

Child well-being in an era of welfare reform:

The sensitivity of transitions in development to policy change

Pamela Morris

MDRC

Greg J. Duncan

Northwestern University

Elizabeth Clark-Kauffman

Northwestern University

This paper was completed as part of the Next Generation Project, a collaboration among researchers at the Manpower Demonstration Research Corporation (MDRC) and several leading research institutions that is being funded by the David and Lucile Packard Foundation, William T. Grant Foundation, and John D. and Catherine T. MacArthur Foundation. We thank Chris Rodriques and Heather Hill for capable research assistance and J. Lawrence Aber, Jacque Eccles, Irv Garfinkel, Aletha Huston, Robert Moffitt, Seymour Spilerman, and Jane Waldfogel for helpful comments on an earlier draft of this paper.

Contact information for corresponding author: Pamela Morris, MDRC, 16 East 34th Street, New York, NY 10016. Pamela_morris@mdrc.org

Draft: February 19, 2004

Abstract

This study examines the age-specific pattern of effects of welfare policies on child achievement. More specifically, we seek to determine whether there are points in development that represent periods of particular sensitivity or vulnerability to welfare and employment policies. Using data from seven random-assignment welfare and antipoverty policies that together provide more than 30,000 observations of children's achievement, we find that times of developmental transition are most sensitive to the changes in families brought about by these policies. More specifically, we find positive effects of welfare and antipoverty policies for children making the transition *into* middle childhood, and negative effects of these same policies for children making the transition *out of* middle childhood and into early adolescence. Effects are more pronounced for generous earnings supplement policies than other welfare and employment strategies. Our effects are robust across various program groupings and cannot be attributed to family characteristics that differ for children of different ages. By examining how the effects of policies targeted at parents' economic well-being vary by child age, this research informs our understanding of the way in which changes in employment and income for low-income parents affect development across childhood.

Child well-being in an era of welfare reform:

The sensitivity of transitions in development to policy change

As with nonexperimental research on maternal employment and income, recent research based on random-assignment experimental studies has found that welfare and employment policies appear to affect younger and older children differently. Programs that increase parents' employment produce either neutral or positive effects for preschool and early-school-age children in poverty but negative effects for adolescents (Gennetian, Duncan, Knox, Clark-Kauffman, & Vargas, 2002; Gennetian & Miller, 2002; Huston et al., 2001; Morris, Huston, Duncan, Crosby, & Bos, 2001). Experimental data on the youngest children are scarce, but the available evidence has shown neutral effects (Morris & Michalopoulos, in press).

We are far from understanding the precise pattern of policy effects across the ages and stages of childhood—i.e., from toddlerhood to preschool, from early middle childhood to later middle childhood, and from pre-adolescence to adolescence. Are there points in development that represent particular sensitivity or vulnerability to welfare and employment policies? The present paper addresses this question using data from seven random-assignment welfare and antipoverty policies that together provide more than 30,000 observations of children's achievement. By examining how the effects of policies targeted at parents' economic well-being vary by child age, this research informs our understanding of the way in which changes in employment and income for low-income parents affect development across childhood.

This study adds to the existing literature in several ways. First, all of the programs were evaluated using a rigorous random-assignment design, in which families were randomly assigned to a group subject to the new welfare program or to a control group – the most reliable methodology for determining the causal effects of policies. By examining the effects of a set of differing welfare-reform policies on children's well-being, all of which are intended to increase employment and reduce welfare, this study informs our understanding of how changes in macro-policies targeted at parental employment can affect child well-being. This information is particularly timely given the reauthorization of welfare at the federal level and continuing evolution of such policies at the state level.

Second, because the programs targeted parents' employment and, sometimes, family income as well, examining the effects on children can inform hypotheses about how changes in parents' employment and income affect children's well-being. Most nonexperimental research on the effects of changes in employment cannot rule out the role of selection factors. In this study, we examine the effects on children of parents' random assignment to a welfare and employment program (and the resulting effects on employment and income) that are unrelated to confounding parental characteristics.

Finally, prior research on the effects of welfare and employment policies has examined the effects of policies one at a time (cf. Huston et al., 2001; Gennetian & Miller, 2002), and across groups of children that include multiple developmental stages (Morris & Michalopoulos, 2003). This study uses seven random-assignment experimental studies that allow us to investigate the generalizability of the findings to a broader set of samples and policies. Moreover, the power of the 30,000-case pooled sample enables us to examine effects within much smaller age groupings than has been possible in prior research. This precision helps us

understand how children at differing developmental stages and transition points in development might be affected by welfare and antipoverty policies and allows us to more flexibly explore alternative hypotheses to any effects observed.

Effects of employment and income by child age

The welfare and antipoverty policies we include here target parents' economic outcomes, and are likely to affect children only indirectly, through changes in their parents' economic situations. A wealth of developmental, economic and policy research, relying on both nonexperimental and experimental data, suggests that changes in parents' employment and family income can affect children's development, at least under certain circumstances. Economic and psychological theories provide frameworks for understanding the mechanisms by which parents' employment and income can have such effects, by emphasizing both the role and distribution of material and social resources (Becker, 1981; Bergstrom, 1997; Coleman, 1988) and family psychological processes (Chase-Lansdale & Pittman, 2002; McLoyd, 1990, 1997, 1998; McLoyd, Jayartne, Ceballo, & Borquez, 1994). More specifically, economic theory would suggest that employment and income may affect children's social behavior and academic achievement by influencing the goods parents purchase for children (books, toys, and child care) and the time parents spend with children. Psychological theory emphasizes the effects of employment and income on parental emotional well-being (stress and depression), and, in turn, on parenting behavior, as one pathway by which parents' employment and income affect children's development.

