The Association between Family Income and Educational Attainment in Middle Childhood

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Introduction

Extensive research has previously documented the association between low income in childhood and lowered academic achievement (Duncan & Brooks-Gunn, 1997; Guo & Harris, 2000; Duncan, Brooks-Gunn & Klebanov, 1994; Smith, Brooks-Gunn & Klebanov, 1997). The negative impact of low income can have lasting consequences on children's future job prospects and earning capability as children from low income families are less likely to graduate from high school and ultimately obtain fewer total years of education (Duncan, Brooks-Gunn, Yeung & Smith, 1998; Axinn, Duncan & Thornton, 1997).

While the negative effects of low income are well documented, there is less consensus on how income should be measured. Is low-income or the entire distribution of income more important? Should it be continuous or categorical? Recent research suggest that an additional dollar of income matters more at the low end of the income scale than at the middle or higher end (Dearing, McCartney & Taylor, 2001). In this case merely including the continuous measure of income will not capture the stronger effects at the low end as effects are averaged across the entire distribution.

Does welfare receipt help or hinder children, independent of low income? Research has recently documented an association between welfare receipt in childhood and increased high school drop-out rates plus lower completed schooling in young adulthood (Ku & Plotnick, 2003). Is the welfare effect simply a proxy for very low income, since theory would suggest that welfare income could have positive and not negative effects for low-income children (Haveman & Wolfe, 1994).

The second issue is the measurement of income over childhood. Is permanent income measured over long periods during childhood or transitory/present income more important in current achievement and behavior? What is the relative importance of the timing of poverty (early or late) during the child's life on their achievement and behavior? What is the importance of transitory or persistent poverty?

Third, while substantial research has documented the overall relationship between income and completed schooling (Duncan & Brooks-Gunn, 1997), there is less understanding of the process by which income/poverty affects completed schooling later on. Research has found direct negative impacts to be pronounced and persistent for cognitive ability and achievement in the school years, with effects on behavior weaker and less consistent (Duncan & Brooks-Gunn, 1997). Studies have found effects of income on behavioral outcomes to be indirect (Yeung, Linver & Brooks-Gunn, 2002). For example, poor achievement and aggressive behavior are both linked to special education placement (Whorton, Siders, Fowler & Naylor, 2001) and to falling behind in school (Guo, Brooks-Gunn & Harris, 1996), leading to school dropout and to lower total schooling completed later on (Cairns, Cairns & Neckerman, 1989; Jimerson & Kaufman, 2003). Chronic health conditions associated with diminished function and alteration of social interactions may lead to behavior problems, which could affect their performance and attachment to school (Gortmaker, Walker, Weitzman & Sobol, 1990).

In addition the contribution of confounding variables such as family structure and transitions, parenting attitudes and practices, and neighborhood characteristics is less well-known (Guo & Harris, 2000; Duncan, et al., 1994; Duncan & Brooks-Gunn, 1997; Hanson, McLanahan & Thomson, 1997). Single parent family structure has been linked

to behavior problems (McLanahan & Sandefur, 1994). Although recent research suggests that parenting practices cannot explain the effects of low income or family structure on child achievement and behavior (Hanson, et al., 1997), research needs to be conducted with more detailed parenting behaviors and measures of achievement and behavior. Previous research has found significant neighborhood effects even after adjusting for various demographic and economic controls. In particular, a good neighborhood, as measured by the presence of affluent neighbors, was found to be associated with higher childhood IQ and less school drop-out (Brooks-Gunn, Duncan, Klebanov & Sealand, 1993). Research suggests that the context in which children grow, their immediate surroundings, are critical to the types of activities and extent of independence that parents permit and encourage (Furstenberg, Cook, Eccles, Elder & Sameroff, 1999), affecting their school success as well.

Finally, most of the research on poverty effects on children has focused on either the IQ and achievement of preschool children (Yeung, et al., 2002; Smith, et al., 1997) or on the completed schooling of adolescents and young adults (Duncan & Brooks-Gunn, 1997). Few articles have addressed the impact of low income on the academic achievement of children in middle childhood, ages 6-13, where the foundation for future success or failure takes shape. Behavior problems can become more obvious and entrenched during these middle childhood years, with implications for social interaction and school performance.

The focus of this study is on the association between low income and the school achievement and behavior of children during middle childhood, and early measures of school performance such as grade retention and special education placement. Using data

from the 1997 Child Development Supplement (CDS) to the Panel Study of Income Dynamics (PSID), this study will explore the relationship between the families' economic well-being over their entire childhood and the child's score on four cognitive tests of achievement and on two subscales of problem behavior. The academic achievement and behavior of these children will then be added to models of being held back in school or placement in special education. Whether or not the child had a chronic health problem will also be added to the model. In addition to income, the impact of welfare receipt on these outcomes will be explored as well as family structure, maternal employment, and transitions in and out of single-parent and two-parent families.

The Importance of Middle Childhood

Middle childhood, from ages 6 to 12, has been recognized as an extremely important developmental stage for developing cognitive competencies and behavioral traits, laying the foundation for future academic achievement and behavior patterns (Erikson, 1950). They enter the formal school system. Their initial experiences may carry long-term effects on achievement. As children become more aware of society as a whole and their place within it, they also become increasingly vulnerable to negative messages and are more likely to perceive limitations because of individual or family characteristics. While studies have shown that the IQs of children from low income families are compromised even before they enter elementary school (Duncan, et al. 1994), it is during the middle school years that this diminished ability coupled with the increasing self and societal awareness can manifest itself in impaired academic achievement and increased behavioral problems. The extent to which these competencies

and patterns in middle childhood persist into adolescence and beyond has been studied and debated (Huston, 2003; Furstenberg, et al., 1999). While the effects of mild to moderate academic impairment may be ambiguous, there are long-term consequences for children who perform so poorly that they are held back from advancing a grade or referred to special education (Guo, et al., 1996). It has been argued that holding children back a grade exacerbates academic problems and actually contributes to lower graduation rates (Potter, 1996; Jimerson & Kaufman, 2003). Although dropout rates for children who receive special education have been declining (Fine, 2002), the educational community continues to debate the efficacy of current special education programs and the best way to educate children with disabilities.

Studies that have specifically examined the association between low income and academic achievement in middle childhood have consistently found that income is positively related to scores on standard achievement tests and negatively related to being held back in school (Pagani, Boulerice & Tremblay, 1997). The relationship between income and placement in special education is more complex, reflecting both the impaired competencies of the child, the initiative of the parent in seeking out the appropriate services, and the school response (Whorton, et al., 2001). Although studies have found a link between low income and behavior problems in middle childhood (Pagani, et al., 1997; Yeung, et al., 2002), the association weakens after controlling for confounding variables such as family structure and transitions.

Effects of Income on Achievement and Behavior

There are at least three major theories for why family income should affect children's achievement and behavior: resource theory, family stress theory, and correlated disadvantage. First, money provides resources. To the extent that low-income parents simply have less money to invest in books, educational activities and toys, health care, housing, and other advantages that require financial resources, children's cognitive skills will be lower, leading to lower completed schooling. Although family income also allows parents to purchase higher quality substitute care for their children if the mother works outside the home (Hofferth & Wissoker, 1992; NICHD Early Child Care Research Network, 1997), research has not found poverty to affect the quality of child care as measured on large-scale surveys nor these survey measures of child care quality to affect intellectual development (Guo & Harris, 2000). Therefore, we do not include measures of child care quality in this study.

Resources affect not only educational materials, but also residential location, neighborhood, and schools. All affect the financial investments made in children (See Figure 1). Parents' decisions about where to live are also constrained by their finances (Hofferth, Phillips & Cabrera, 2001). While characteristics of neighborhoods are not independent of family finances, variation in neighborhoods may influence children independent of family characteristics. A variety of theories have been developed to explain the effects of neighborhoods (Mayer & Jencks, 1989). The most promising are those based upon socialization and peer influence. Socialization theories argue that communities with strong institutions and committed residents with ties to one another through common values and norms (social capital), who watch out for the children, and

are involved in local schools are likely to result in children having few behavior problems (Sampson, Raudenbush & Earls, 1997). Peer influence theories argue that neighborhoods that contain youth with delinquent behavior and values and that are not controlled by parents or community may wind up with serious behavior and school problems. However, early research showed that it was the lack of middle-class families, not the presence of low-income families that was associated with increased school drop-out and out-of-wedlock births (Brooks-Gunn, et al., 1993). Recent research supports the importance of social ties or social capital in preventing delinquent behavior (Sampson, et al., 1997). We, therefore, measure the quality of the neighborhood in positive terms.

The second theory is family stress theory. According to the family stress model (Conger & Elder, 1994), low income, welfare receipt, and family structure are expected to affect the parenting behavior of the mother, including warmth, emotional support, cognitive stimulation and school engagement (Figure 1). This is because low income leads to economic strain, which causes emotional distress such as depression (Belle, 1990; McLoyd & Wilson, 1991). This emotional distress, in turn, compromises parenting ability and reduces the ability to remain engaged in the children's school (Elder & Conger, 2000; Furstenberg, et al., 1999). Poor parenting leads to reduced achievement and more behavior problems (Petterson & Albers, 2001; Yeung, et al., 2002)

A third explanation cites correlated disadvantages or selection. According to this hypothesis, it is not low income or welfare status, per se, but characteristics of individuals or families that result in both low income and poor human capital for children (Mayer, 1997). Examples include low parental IQ, poor mental and physical health, and low levels of initiative. Female headship and large family size may also create disadvantages

affecting both resource availability and child outcomes. Controlling for these other factors should reduce the effect of income per se.

Effects of Welfare Receipt during Childhood

Less research has focused upon whether, among families with similar family incomes, welfare has a detrimental or helpful effect. On some measures children in welfare families may do worse than other poor children, while on other measures they may do better. We focus on two explanations for welfare effects.

First, low-income families receiving welfare differ in financial resources from those who do not. Welfare-receiving families are generally at the low end, with incomes below the poverty level. Thus, if welfare and non-welfare receiving families are compared, the former will be less well off. It is important, therefore, to compare families with comparable incomes. While low income has generally been found to be detrimental to children's achievements, the provision of financial cash assistance through programs such as AFDC should result in improvements in children's well-being relative to comparable families without such cash assistance. Consistency and stability of income may also contribute to child well-being.

