2 times that poverty line. “Middle class” is defined as income above twice the poverty line.

Figure 2: Family enrichment expenditures on children



Duncan and Murnane (2011). Calculations based on data from the Consumer Expenditure Surveys. Amounts are in 2012\$.

Figure 3: Impacts of Earnings Supplement Programs on School Achievement, by Age of Child



Note: * $p < .05$; Source: Morris et al. (2005).

Figure 4: Associations between income increases and adult (age 30-41) outcomes, by childhood stage

Adult outcome (age 30-41)	Age when income is measured		
	Prenatal to age 2	Age 3-5	Age 6-15
Earnings	+	ns	ns
Work hours	+	ns	ns
Work limitations	-	ns	ns
Arthritis	-	ns	+
Hypertension	-	ns	ns
Depression	ns	ns	ns
General health	ns	ns	ns

Shaded boxes indicate coefficient was significant at $p < .05$. Source: Ziol-Guest (2012)