However, if people who receive cash assistance respond by reducing their efforts to become self-sufficient, cash assistance will not improve their economic well-being. A second explanation, therefore, argues that welfare recipiency affects the attitudes and values of parents, and their behaviors (such as employment). It is also stigmatizing to mothers and their families. Mothers may view themselves more negatively as a result. This "welfare culture" model emphasizes deviant values, attitudes, and behaviors of

parents that are transmitted to their children through the parenting process. Existing research is limited in that welfare receipt is usually measured during adolescence; receipt at that time may have a stronger effect on schooling and fertility than receipt measured at earlier ages.

The effects of welfare per se, therefore, are ambiguous, since welfare families clearly have the lowest incomes. Early research compared children in poor, welfare receiving families with children in poor, non-welfare families and children in nonpoor families (Zill, Moore, Smith, Stief & Coiro, 1991). The difference in well-being between children in poor families who received welfare and those in poor families who did not is the measure of the effect of welfare receipt. The difference between children in families who were poor and those who were not is the measure of the effect of poverty. These early studies found that, for the most part, children's achievement differed by poverty and not by AFDC receipt. The children's home environment, as measured by the Home Observation for the Measurement of the Environment (HOME) scale (Caldwell & Bradley, 1984), also differed by poverty, not AFDC.

On a few measures, including having the TV on 7 or more hours daily, frequency of hugging, and having a home with a dark interior, children from poor welfare-receiving families were the most disadvantaged (Zill, et al., 1991). This is consistent with either the lower resources or the welfare culture hypothesis. On other measures children in poor AFDC-receiving families were at an advantage. For example, they were more likely to have health coverage and were in better health. These latter findings are consistent with the expectation that AFDC improves child health by providing needed resources.

Recent studies have identified parenting differences between AFDC-receiving and non-AFDC-receiving poor families. One study comparing families that had received AFDC within the last 12 months with those that had not, found poor, non-AFDC families to be more effective in monitoring, supervising, and disciplining their adolescent children than AFDC families (Kalil & Eccles, 1998). This is consistent with the correlated disadvantages and welfare culture hypotheses. However, no difference in children's achievement or behavior was found.

There is some evidence that duration of welfare receipt matters. One study found that low-income families who had received welfare less than 2 years had better scores on a test of school readiness (Zaslow, McGroder, Cave & Mariner, 1999) than those in longer-term AFDC families. However, this measure was not associated with positive social behaviors, internalizing behavior problems, or health. A second study of the effects of the depth and duration of poverty and welfare (Moore & Driscoll, 1996) found that differences among white children in welfare and non-welfare low-income families disappeared when background characteristics and the selectivity of welfare receipt were taken into account. This was not the case for black children. For black children, living in a family that experienced any welfare receipt was associated with increased behavior problems. These results are consistent with the correlated disadvantages hypothesis, which says that other factors lead to both welfare receipt and lower achievement and greater behavior problems. However, for blacks they are also consistent with both the resources and welfare trap hypotheses. Finally, a third study found children of recent welfare leavers to be advantaged compared with non-welfare receivers and non-leavers in terms of cognitive achievement but to display greater behavior problems (Hofferth,

Smith, McLoyd & Finkelstein, 2000). This suggests that income changes may also be disruptive.

Ku and Plotnick (2003) measured welfare as the number of childhood years receiving welfare, divided into childhood periods, and by average annual welfare income. Family income was reported as average annual family cash income including welfare benefits plus the cash value of food stamps. The authors found a negative effect of number of years of welfare receipt over the entire childhood period. They did not examine welfare receipt just among low-income families. Given that income was measured as a continuous variable, the welfare variable could simply be an indicator for low income.

Haveman and Wolfe (1994), in contrast, examined the effect of welfare receipt only among those in poverty. Years spent in poverty was associated with a smaller number of years of schooling completed. They also found a small but significant positive impact of welfare receipt between ages 6 and 15 above and beyond the poverty effect.

The results of this and the previous studies suggest that poverty is the most critical variable affecting child development; the additional effects of welfare receipt may be positive when children from families with low incomes are considered. In this paper we utilize an indicator of low income as well as an indicator of welfare experience.

Effect of Family Structure on Children's Achievement and Behavior

Extensive research has documented the association between family structure and children's achievement and behavior. Much of the research on family structure has contrasted children living in one-parent families with those living in two-parent families.

This research has examined children of all ages, although much of the research has been on educational outcomes during high school, and later adolescent outcomes such as high school graduation and college attendance (Sigle-Rushton & McLanahan, 2002). Among the specific outcomes that have been studied are 1) psychological and behavioral problems; 2) educational achievement such as test scores and grades; and, 3) educational attainment including high school graduation, college attendance, and college completion.

Much of the work on the relationship between family structure and psychological and behavioral problems has focused on the effects of a change in family structure, especially divorce. Research has shown that divorce is a traumatic experience for children, which has significant effects on their psychological well-being. Shyness and aggression are much more common among children whose families break up than among children whose families remain intact (Jekielek, 1998; Cherlin, Furstenberg & Chase-Lansdale, 1991). When researchers have examined the impact of living in different types of families, they have found that children from single-parent families are more likely than those from intact families to have problems in school (Entwisle & Alexander, 1996; Thomson, Hanson & McLanahan, 1994). Some research suggests that family structure may have stronger effects on aggression among boys than among girls, but fairly similar effects on anxiety or depression (Jekielek, 1998; Sigle-Rushton & McLanahan, 2002).

Several pieces of research show that children living in single-mother families have lower levels of educational achievement than do children living in two-parent families (Morrison & Cherlin, 1995; Entwisle & Alexander, 1995; Entwisle & Alexander, 1996; Lang & Zagorsky, 2001). The research suggests a strong relationship between

family structure and test scores (Pong, Dronkers & Hampden-Thompson Gillian, 2002) and family structure and grades (Thomson, et al., 1994).

Children residing in two-parent families also have higher levels of educational attainment than do those residing in one-parent families. Children from two-parent families are more likely to remain in school than are children from one-parent families (Astone & McLanahan, 1991; Painter & Levine, 2000; Lang & Zagorsky, 2001). DeLeire and Kalil (2002) found that children who were living with both biological parents were more likely than children from other types of families to complete high school and go on to college. Research that has looked at more than snapshot measures of family structure, e.g., studies that look at the years that children spend in different types of families find that years spent in a two-parent family is strongly associated with educational attainment (Bjorklund, Ginther & Sundstrom, 2002).

These studies use different data sets and include different control variables in the analysis. Consequently the association between family structure and children's achievement and behavior emerges as stronger in some studies than in others. These relationships are particularly strong before controlling for family income (McLanahan & Sandefur, 1994). Since single-parent families tend to have significantly lower incomes than two-parent families, and family income is strongly associated with educational outcomes, including family income as a control variable often explains a good deal of the relationship between family structure and educational achievement. Maternal depression and parenting behaviors also are important intervening variables for some outcomes (Sigle-Rushton & McLanahan 2002).

Effects of Maternal Employment

A number of studies have explored the effect of maternal employment particularly in the early years of a child's life on later academic achievement and behavior problems. The most recent data from both the NLSY and the NICHD study of early child care suggest that the effects of maternal employment after the first year of life are positive for children's academic achievement (NICHD Early Child Care Research Network, 1998). Studies have documented small but consistent negative effects of extensive employment during the child's first year of life on later cognitive achievement (Brooks-Gunn, Han & Waldfogel, 2002). Studies also find increased incidence of behavior problems associated with extensive non-maternal care during the preschool years. Children of mothers who are less sensitive combined with poor quality child care or extensive care were less secure (NICHD Early Child Care Research Network, 1997).

Pathways to High School Completion

Child Achievement, Behavior and Health. We have discussed how low income, welfare receipt, family structure and work history affect parenting variables and neighborhood quality. Parenting and neighborhood quality, in turn, are expected to influence children's achievement, behavior problems, and health. Our measures of cognitive achievement are based upon standardized tests administered by interviewers in the child's home. While some studies have examined measures of IQ (Brooks-Gunn, et al., 1993; Brooks-Gunn, Duncan & Maritato, 1997), IQ is believed to be relatively immutable and therefore not likely to be affected by changing income and family structure. Behavior problems are measured by a standard set of questions asked of the

primary caregiver and classified into either externalizing or aggressive problems and internalizing or withdrawn problems. Health is assessed by an indicator of the presence of chronic health conditions.

School Progress: Placement in Special Education and Grade Retention. Two of the pathways through which early achievement and behavior might affect later schooling are school placement and school retention. Poor achievement and bad behavior might cause schools to place students in special education or even to retain them in grade. Both are likely to substantially reduce high school completion and later years of schooling. A study of the Perry Preschool Program found that one of the major mediating factors in high school success was whether the child was placed in special education. Students placed in special education completed significantly less schooling than those not so placed (Berrueta-Clement, Schweinhart, Barnett, Epstein & Weikart, 1984). Other research shows grade retention to be associated with school drop-out (Cairns, et al., 1989; Jimerson & Kaufman, 2003; Rumberger, 1995).

Data, Measurement, and Methodology

The study sample was drawn from the 1997 Child Development Supplement (CDS) to the Panel Study of Income Dynamics (PSID). The PSID is a 30-year longitudinal survey of a representative sample of U.S. men, women, children, and the families in which they reside. Although a supplementary sample of recent immigrants was added in 1997, these families were not used here since only one wave of data was available. When weights are used, the PSID has been found to be representative of U.S. individuals and their families (Fitzgerald, Gottschalk & Moffitt, 1998). With funding

from the National Institute of Child Health and Human Development (NICHD), data were collected in 1997 on up to two randomly selected 0-12-year-old children of PSID respondents both from the primary caregivers and from the children themselves (Hofferth, Davis-Kean, Davis & Finkelstein, 1999). A small number who had turned 13 by the interview date are included in the analysis. The CDS survey period began in March 1997 and, with a break from mid-June through August, ended on December 6, 1997. Interviewers were completed with 2,380 child households containing 3,563 children under age 13. From this sample of children we selected 1,676 children who were not recent immigrants and who were 6 to 12 years of age at the time of the interview. The response rate was 90% for those families regularly interviewed in the core PSID. Post-stratification weights based upon the 1997 Current Population Survey were used to make the data nationally representative.

While most of our measures were available for the full sample of 1,676 children, we also included two variables—neighborhood quality and maternal depression—that were available for the 60% of children whose primary caregiver also completed a household survey. Because of the potential selectivity of this subsample, we conducted comparable analyses on both samples except when that variable was included. Weights for this subsample that take into account attrition from the full sample were used to attempt to reduce the effects of differential attrition (Hofferth, et al., 1999).

Measures

Our major variables are income, welfare receipt, maternal work history and family structure and transitions. These are created for the entire life course of the child, from birth to the time of the 1997 survey.

Low Family Income

We examined a variety of measures of family income, based upon research conducted by Duncan and colleagues and summarized in Duncan & Brooks-Gunn (1997; 1998). This includes average family income, average income to needs, and proportion of time in poverty in the child's early and middle childhood years. Average income and average income to needs had small effects that were generally not significant after other variables were controlled. The measurement of income is discussed in depth in Mayer (Mayer, 1997). The argument for using a measure of low income is that the effect of additional income is nonlinear; an increase in income at low levels should matter more than an increase at the upper levels. Recent research shows that this is the case; increasing income for children from poor families improved their achievement to levels equal to those of children of higher income families, whereas changing the income of children from high-income families did not affect achievement (Dearing, et al., 2001). Because of the standard understanding of the meaning of the poverty line and its use in public policy, we use the ratio of income to the poverty line. This adjusts for differences in family size and was originally based upon the cost of the food needs of a given size family. Given the decline in fraction of large families, most of the variation in needs today is income-based.

Another issue is whether permanent or transitory income effects are most important. The research is unequivocal in this regard; long-term income is much more highly associated with children's outcomes than short-term measures (Mayer, 1997). Families are able to save and borrow against temporary financial setbacks. Long-term income is a more permanent characteristic of the family. Here we are able to characterize income for substantial periods of the child's life, including short- and long-term effects.

In our research, the overall proportion of time spent in a family with income below the poverty line was significantly related to achievement; however, the results generally disappeared with controls for other factors. Recent research suggests that one of the problems with the poverty line is that it is categorical and does not capture families that are struggling and that are near but above the cutoff. When we include dummy variables for both "income to needs under poverty" and "income to needs between poverty and twice the poverty line," we found that the effects on children's achievement and behavior were very similar; consequently, in our final specifications our poverty dummy variable indicates above or below twice the poverty line. In those specifications we have 3 dummy variables: 1) whether the child's family income was less than the poverty line at any time during age 0-5 but not later, 2) whether family income was less than the poverty line at any time during 6-12 but not earlier, and 3) whether family income was less than the poverty line at some time in both periods. In this way we capture short-term and long-term effects and the timing of low-income experienced by children.

To construct the ratio of income to needs each year we extracted the total family income each year of the child's life from the core PSID and divided this by the

government poverty threshold (U.S. Census Bureau, 2001) We then averaged the income-to-needs ratios for the periods where the child was aged 0-5 years of age, 6-12 years, and an average over the child's entire lifetime up to 12 years of age. We then constructed a set of dummy variables to measure when and if the child was ever in a family that was considered "low income" which was defined as less than 2 times the poverty threshold. If the average income-to needs was less than 2 when the child was 0-5 but was greater than 2 when the child was 6-12, the dummy variable "Low income-child's age 0-5 only" was assigned a value of 1. Similarly, if the average income-to-needs was greater than 2 when the child was 0-5 but less than 2 when the child was 6-12, then the dummy variable "Low income-child's age 6-12 only" was assigned a value of 1. Finally, if the average income to needs was below 2 for both periods then the dummy variable "Low income-child's age 0-12" was assigned a value of 1. Therefore all groups are mutually exclusive and the children who were never low income were the reference group.

Welfare Receipt

To construct the welfare receipt variable we also tested several specifications. Consistent with previous research (Ku & Plotnick, 2003), we used the proportion of the child's first six years and middle childhood years in a welfare-receiving family. We used the proportion of time rather than the number of years that was used by Ku and Plotnick since our children were in their middle childhood years in 1997 whereas Ku and Plotnick's subjects were at least age 18. From the core PSID we extracted information on the months of the child's life that the mother received AFDC benefits. We used this information to construct continuous variables containing the percent of the child's life

that the mother was on AFDC for two periods--when the child was 0-5 years of age and when they were 6-12. The values ranged between 0 (mother never received AFDC benefits) to 100 (mother received AFDC benefits every month).

Family Structure and Transitions

Data on the marital status of the head of the household was extracted from the core PSID for every year of the child's life. Each year the head of the household was categorized as either: married, single (never married), divorced, widowed, or separated. Using this information we constructed a dummy variable for each year of the child's life on whether the family was one parent (single, divorced, or separated) or two-parent (married or widowed). As have others (Guo & Harris, 2000), the children whose parent was widowed were included with children of two parents because children of widowed parents do not suffer the same economic and achievement disadvantages as children of divorced or never married parents and there are too few cases with widowed parents for separate treatment. Combining information from the dummy variables over the years of the child's life we were able to classify the family structure and transitions when the child was 0-5 years of age and 6-12. If the child was continuously in a one-parent family due to divorce or separation then the dummy variable "All one parent" was assigned a value of 1. If the child had a family transition when they were 0-5 but a stable family structure when they were 6-12 then the dummy variable "Early transition" was assigned a value of 1. Similarly, if the child started off in a stable family when they were 0-5 but had a family transition when they were 6-12 then the dummy variable "Later transition" was assigned a value of one. Finally, if there was a transition when the child was 0-5 and 6-

12 then the dummy variable "Transition in both periods" was assigned a value of 1. Although we would have liked to have classified the transitions in more detail (i.e. divorced and then (re)married, or (re)married and divorced), there were not enough cases to warrant this level of detail. Children that were continuously in two-parent families over the entire period from birth to age 12 were the reference group.

Work History

Because research has found effects of maternal employment, particularly in the early years of the child's life, on the child's achievement and behavior (Brooks-Gunn, et al., 2002), we also included the percent of years the mother was employed when the child is age 0-5 and when the child is age 6-12. These data were drawn from the core PSID.

Achievement and Behavior

A child's cognitive development was assessed by using four subtests of the Woodcock-Johnson Revised Test of Basic Achievement: letter-word identification, a test of the children's ability to respond to letters and words; passage comprehension, a test that measures vocabulary and comprehension skills; calculation, a test of mathematical calculation performance; and applied problems, a test of skill in analyzing and solving practical numerical problems (Woodcock & Mather, 1989). A child's socio-emotional development was measured by the Behavior Problems Index, a 30-item scale which attempts to quantify the existence and severity of child behavior problems drawn from the Achenbach and designed for survey administration (Peterson & Zill, 1986). From this scale, two subscales can be derived which measure two general types of behavior

problems: internalizing, distressed or withdrawn behavior; and externalizing, aggressive behavior (Rogers, Parcel & Menaghan, 1991).

The primary caregiver was asked whether the child had ever repeated a grade or been held back because the school recommended it. She/he was also asked whether the child has ever been classified by the school as needing special education. The responses to these questions were used to construct dummy variables for these school outcomes.

Child Health

The health of the child was measured by whether a doctor has ever said the child has one of a set of chronic health problems such as asthma, diabetes, and chronic ear infections. It does not include developmental disabilities.

Measurement of the Demographic Control Variables

The demographic control variables used in the analyses are divided into two groups: those that characterize the child/family at the child's birth or are permanent characteristics and those that characterize the child/family at the time of the interview for the 1997 CDS. The variables that were extracted from the PSID in the year in which the child was born include the mother's age in the child's birth year, and the number of children in the family at the time of the child's birth. Data that were obtained from the CDS include race and ethnicity of child (based on the race and ethnicity of the head of the household), whether the child was a low birth weight infant, the gender of the child, and the mother's score on the passage comprehension test (identical to that administered

to the child). The latter controls for the mother's verbal achievement, which, given that they are adults, is likely to be relatively unchanging.

Current demographic characteristics were obtained during the 1997 CDS interview and include the mother's completed education at the survey date, the age of the child at survey date, and the number of children in the family at the survey date.

Parenting variables

We added four parenting variables (cognitive stimulation, parental school engagement, maternal warmth, and maternal depression) to the models to measure the extent to which these variables mediate the effects of income, welfare receipt, maternal work history, and family transitions on the cognitive and behavioral outcomes of children.

Cognitive Stimulation.

The cognitive stimulation in the home environment was based on a subset of items from the Home Observation for Measurement of the Environment (HOME) inventory (Caldwell & Bradley, 1984). The subset consisted of 14 items in the inventory that assessed the physical environment in which the children lived as well as the cognitively stimulating materials available to them. Four items measured the extent to which the home environment was clean, cluttered, monotonous and safe. The responses to these items were from direct observation of the interviewer and assigned a value of 0 or 1, with 1 indicating responses that were the most positive (e.g very clean). Other items include the number of books the child had (1=10 or more, 0=fewer), the frequency of

reading to the child (1=several times a week, 0=less often), the frequency with which the child reads to him or herself (1=several times a week, 0=less often), whether the child is encouraged to engage in hobbies (1=yes, 0=no), has a musical instrument (1=yes, 0=no), participates in extracurricular activities (1=yes, 0=no), whether the family subscribes to a newspaper (1=yes, 0=no), whether if watching television discusses the programs with a parent (1=yes, 0=no), goes to a museum (1=several times a year, 0=less frequently), and attends a musical or theatrical performance (1=several times a year, 0=less frequently). The responses to the 14 items were added and ranged from 2.5 to 14 with a mean of 10.18.

Parental School Engagement.

The variable that quantifies the extent to which parents were positively engaged in their child's school is based on a 7-item scale. The primary caregiver was asked to answer the following questions about whether and how often they had participated in following activities in the current school year: volunteered in the classroom, school office or library; had an informal conversation with the child's teacher; made a presentation to the child's class; observed (his/her) classroom; attended a school event in which the child participated such as a play, sporting event or concert; attended a school event in which the child did not participate; attended a meeting of the PTA or other such organization. The following values were assigned: 1=parent had not participated in the activity in the current school year, 2=parent had participated once, 3=parent had participated more than once. The values for the 7 items were totaled and the parent's school engagement ranged between 7 and 21. The mean for this item was 12.17 with a

standard deviation of 3.63. There were an additional four items which asked questions about the parent's participation in activities at the child's school but we did not include these because they could be indicative of problems the child is having (e.g. met with school counselor).

Maternal Warmth

The warmth of the primary caregiver (almost always the mother) is assessed by asking six questions pertaining to the amount of time in the last month that the primary caregiver did the following: hugged or showed physical affection to their child; told child that they loved them; spent time with the child doing one of their favorite activities; joked or played with the child; talked with them about things that they are especially interested in; told the child they appreciated something they did. The responses to the questions are: 1=Not in the last month, 2=1 or 2 times in past month, 3=about once a week, 4=several times a week, 5=everyday. If the response to the question was 4 or 5, a value of 1 was added to the maternal warmth scale. Thus the maternal warmth scale ranges from 0 to 6 with a mean of 5.15.

Maternal Depression

Depression was measured by maternal scores on a short (10-item) psychological distress scale developed by Ronald Kessler from the Composite International Diagnostic Interview (CIDI) of the World Health Organization (Kessler & Mroczek, 1994). "During the past 30 days, how often did you feel tired out for no good reason? Feel nervous? feel depressed?" Responses ranged from 1=all of the time to 5=none of the time. The items

were reverse coded so that 0=none and 4=all of the time and items were summed. Scores ranged from 0 to 33, with a mean of 15.46 and a standard deviation of 4.62.

Quality of the Neighborhood

The variable which measures the quality of the neighborhood in which the child lives is based on a single question which is asked of the primary caregiver: How would you rate your neighborhood as a place to raise children? The responses range from 1=excellent to 5=very poor. We reverse coded this item. This item provides an overall measure of the safety of the neighborhood, activity outlets for kids, and the quality of the school systems.

Methodology

Cognitive and Behavior Outcomes

For cognitive and behavioral outcomes we used ordinary least squares regression to examine the relationship between income, welfare receipt, maternal work history and family structure. In model 1 we control only for demographic characteristics in place at the time of the birth of child. In the second model we add current demographic characteristics of the mother and child in order to see to what extent current characteristics modify the effects of income, welfare, maternal work history, and family structure over the entire life course of the child.

In model 3 we add three parenting variables, the cognitive scale from the HOME, warmth, and school engagement, available for all children. By examining the coefficients on income, welfare receipt, maternal work history and family structure, we

can see whether these parenting variables mediate any of the effects of these variables on achievement and behavior.

Maternal depression was added separately in model 4 because it was only available for those children whose primary caregiver had completed a household questionnaire.

Finally, in model 5 we add the measure of the quality of the neighborhood, which was also available only for the sample with a completed household questionnaire. Because the samples in models 4 and 5 are smaller and may differ from the full sample, we include regression coefficients for the total sample and for the sample with a completed primary caregiver household questionnaire in the first three models.

Chronic Health Problems

We used logistic regression to model the association between income, welfare receipt, maternal work history, and family structure and transitions on whether the child had any chronic health problems (1=yes, 0=no). The introduction of covariates into the model was identical to that of the cognitive and behavior outcomes models.

School Outcomes

Logistic regression was used in the models for school outcomes because both variables (held back and special education) were dichotomous. The covariates were identical to the cognitive, behavior, and health models except that an additional model was added to the analysis. After controlling for all other covariates, a model that controlled for the child's cognitive achievement (their passage comprehension score),

total behavior problems (both internalizing and externalizing), and whether they had a chronic health problem was added. The purpose of this final model is to examine the extent to which each of these assessments contributed to the child being held back in school or receiving special education.

Results

Cognitive outcomes

Tables 1-4 show the results of regressing the four tests of cognitive achievement (passage comprehension, mathematical calculation, letter-work identification, and applied problems) on the families' economic history, welfare receipt, maternal work history and family structure/transitions while controlling for various demographic variables.

(Tables 1 to 4 about here)

Family Economic History

Of the four tests of cognitive achievement, only the applied problems score had significantly negative results for all three definitions of low-income (table 4). On average, a child from a family that is low-income during their middle years only scored 9 points lower on this test than a child whose family is never low income, about half of the standard deviation (Models 4 and 5). The coefficients for early low-income only and persistent low-income are smaller, about 5 points or one-third of the standard deviation, but significant as well.

Results for the passage comprehension and mathematical calculation scores (Tables 1 & 2) reveal a strong and persistent association between low-income during the child's middle years only and also with persistent low-income. By the final model, a

child whose family is low-income during the child's middle years only scored about 5 points lower on the passage comprehension test and almost 8 points lower on the mathematical calculations test than a child whose family is never low-income. Again, these are one-third to one-half of a standard deviation, a substantial effect size. The coefficients for persistent low-income are smaller but significant. The coefficients for low-income during the child's early years are also negative but only significant for the total sample in the earlier models.

The only income variable that is significantly associated with lower scores on the letter-word identification test is persistent low-income (Table 3). The size and strength of the coefficient for persistent low-income is reduced when mediating variables of parenting characteristics and quality of the neighborhood are added. While the coefficients for early low-income and persistent low income are always negative, they are reduced to non-significance when mediating variables are added.

Welfare Receipt

The coefficients for welfare receipt in the child's early years are positive for all four tests but only significant at the margin ($p<.10$) for the mathematical calculation and letter-word identification scores. Compared with a child whose family did not receive welfare, those in families that received welfare all months of the child's early years scored about 17 and 20 points higher on the mathematical calculations and letter-word identification tests, respectively (Model 5). These are large effects, about 1 standard deviation. The results for welfare receipt during the child's middle years are inconsistent and never significant.

Maternal Work History

Maternal work during the early years of the child's life is associated with lower scores on three of the four tests of cognitive achievement. The coefficients are small, however, amounting to about a 3-5 point lower score for a child whose mother works every year compared with those whose mothers never work. This translates to an effect size of about .20. In contrast, a child whose mother works all of the middle years of a child's life scores 3 points higher on the passage comprehension test than a child whose mother did not work at all. The coefficients for this variable in the other three tests are always positive, but not significant.

Family Structure and Transitions

In general the coefficients for the family structure/transition variables are negative in the early models, indicating lower test scores, but then turn positive upon the addition of the parenting variables in the later models. By the final models, the only significant result is that children in a family with an early transition (when the child was 0-5) but no other transition scored about 3 points higher on the passage comprehension test than children in stable two-parent families. The coefficient is always positive and becomes significant when the parenting variables are added to the model. Children who are consistently in one-parent families their entire childhoods do not score differently on the achievement tests from children who are consistently in two-parent families.

Parenting Characteristics

Parental school engagement is significantly associated with higher test scores on all four cognitive achievement tests (Model 3). Both the size and strength of the coefficient is greatest for the mathematical calculations test where an increase of 1 standard deviation (4 points) on the parental school engagement scale is associated with a 2.4 point increase in the test score. Cognitive stimulation is associated with higher test scores on all four tests in Model 3. However, in the last two models, it is significant for the letter-word identification test but not for the other three tests. Maternal warmth is not consistently associated to scores on any of the tests. Maternal depression is also not significantly associated with scores on any of the achievement tests.

In terms of parenting variables acting as mediators, the size of the coefficients for the low-income variables are lowered but not eliminated upon the addition of the parenting variables in model 3. Controlling for the parenting variables actually increases the positive association between welfare receipt in the child's early years and higher test scores. The coefficients for maternal work history are not significantly changed by the addition of the parenting variables. The association between family structure/transitions and the scores on the cognitive achievement tests are almost never significant, with a few exceptions, but the addition of the parenting variables changes the signs of the coefficients from negative to positive in many cases.

Quality of the Neighborhood

The coefficient for the quality of the neighborhood in which the child lives is positive for all tests but only significant for the passage comprehension score. The

coefficients for the other variables change very little when this variable is added to the final model. The results do not suggest a mediating role for neighborhood on achievement.

Control Variables

Table 1, passage comprehension, also includes the control variables. The effects of control variables on reading achievement are as anticipated. For example, Black and Hispanic children have lower test scores, as do males and children from larger families. Children of older mothers and mothers with higher test scores have higher test scores themselves. Test scores are standardized; older children have slightly lower test scores. Finally, maternal education is not associated with children's scores on passage comprehension with controls for the mother's own test scores and all the other variables in the model. There is nothing surprising in the effects of controls in this or in the other analyses (not shown).

Behavior Outcomes

Tables 5 and 6 contain the results of regressing two behavioral outcomes (internalizing behavior problems and externalizing behavior problems) on the family economic history, welfare receipt, maternal work history, and family structure and transitions. Demographic controls are held constant throughout all models.

(Tables 5 and 6 about here)

Family Economic History

There is a consistent association between low income during the child's early years, whether persistent or not, and the child having an internalizing behavior problem. A child in a low-income family during their early years scores 2.30 points higher (62 percent of a standard deviation) on the internalizing behavior scale than a child whose family is never low income (Model 5). Likewise, a child in a persistently low-income family scores 1.56 points higher on the internalizing behavior problem scale. The coefficient for low income during the middle childhood years only is positive in the last two models, but small and never statistically significant.

Persistently low income is associated with a score of 1.75 on the externalizing behavior problems scale, about .30 of a standard deviation, controlling for all variables except maternal depression and neighborhood quality (Model 3). Including maternal depression reduces the coefficient by 8 percent. After controlling for quality of the neighborhood, there is no longer a significant association between low income during the child's life and externalizing behavior problems. This suggests that quality of the neighborhood is one of the factors that explain the relationship between low income and more behavior problems.

Welfare Receipt

In the total sample, a higher proportion of months spent on AFDC during middle childhood is associated with a greater frequency of externalizing behavior problems. The effect is substantial. An increase of 50 percent in the proportion of months on AFDC is associated with an increase of 5 points on the external behavior problems scale, about 1 standard deviation. In the sample with a completed primary caregiver household

questionnaire, however, the coefficient is about half the size and not significant. There is only one small and marginally significant effect of months on AFDC during middle childhood on internalizing behavior problems in the total sample (model 3). This does not show up in the sample with completed primary caregiver household questionnaire. Thus, in the full sample there is an association with greater externalizing problems, but in the reduced sample in the final models, there are no significant associations between welfare receipt during the child's early and/or middle years and either internalizing or externalizing behavior problems.

Maternal Work History

There is a persistent, albeit small, association between extensive maternal work during the child's early years and increased externalizing behavior. By the final model, a child whose mother worked all of the child's early years scored 2 points higher on the externalizing scale than a child whose mother never works. Maternal work during the child's middle childhood years is negatively associated with externalizing in the total sample, but never significant for the smaller sample. Since the coefficients for the two samples are identical, it could be that there are simply not enough cases in the smaller sample for precise estimation.

For internalizing behavior problems there are small, significant effects for the total sample, but not for the smaller sample. By the last three models, the coefficient for maternal work during the early years is positive, indicating more internalizing behavior, but non-significant. The coefficient for maternal work during the middle years is effectively 0 by the final three models.

Family Structure and Transitions

A child who experienced a family transition in both their early and middle childhood years and in their middle childhood years only are significantly more likely to exhibit internalizing behavior than a child in a stable two-parent family. The coefficients for these two variables are significant across all models and amount to 1 to 1.3 points higher on the internalizing behavior scale for having a family transition during middle childhood. Similar results are found for externalizing behavior but only for the total sample models. Although these coefficients for the total sample are substantial, 2 points higher on externalizing for having transitions in both early and middle childhood, the coefficients are never significant in the smaller sample.

Parenting Characteristics

Maternal warmth is strongly associated with less internalizing and externalizing behavior (coefficients -.47 and -.62, $p < .001$, Model 5). The effect size is about half of a standard deviation. Maternal depression is positively associated with both types of behavior problems but the coefficients are not as large nor the statistical significance as strong as for maternal warmth. Parental school engagement is negatively associated with both internalizing and externalizing in model 3, but reduced to non-significance when maternal depression is added to the next model, model 4.

The addition of the parenting variables to the internalizing and externalizing models changes the coefficients for the low-income variables very little (model 3). This suggests that the parenting characteristics do not mediate the effects of low income for

these behavior problems. Welfare receipt and maternal work history remain virtually unchanged after adding the parenting variables. For internalizing behavior, the coefficients for the family transitions early/middle and middle remain significant after adding the parenting variables, but the size of the coefficient for early/middle transitions drops after maternal depression is added (model 4). Thus maternal depression mediates some of the impact of family structure on internalizing problems. Maternal warmth and parental school engagement mediate the effects of a family transition during the child's middle years on their externalizing behavior. The coefficient for the effect of a family transition drops slightly once warmth and school engagement are added to the model (model 3).

Quality of the Neighborhood

The quality of the neighborhood is negatively associated with both internalizing and externalizing behavior, but the coefficient is almost twice as large for externalizing (-.95) as for internalizing (-.52). For internalizing behavior, adding this variable reduces slightly the coefficients on the low-income and family structure transition variables, but they are still significant. Adding the quality of the neighborhood variable to the externalizing model reduces the coefficient for persistent low-income to non-significance. The remaining coefficients in the externalizing problems model are changed very little by the addition of this variable. This suggests that quality of the neighborhood mediates the effects of both income and family structure on children's behavior problems.

Chronic Health Problems

Table 7 contains the results of regressing whether the child had a chronic health problem on income, welfare receipt, maternal work history, and family structure and transitions.

(Table 7 about here)

Family Economic History

A child in a family that is low income during their middle childhood years only is significantly more likely to have a current chronic health problem than a child in a family that never experienced low income. The coefficient for this variable is only significant for the smaller sample and only after controlling for current demographic variables. The coefficients for the other two low-income variables are always positive but never significant.

Welfare Receipt and Maternal Work History

All of the coefficients for welfare receipt and maternal work history are very small, essentially zero when rounded to two decimal places. Although the coefficient for maternal work during the child's early years is significant at the .10 level, the coefficient size is too small to indicate a meaningful finding.

Family Structure and Transitions

There are no significant associations between family structure and transitions and chronic health problems. The coefficients are never significant in any of the models.

Parenting Characteristics

Of the parenting variables, only maternal depression has a significant effect on chronic health problems. Children whose mothers are depressed are slightly more likely to have chronic health problems than children whose mothers are not. The addition of the parenting variables into the model has almost no effect on the coefficients for income, welfare receipt, maternal work history, and family structure and transitions.

Quality of the Neighborhood

The quality of the neighborhood is not significantly associated with chronic health problems and does not change the coefficients of the other variables when added to the model.

School Outcomes

Tables 8 and 9 contain the results of the logistic regression models for the two school outcomes: held back in school and special education.

(Tables 8 and 9 about here)

Family Economic History

Low income during the child's middle childhood years only and persistently low income across both early and middle childhood periods are associated with a significantly higher rate of being held back in school. The coefficients are significant in all models for held back through model 5, although they are reduced somewhat when child assessments are added to the final model.

The results are somewhat different for special education placement. Low income during the child's middle childhood years only is strongly associated with being placed in

special education but only in the reduced sample up through model 5. The addition of the child assessments in model 6 reduces low-income-children's age 6-12-only coefficient to non-significance. Low income in early childhood is positively associated with special education in all models but the coefficients are not as large as those for low income during the child's middle years only and the coefficients are significant only in the total sample.

Welfare Receipt

A child whose family receives welfare during their early years is less likely to be held back in school while the reverse is true when the family receives welfare during the child's middle years. The significant effect for early welfare receipt is only apparent when the child assessments are added to the final model (model 6). There are no significant effects of welfare receipt on receiving special education.

Maternal Work History

There are small effects for maternal work history that persist until child assessments are added to the final models. Maternal work during the child's middle childhood years is negatively associated with being held back in school while maternal work during the child's early years is positively associated with receiving special education.

Family Structure and Transitions

Children in a family with family transitions during both the early childhood and middle childhood years are more likely to be placed in special education than children in a stable two-parent family. However, this result is significant only for the total sample. Across both samples, children in families that make a transition during their middle years only are consistently less likely to receive special education than children in a stable two-parent family. The addition of maternal depression does not reduce the effect of early/middle transitions on receiving special education.

Living in a stable single parent family or experiencing any family transition is associated with an increased likelihood of being held back in school. These are stronger in the full sample than in the reduced sample. These other family structures and transitions are associated with a higher rate of being held back in school in earlier models but are reduced to non-significance when maternal depression is added.

Parenting Characteristics

Cognitive stimulation and maternal warmth are significant predictors of not being held back in school up to and including model 5. By the final model (model 6), the only parenting characteristic that is significantly associated with the risk of a child being held back in school is parental school engagement. Surprisingly, the greater the parental school involvement, the greater the likelihood that a child is held back. This suggests that school engagement is an outcome and not a preventive measure. Maternal depression is never significant.

The findings for special education differ from those of being held back. By the final model, cognitive stimulation is negatively associated with a child receiving special

education while maternal depression is positively associated with this outcome. Maternal depression is always significant once added to the model, but cognitive stimulation only becomes so upon the addition of the child assessments in the final model (model 6). Neither school engagement nor maternal warmth is associated with being placed in special education.

Adding the parenting variables to the models does little to change the coefficients for the income, welfare receipt and maternal work history variables. For the special education analysis, the addition of maternal depression slightly reduced the coefficient for early/middle transitions.

Quality of the Neighborhood

The quality of the neighborhood is negatively associated with a child being held back when it is first entered into the model, but non-significant when child assessments are added. The addition of this variable into the models (model 5) slightly reduces the coefficient on persistent low income in the held-back analysis. The quality of the neighborhood is never significantly associated with a child receiving special education.

Child Assessments

Both behavior problems and achievement are associated with being held back, although the statistical significance was greater for achievement. A child's behavior problems increase the likelihood of being held back in school and a higher passage comprehension score reduces this likelihood. Chronic health problems are not significantly associated with being held back.

In contrast to the findings for being held back, chronic health problems are strongly associated with receiving special education. The child's passage score is also strongly associated with receiving special education but the effect is negative. The coefficient for the child's behavior problems is not significant.

The achievement and behavioral assessments mediate many of the findings for the variables previously introduced. The child assessments diminish the effects of low income on being held back and eliminate it for special education. The significant results for maternal work history become non-significant when the assessments are added. For held back, the effects of two of the four parenting variables are rendered non-significant when assessments are added. In contrast, the association between cognitive stimulation and receiving special education becomes significant only upon the addition of the assessments. For held back, the significant coefficient for the quality of the neighborhood is eliminated when the assessments are added.

Discussion and Conclusions (Still in progress)

The results support other research that has shown low income to have an effect on cognitive achievement test scores and family structure to primarily influence behavior problems. Even so, low income was found to be associated with increased internalizing problems. The results do not support previous research that suggests that income during the preschool years in more important than later income. This research found either that low income during all of childhood or low income during the middle childhood years only was most strongly predictive of lower achievement. It makes sense that current

rather than past low income would affect children's current achievement. Given that the income variables were created to be exhaustive and mutually exclusive, low income during early childhood only implies that family income has improved by middle childhood. Low income during the preschool years was associated with increased internalizing or withdrawn behavior problems, however. Income-occasioned behavior problems may be more difficult to reverse than achievement-related problems.

The results also support research on mediators. Maternal depression and the quality of the neighborhood were important mediators of the effect of income on behavior. Cognitive stimulation and school engagement mediate some of the effect of income on achievement. The results suggest that reducing maternal depression and improving neighborhood environments would help reduce the effect of low income on children's behavior problems. Increasing cognitive stimulation and school engagement would reduce the effect of low income on achievement.

A focus on cognitive achievement alone will not help children succeed. Income still retains significant effects on grade retention even after mediating factors are included and both cognitive achievement and behavior are important influences on being held back in school, an important predictor of later achievement. Special education placement, in contrast, is a function of achievement and health, which completely explain the effects of low income. Achievement and health problems are associated with placement in special education, whereas behavior problems are not. Welfare receipt was not found to be consistently associated with achievement. Where an association was found, it was for young children and it was positive.

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Conceptual Model for the Effects of Low income/Welfare Receipt/Maternal Work History/Family Structure and Transitions on School Progress in Middle Childhood

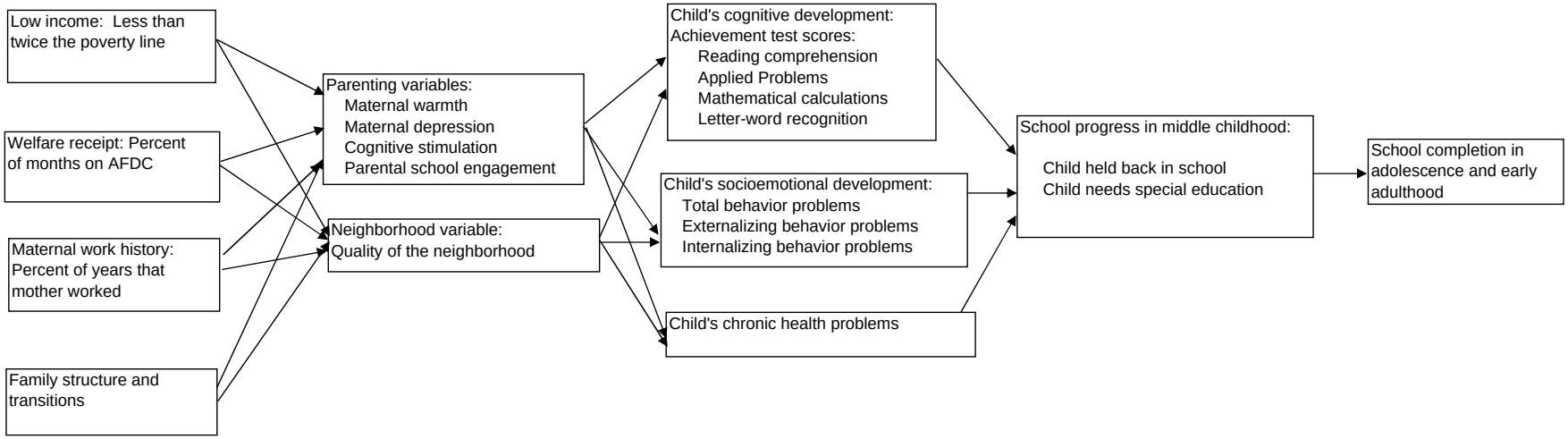

Table 1. Regression of Child's Passage Comprehension Score on the Family Income History and Controls

Covariates	Passage Comprehension Score							
	Model 1		Model 2		Model 3		Model 4	Model 5
	Total sample	Sample with completed household questionaire	Total sample	Sample with completed household questionaire	Total sample	Sample with completed household questionaire	Sample with completed household questionaire	Sample with completed household questionaire
Family economic history								
Low income-child's age 0-5 only	-5.01 **	-3.00	-4.30 *	-2.30	-3.71 *	-1.64	-1.76	-1.88
Low income-child's age 6-12 only	-4.82 **	-7.18 ***	-3.70 *	-6.08 **	-3.17 +	-5.83 **	-5.66 **	-5.49 **
Low income-child's age 0-12	-6.24 ***	-6.03 ***	-4.87 **	-4.19 *	-4.04 *	-3.57 +	-3.74 *	-3.41 +
Welfare receipt								
Percent of months on AFDC-child's age 0-5 only	0.04	0.07	0.04	0.07	0.05	0.07	0.07	0.07
Percent of months on AFDC-child's age 6-12 only	-0.12	0.00	-0.11	0.02	-0.12	0.03	0.04	0.06
Work history								
Percent of years mother is working-child's age 0-5 only	-0.04 *	-0.04 *	-0.05 **	-0.05 *	-0.04 *	-0.04 *	-0.04 *	-0.04 *
Percent of years mother is working-child's age 6-12 only	0.04 *	0.03 *	0.03 +	0.02	0.03 *	0.03	0.03	0.03 +
Family structure and transitions								
In single parent family	2.33	3.40	1.16	1.66	1.30	2.12 **	2.07	2.13
Early transition (child 0-5)/late transition (child 6-12)	-0.93	3.03	-1.58	2.88	-1.49	2.53	2.36	2.52
Early transition (child 0-5) only	1.78	4.82 **	-0.20	2.73	-0.03	2.83	2.99 +	3.10 +
Late transition (child 6-12) only	-1.53	0.32	-1.31	0.35	-0.71	0.75	0.74	0.74
Demographic lifecourse variables								
Child is black	-2.62 +	-3.71 *	-2.23	-3.36 *	-2.19	-3.46 *	-3.15 *	-2.69 +
Child is Hispanic	-6.50 *	-13.90 ***	-4.78 +	-14.64 ***	-4.46	-13.67 ***	-13.90 ***	-14.05 ***
Child is Other Race (white omitted)	3.24	4.05	2.88	3.76	3.10	3.87	3.71	3.47
Mother's age at child's birth	0.16 *	0.15 *	0.09	0.11	0.05	0.08	0.10	0.09
Number of children in family at child's birth	-0.75 +	-0.31	-0.22	0.28	-0.19	0.29	0.28	0.25
Missing information for number of children	2.57	1.05	-0.31	-0.79	0.05	-0.54	-0.86	-0.32
Child was a low birthweight infant	-1.86	-1.58	-1.83	-1.27	-1.55	-0.92	-0.77	-0.58
Child is male	-2.68 **	-3.86 ***	-2.97 ***	-4.21 ***	-2.56 **	-3.88 ***	-3.86 ***	-3.97 ***
Mom's passage score	0.96 ***	1.08 ***	0.92 ***	1.07 ***	0.87 ***	1.02 ***	1.03 ***	1.03 ***
Demographic current variables								
Mother's education-High school			0.32	-0.45	-0.26	-0.76	-0.84	-0.92
Mother's education - Some college			1.20	1.18	0.35	0.61	0.59	0.56
Mother's education-College			3.38	2.33	2.09	1.34	1.40	1.11
Age of child (years)			-0.85 ***	-0.93 ***	-0.73 **	-0.82 **	-0.77 **	-0.81 **
Number of children in family			-2.26 ***	-2.29 ***	-2.44 ***	-2.40 ***	-2.32 ***	-2.35 ***
Parenting variables								
Cognitive stimulation					0.69 *	0.46	0.46	0.45
Parent's school engagement					0.28 *	0.30 *	0.32 *	0.30 *
Maternal warmth					-0.67 +	-0.46	-0.39	-0.41
Maternal depression							0.15	0.17
Outside influences variable								
Quality of the neighborhood								0.91 +
R-square	0.24	0.29	0.27	0.32	0.28	0.33	0.33	0.33
N	977	749	977	749	977	749	749	749

*** p<.001 ** p<.01 * p<.05 + p<.10

Table 2. Regression of Child's Mathematical Calculation Score on the Family Income History and Controls

Covariates	Mathematical Calculation Score							
	Model 1[a]		Model 2[a,b]		Model 3[a,b]		Model 4[a,b]	Model 5[a,b]
	Total sample	Sample with completed household questionaire	Total sample	Sample with completed household questionaire	Total sample	Sample with completed household questionaire	Sample with completed household questionaire	Sample with completed household questionaire
Family economic history								
Low income-child's age 0-5 only	-4.90 *	-2.97	-3.10	-1.10	-2.46	-0.14	-0.18	-0.27
Low income-child's age 6-12 only	-7.68 ***	-9.69 ***	-5.51 *	-8.17 **	-5.14 *	-8.04 **	-7.99 **	-7.85 **
Low income-child's age 0-12	-8.35 ***	-10.69 ***	-5.67 **	-7.89 ***	-4.79 *	-6.93 **	-6.98 **	-6.72 **
Welfare receipt								
Percent of months on AFDC-child's age 0-5 only	0.12	0.14	0.12	0.16	0.14 +	0.16	0.16 +	0.17 +
Percent of months on AFDC-child's age 6-12 only	-0.09	-0.16	-0.08	-0.14	-0.10	-0.13	-0.13	-0.12
Work history								
Percent of years mother is working-child's age 0-5 only	-0.01	-0.02 *	-0.02	-0.02	-0.01	-0.01	-0.01	-0.01
Percent of years mother is working-child's age 6-12 only	0.01	0.02	0.00	0.01	0.01	0.02	0.02	0.02
Family structure and transitions								
In single parent family	-0.65	1.91	-1.86	0.38	-1.14	1.30	1.29	1.33
Early transition (child 0-5)/late transition (child 6-12)	-2.92	-1.58	-3.04	-1.15	-3.62	-2.06	-2.11	-1.99
Early transition (child 0-5) only	-1.62	-0.85	-2.84	-2.00	-2.63	-1.72	-1.68	-1.58
Late transition (child 6-12) only	-2.41	0.59	-2.24	0.61	-1.38	1.35	1.35	1.34
Parenting variables								
Cognitive stimulation					0.61 +	0.52	0.51	0.51
Parent's school engagement					0.56 ***	0.63 ***	0.63 ***	0.62 ***
Maternal warmth					0.25	-0.02	0.00	-0.01
Maternal depression							0.04	0.06
Outside influences variable								
Quality of the neighborhood								0.71
R-square	0.15	0.15	0.18	0.18	0.19	0.20	0.20	0.20
N	975	747	975	747	975	747	747	747

*** p<.001 ** p<.01 * p<.05 + p<.10

[a]Model includes controls for life course demographic variables.
[b]Model includes controls for current demographic variables.

Table 3. Regression of Child's Letter-Word Identification Score on the Family Income History and Controls

Covariates	Letter-Word Identification Score							
	Model 1[a]		Model 2[a,b]		Model 3[a,b]		Model 4[a,b]	Model 5[a,b]
	Total sample	Sample with completed household questionaire	Total sample	Sample with completed household questionaire	Total sample	Sample with completed household questionaire	Sample with completed household questionaire	Sample with completed household questionaire
Family economic history								
Low income-child's age 0-5 only	-5.23 *	-2.52	-4.30 +	-1.98	-3.49	-1.11	-1.19	-1.32
Low income-child's age 6-12 only	-4.75 *	-6.21 *	-2.63	-4.63 +	-1.87	-4.20	-4.09	-3.91
Low income-child's age 0-12	-9.22 ***	-9.19 ***	-7.15 ***	-6.98 **	-5.73 **	-5.82 *	-5.93 *	-5.58 *
Welfare receipt								
Percent of months on AFDC-child's age 0-5 only	0.12	0.18 +	0.10	0.18 +	0.12	0.20 +	0.19 +	0.20 +
Percent of months on AFDC-child's age 6-12 only	-0.18	-0.15	-0.17	-0.18	-0.20 +	-0.18	-0.18	-0.16
Work history								
Percent of years mother is working-child's age 0-5 only	-0.05 *	-0.06 *	-0.06 **	-0.06 *	-0.05 *	-0.04 +	-0.05 +	-0.05 +
Percent of years mother is working-child's age 6-12 only	0.04 *	0.04 +	0.03	0.02	0.03	0.03	0.03	0.03
Family structure and transitions								
In single parent family	2.34	3.37	1.73	2.32	2.09	3.12	3.09	3.15
Early transition (child 0-5)/late transition (child 6-12)	-0.39	4.94	-0.80	5.30	-0.92	4.64	4.53	4.70
Early transition (child 0-5) only	0.83	3.23	0.30	2.68	0.51	2.76	2.86	2.98
Late transition (child 6-12) only	-1.42	0.90	-1.95	0.07	-0.80	1.03	1.03	1.02
Parenting variables								
Cognitive stimulation					1.41 ***	1.14 **	1.14 **	1.13 **
Parent's school engagement					0.32 +	0.36 +	0.38 +	0.36 +
Maternal warmth					-0.71	-0.29	-0.24	-0.26
Maternal depression							0.10	0.12
Outside influences variable								
Quality of the neighborhood								0.97
R-square	0.23	0.24	0.26	0.26	0.28	0.28	0.28	0.28
N	979	749	979	749	979	749	749	749

*** p<.001 ** p<.01 * p<.05 + p<.10

[a]Model includes controls for life course demographic variables.
[b]Model includes controls for current demographic variables.

Table 4. Regression of Child's Applied Problems Score on the Family Income History and Controls

Covariates	Applied Problems Score							
	Model 1[a]		Model 2[a,b]		Model 3[a,b]		Model 4[a,b]	Model 5[a,b]
	Total sample	Sample with completed household questionaire	Total sample	Sample with completed household questionaire	Total sample	Sample with completed household questionaire	Sample with completed household questionaire	Sample with completed household questionaire
Family economic history								
Low income-child's age 0-5 only	-6.84 ***	-7.72 ***	-5.26 **	-5.98 **	-4.97 **	-5.54 *	-5.56 *	-5.65 **
Low income-child's age 6-12 only	-6.78 ***	-10.10 ***	-5.19 **	-8.86 ***	-5.03 **	-8.84 ***	-8.81 ***	-8.68 ***
Low income-child's age 0-12	-6.16 ***	-8.62 ***	-3.87 *	-5.90 **	-3.10 +	-5.15 *	-5.18 *	-4.92 *
Welfare receipt								
Percent of months on AFDC-child's age 0-5 only	0.01	0.02	0.03	0.04	0.06	0.06	0.06	0.06
Percent of months on AFDC-child's age 6-12 only	-0.04	0.00	-0.04	0.04	-0.07	0.03	0.03	0.04
Work history								
Percent of years mother is working-child's age 0-5 only	-0.03	-0.04 *	-0.03 +	-0.04 *	-0.03 *	-0.03 +	-0.03 +	-0.03 +
Percent of years mother is working-child's age 6-12 only	0.02	0.03	0.01	0.02	0.02	0.03	0.03	0.03
Family structure and transitions								
In single parent family	0.03	3.01	-1.37	1.32	-0.63	2.05	2.04	2.09
Early transition (child 0-5)/late transition (child 6-12)	-1.58	1.48	-2.14	1.36	-2.88	0.57	0.54	0.66
Early transition (child 0-5) only	-2.63	0.35	-4.45 **	-1.43	-4.31	-1.29	-1.26	-1.17
Late transition (child 6-12) only	-0.47	1.34	-0.02	1.64	0.86	2.38	2.38	2.38
Parenting variables								
Cognitive stimulation					0.82 **	0.58 +	0.58 +	0.58
Parent's school engagement					0.29 *	0.37 *	0.37 *	0.35 *
Maternal warmth					0.61	0.59	0.61	0.59
Maternal depression							0.03	0.04
Outside influences variable								
Quality of the neighborhood								0.71
R-square	0.28	0.28	0.31	0.31	0.32	0.32	0.32	0.32
N	977	749	977	749	977	749	749	749

*** p<.001 ** p<.01 * p<.05 + p<.10

[a]Model includes controls for life course demographic variables.

[b]Model includes controls for current demographic variables.

Table 5. Regression of Internaling Behavior Problem on the Family Income History and Controls

Covariates	Internalizing Behavior Problem							
	Model 1[a]		Model 2[a,b]		Model 3[a,b]		Model 4[a,b]	Model 5[a,b]
	Total sample	Sample with completed household questionaire	Total sample	Sample with completed household questionaire	Total sample	Sample with completed household questionaire	Sample with completed household questionaire	Sample with completed household questionaire
Family economic history								
Low income-child's age 0-5 only	1.85 ***	2.38 ***	1.69 ***	2.16 ***	1.73 ***	2.31 ***	2.23 ***	2.30 ***
Low income-child's age 6-12 only	-0.08	0.03	-0.16	-0.07	-0.05	0.10	0.20	0.11
Low income-child's age 0-12	1.21 **	2.04 ***	1.01 *	1.79 ***	1.06 *	1.85 ***	1.75 ***	1.56 **
Welfare receipt								
Percent of months on AFDC-child's age 0-5 only	-0.01	-0.02	-0.01	-0.02	-0.02	-0.03	-0.03	-0.03
Percent of months on AFDC-child's age 6-12 only	0.03	0.00	0.04	-0.01	0.04 +	0.00	0.00	-0.01
Work history								
Percent of years mother is working-child's age 0-5 only	0.01 *	0.01	0.01 *	0.01	0.01 +	0.01	0.01	0.01
Percent of years mother is working-child's age 6-12 only	-0.01 +	0.00	-0.01 +	0.00	-0.01 *	0.00	0.00	0.00
Family structure and transitions								
In single parent family	0.28	-0.07	0.36	0.06	0.17	-0.02	-0.05	-0.08
Early transition (child 0-5)/late transition (child 6-12)	2.22 ***	1.34 +	2.23 ***	1.35 +	2.46 ***	1.53 *	1.44 +	1.34 +
Early transition (child 0-5) only	-0.02	0.04	0.02	0.16	0.03	0.12	0.21	0.15
Late transition (child 6-12) only	1.23 **	1.12 *	1.16 **	1.06 *	1.13 **	1.02 *	1.02 *	1.02 *
Parenting variables								
Cognitive stimulation					0.08	0.12	0.12	0.12
Parent's school engagement					-0.06 +	-0.04	-0.02	-0.01
Maternal warmth					-0.36 ***	-0.52 ***	-0.48 ***	-0.47 ***
Maternal depression							0.09 **	0.08 **
Outside influences variable								
Quality of the neighborhood								-0.52 ***
R-square	0.08	0.08	0.08	0.09	0.10	0.11	0.12	0.14
N	1,002	749	1,002	749	1,002	749	749	749

*** p<.001 ** p<.01 * p<.05 + p<.10

[a]Model includes controls for life course demographic variables.
[b]Model includes controls for current demographic variables.

Table 6. Regression of Child's Externalizing Behavior Problem on the Family Income History and Controls

Covariates	Externalizing Behavior Problems							
	Model 1[a]		Model 2[a,b]		Model 3[a,b]		Model 4[a,b]	Model 5[a,b]
	Total sample	Sample with completed household questionaire	Total sample	Sample with completed household questionaire	Total sample	Sample with completed household questionaire	Sample with completed household questionaire	Sample with completed household questionaire
Family economic history								
Low income-child's age 0-5 only	0.73	1.00	0.39	0.71	0.37	0.84	0.74	0.87
Low income-child's age 6-12 only	-0.35	0.20	-0.73	-0.11	-0.65	0.06	0.19	0.01
Low income-child's age 0-12	1.37 *	2.42 ***	0.82	1.83 *	0.71	1.75 *	1.61 *	1.26
Welfare receipt								
Percent of months on AFDC-child's age 0-5 only	0.01	-0.02	0.00	-0.03	-0.01	-0.04	-0.04	-0.04
Percent of months on AFDC-child's age 6-12 only	0.09 *	0.04	0.09 *	0.04	0.10 **	0.05	0.06	0.04
Work history								
Percent of years mother is working-child's age 0-5 only	0.02 *	0.02 *	0.01 *	0.02 *	0.01 +	0.01 +	0.01 +	0.02 *
Percent of years mother is working-child's age 6-12 only	-0.01 *	-0.01	-0.01 +	-0.01	-0.01 **	-0.01	-0.01	-0.01
Family structure and transitions								
In single parent family	-0.72	-1.28	-0.58	-1.07	-0.92	-1.27	-1.31	-1.38
Early transition (child 0-5)/late transition (child 6-12)	1.45 +	-0.11	1.52 +	-0.04	1.91 *	0.28	0.15	-0.02
Early transition (child 0-5) only	0.84	0.98	0.89	1.12	0.87	1.09	1.21	1.09
Late transition (child 6-12) only	1.12 +	1.01	1.12 +	1.09	0.90	0.87	0.87	0.87
Parenting variables								
Cognitive stimulation					-0.11	-0.05	-0.06	-0.05
Parent's school engagement					-0.11 *	-0.06	-0.05	-0.02
Maternal warmth					-0.49 ***	-0.71 ***	-0.65 ***	-0.62 ***
Maternal depression							0.12 **	0.10 *
Outside influences variable								
Quality of the neighborhood								-0.95 ***
R-square	0.07	0.07	0.08	0.08	0.10	0.10	0.11	0.14
N	1,002	749	1,002	749	1,002	749	749	749

*** p<.001 ** p<.01 * p<.05 + p<.10

Table 7. Regression of Child's Chronic Health Problems on the Family Income History and Controls

Covariates	Chronic Health Problems							
	Model 1		Model 2		Model 3		Model 4	Model 5
	Total sample	Sample with completed household questionaire	Total sample	Sample with completed household questionaire	Total sample	Sample with completed household questionaire	Sample with completed household questionaire	Sample with completed household questionaire
Family economic history								
Low income-child's age 0-5 only	0.00	0.02	0.02	0.05	0.03	0.05	0.05	0.05
Low income-child's age 6-12 only	0.05	0.08	0.09	0.14 +	0.09	0.14 +	0.15 +	0.15 +
Low income-child's age 0-12	0.03	0.06	0.04	0.08	0.04	0.09	0.08	0.07
Welfare receipt								
Percent of months on AFDC-child's age 0-5 only	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Percent of months on AFDC-child's age 6-12 only	0.00	0.01	0.00	0.01	0.00	0.01	0.01	0.01
Work history								
Percent of years mother is working-child's age 0-5 only	0.00	0.00	0.00	0.00 +	0.00	0.00	0.00 +	0.00 +
Percent of years mother is working-child's age 6-12 only	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Family structure and transitions								
In single parent family	0.00	-0.08	-0.01	-0.11	0.00	-0.10	-0.10	-0.11
Early transition (child 0-5)/late transition (child 6-12)	0.11	0.07	0.11	0.06	0.11	0.05	0.04	0.04
Early transition (child 0-5) only	0.04	-0.04	0.03	-0.07	0.03	-0.07	-0.06	-0.06
Late transition (child 6-12) only	-0.01	0.01	-0.01	0.01	-0.01	0.01	0.01	0.01
Parenting variables								
Cognitive stimulation					-0.01	0.01	0.01	0.01
Parent's school engagement					0.01	0.00	0.00	0.00
Maternal warmth					0.00	0.00	0.01	0.01
Maternal depression							0.01 *	0.01 *
Outside influences variable								
Quality of the neighborhood								-0.01
R-square	0.03	0.04	0.04	0.32	0.04	0.07	0.07	0.07
N	1,002	749	1,002	749	1,002	749	749	749

*** p<.001 ** p<.01 * p<.05 + p<.10

[a]Model includes controls for life course demographic variables.
[b]Model includes controls for current demographic variables.

Table 8. Regression of Child Held Back in School on the Family Income History and Controls

Covariates	Held Back in School								
	Model 1[a]		Model 2[a,b]		Model 3[a,b]		Model 4[a,b]	Model 5[a,b]	Model 6[a,b]
	Total sample	Sample with completed household questionaire	Total sample	Sample with completed household questionaire	Total sample	Sample with completed household questionaire	Sample with completed household questionaire	Sample with completed household questionaire	Sample with completed household questionaire
Family economic history									
Low income-child's age 0-5 only	0.26	0.83	0.26	0.67	0.24	0.94	0.91	0.98	0.75
Low income-child's age 6-12 only	1.45 ***	2.09 ***	1.50 ***	2.08 ***	1.56 ***	2.08 ***	2.08 ***	2.07 ***	1.71 **
Low income-child's age 0-12	0.88 *	1.34 *	0.99 *	1.55 **	0.95 *	1.54 *	1.51 *	1.40 *	1.14 +
Welfare receipt									
Percent of months on AFDC-child's age 0-5 only	-0.03	-0.05	-0.03	-0.05	-0.04 +	-0.05	-0.05	-0.05	-0.06 +
Percent of months on AFDC-child's age 6-12 only	0.00	0.05	0.00	0.05	0.01	0.06 +	0.06 +	0.06 +	0.06 +
Work history									
Percent of years mother is working-child's age 0-5 only	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Percent of years mother is working-child's age 6-12 only	-0.01 *	-0.01	-0.01 *	-0.01 +	-0.01 *	-0.01	-0.01 +	-0.01 +	-0.01
Family structure and transitions									
In single parent family	0.92 +	0.54	1.04 *	0.72	0.88 +	0.68	0.68	0.70	1.11
Early transition (child 0-5)/late transition (child 6-12)	0.67	0.62	0.53	0.48	1.00 +	0.60 +	0.61	0.40	0.06
Early transition (child 0-5) only	0.57	0.17	0.74	0.26	0.84 +	0.42	0.42	0.38	0.63
Late transition (child 6-12) only	0.74 +	-0.13	0.59	-0.31	0.59	-0.36	-0.35	-0.35	-0.51
Parenting variables									
Cognitive stimulation					-0.22 *	-0.23	-0.23 +	-0.23 +	-0.21
Parent's school engagement					0.04	0.10 +	0.10 +	0.12 *	0.10 +
Maternal warmth					-0.23 *	-0.29 *	-0.28 *	-0.26 *	-0.13
Maternal depression							0.01	-0.01	-0.03
Outside influences variable									
Quality of the neighborhood								-0.39 *	-0.27
Child variables									
Total behavior problems									0.06 **
Passage score									-0.06 ***
Chronic health problems									0.56
-2 log L	419.57	272.48	412.03	265.34	389.26	255.27	255.21	251.32	221.59
N	945	706	945	706	945	706	706	706	706

*** p<.001 ** p<.01 * p<.05 + p<.10

[a]Model includes controls for life course demographic variables.
[b]Model includes controls for current demographic variables.

Table 9. Regression of Child Received Special Education on the Family Income History and Controls

Covariates	Received Special Education								
	Model 1[a]		Model 2[a,b]		Model 3[a,b]		Model 4[a,b]	Model 5[a,b]	Model 6[a,b]
	Total sample	Sample with completed household questionaire	Total sample	Sample with completed household questionaire	Total sample	Sample with completed household questionaire	Sample with completed household questionaire	Sample with completed household questionaire	Sample with completed household questionaire
Family economic history									
Low income-child's age 0-5 only	0.92 **	0.71	0.82 *	0.51	0.84 *	0.51	0.54	0.55	0.08
Low income-child's age 6-12 only	0.52	1.19 **	0.33	0.91 +	0.31	0.91 +	1.09 *	1.09 *	0.35
Low income-child's age 0-12	0.36	0.59	0.25	0.23	0.13	0.15	0.08	0.08	-0.68
Welfare receipt									
Percent of months on AFDC-child's age 0-5 only	0.00	0.00	0.00	-0.01	0.00	-0.01	-0.02	-0.02	-0.01
Percent of months on AFDC-child's age 6-12 only	0.01	-0.02	0.01	-0.05	0.02	-0.05	-0.05	-0.05	-0.02
Work history									
Percent of years mother is working-child's age 0-5 only	0.00	0.01 +	0.01	0.01 *	0.01	0.01 *	0.01 *	0.01 *	0.01
Percent of years mother is working-child's age 6-12 only	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Family structure and transitions									
In single parent family	0.12	-0.39	0.29	-0.05	0.18	-0.16	-0.12	-0.14	0.16
Early transition (child 0-5)/late transition (child 6-12)	0.86 *	-0.69	0.89 *	-0.50	1.01 **	-0.50	-0.59	-0.60	-0.59
Early transition (child 0-5) only	0.18	-1.09 *	0.49	-0.68	0.49	-0.66	-0.59	-0.61	-0.02
Late transition (child 6-12) only	-0.56	-1.19 *	-0.61	-1.10 *	-0.77 *	-1.24 *	-1.21 *	-1.21 *	-1.23 *
Parenting variables									
Cognitive stimulation					-0.16 *	-0.11	-0.11	-0.11	-0.18 +
Parent's school engagement					0.01	0.00	0.02	0.02	0.04
Maternal warmth					-0.06	-0.10	-0.07	-0.06	-0.06
Maternal depression							0.10 ***	0.10 ***	0.09 **
Outside influences variable									
Quality of the neighborhood								-0.07	0.03
Child variables									
Total behavior problems									0.01
Passage score									-0.09 ***
Chronic health problems									1.38 ***
-2 log L	752.24	484.44	728.49	461.82	721.41	458.17	446.55	446.27	365.79
N	965	721	965	721	965	721	721	721	721

*** p<.001 ** p<.01 * p<.05 + p<.10

[a]Model includes controls for life course demographic variables.

[b]Model includes controls for current demographic variables.

Appendix Table A. Means and Standard Deviations of Independent Variables in the Analyses

Variables	Total Sample	
	Mean	**Standard deviation**
Family economic history		
Low income-child's age 0-5 only	0.08	0.27
Low income-child's age 6-12 only	0.08	0.27
Low income-child's age 0-12	0.23	0.43
Welfare receipt		
Percent of months on AFDC-child's age 0-5 only	2.15	7.99
Percent of months on AFDC-child's age 6-12 only	1.20	5.79
Work history		
Percent of years mother is working-child's age 0-5 only	56.23	36.41
Percent of years mother is working-child's age 6-12 only	65.17	39.26
Family structure and transitions		
In single parent family	0.09	0.28
Early transition (child 0-5)/late transition (child 6-12)	0.05	0.22
Early transition (child 0-5) only	0.11	0.31
Late transition (child 6-12) only	0.11	0.32
Demographic life course variables		
Child is African American	0.20	0.41
Child is Hispanic	0.03	0.16
Child is Other Race (white omitted)	0.01	0.12
Mother's age at child's birth	28.49	6.60
Number of children in family at child's birth	1.39	1.20
Missing information for number of children	0.01	0.10
Child was a low birthweight infant	0.07	0.26
Child is male	0.50	0.51
Mom's passage score	32.23	4.90
Demographic current variables		
Mother's education-High school	0.36	0.49
Mother's education - Some college	0.31	0.47
Mother's education-College	0.25	0.44
Age of child (years)	9.76	1.86
Number of children in family	2.49	1.00
Parenting variables		
Cognitive stimulation	10.18	1.86
Parent's school engagement	12.48	3.72
Maternal warmth	5.08	1.33
Maternal depression	NA	NA
Outside influences variable		
Quality of the neighborhood	NA	NA
N	978	978

NA - Not applicable

Note: The means in this table are for the Passage Comprehension Score model. Results for the ot

Appendix Table B. Means and Standard Deviations of Dependent Variables in the Analyses

Variables	Total Sample			Sample with Completed Household Questionnaire		
	N	Mean	Standard deviation	N	Mean	Standard deviation
Dependent variables						
Passage comprehension score	978	107.05	15.87	750	108.36	15.42
Mathematical calculation score	975	104.69	17.84	748	106.71	17.50
Applied problems score	976	111.25	16.98	750	112.94	17.03
Letter-word identification score	978	108.19	19.77	750	109.77	20.17
Internalizing behavior problems	978	16.51	3.79	750	16.47	3.86
Externalizing behavior problems	978	22.73	5.67	750	22.59	5.62
Total behavior problems	978	40.54	8.82	750	40.32	8.73
Chronic health problems	978	0.50	0.51	750	0.50	0.52
Held back in school	945	0.07	0.25	706	0.06	0.24
Received special education	965	0.14	0.36	721	0.12	0.33