For low-income families headed by single mothers, the associations between maternal employment and children's cognitive and social development tend to be positive, but much of this difference is a function of preexisting differences between mothers who are and are not employed (Harvey, 1999; Huston, 2002; Vandell & Ramanan, 1992; Zaslow & Emig, 1997). The effects of maternal employment on children's development also depend on the characteristics of employment—its quality, extent, and timing—and on the child's age (Brooks-Gunn, Han, & Waldfogel, 2002; Harvey, 1999; Parcel & Menaghan, 1994). Highly routinized jobs that pay very low wages and afford little autonomy are associated with low levels of home environmental stimulation, which, in turn has been found to affect children's development adversely (Moore & Driscoll, 1997; Parcel & Menaghan, 1994, 1997).

More relevant for the current study are differences in the effects of maternal employment by child age. Employment during both infancy and adolescence may pose problems for children. Recent evidence suggests that there may be negative impacts of employment during the child's first year of life (Brooks-Gunn et al., 2002) and some investigations suggest negative effects for adolescents (Huston, 2002). In one low-income sample, maternal employment has been found to be associated with reduced parental supervision and increased adolescent delinquency in low-income families (Sampson & Laub, 1994). But more recent findings suggest that maternal movements into employment may be beneficial for the mental health of adolescents, although there are few effects on preschoolers (Chase-Lansdale, et al., 2003).

Poverty has consistently negative associations with children's development, but there is considerable controversy about the causal role of income *per se*, as opposed to other correlates of poverty (Bradley & Corwyn, 2002; Duncan & Brooks-Gunn, 1997; Duncan, Yeung, Brooks-Gunn, & Smith, 1998; Mayer, 1997; McLoyd, 1998). Several studies suggest that income is more consistently related to cognitive performance than to behavior and health (Duncan &

Brooks-Gunn, 1997; Duncan, Yeung, Brooks-Gunn, & Smith, 1998; Klerman, 1991; Korenman & Miller, 1997). Movements into and out of poverty appear to be more important than changes across higher levels of income, and chronic poverty appears more detrimental than transitory poverty (Bolger, Patterson, Thompson, & Kupersmidt, 1995; Bradley & Corwyn, 2002; Dearing, McCartney, & Taylor, 2001; Duncan & Brooks-Gunn, 1997; Duncan et al., 1994; McLoyd, 1998). As with employment, however, the effects may differ by child age. One longitudinal analysis demonstrated that early childhood poverty (when the child is age 0–5) was more strongly associated with children’s failure to complete schooling in adolescence than was poverty from age 6 to 15 (Duncan, Yeung, Brooks-Gunn, & Smith, 1998).

Understanding the source of the variation in effects

Age-specific patterns of effects of welfare programs may arise because of differences in the way individual characteristics interact with micro-system changes brought about by policy initiatives targeting maternal employment and income. Prior theoretical work would suggest that differences in developmental tasks, sensitivity to change, and interactions with the environment across childhood may explain differences in the way younger, middle childhood, and adolescent children are affected by maternal employment.

First, responses by younger and older children to changes in parents’ employment and income may reflect differences in the extent to which changes in employment and income affect the achievement of developmental tasks—that is, the goodness of the stage-environment fit (Eccles et al., 1993). Children’s development may be characterized by the achievement of successive stage-salient developmental tasks (Sroufe, 1979; Waters & Sroufe, 1983). Children across developmental periods may vary in their responses to policies that affect employment and income because of differences in the “fit” between these changes in children’s proximal environments and the attainment of their developmental tasks. That is, maternal employment may promote or interfere with the attainment of stage-salient tasks in ways that affect later development. For example, researchers finding negative effects of maternal employment in the second and third quarter of the first year of life have argued that the parent-child separation that occurs with parental employment interferes with the child’s formation of the representation of the parent, at the critical moment when these representations are being established (Baydar & Brooks-Gunn, 1991). For older children, parents’ transitions to employment that occur at the time of identity development may foster the increasing autonomy needed at this point in development. At other stages of development, a mother’s absence owing to employment may be less critical to the attainment of critical developmental tasks, and so have few effects.

Differences across developmental responses to policy changes may also reflect differential *sensitivity* of children of different ages to changes in development. A number of researchers have argued that early childhood is a “sensitive period” in development, amenable to intervention (Shonkoff & Philips, 2000; Sroufe, 1979). The first few years of life are characterized by significant growth in physical, cognitive and socio-emotional development, and underlying these changes are increases in synapse formation in the brain. The overproduction of synapses that occurs with experience-expectant processes makes certain periods of development most sensitive to environmental inputs, at least for processes like sensory development (Greenough et al., 1987). While changes in environment can result in the creation of synaptic connections, through experience-dependent processes, the plasticity of the individual changes over the course of development. Waddington (1957) has described development as proceeding along the branches of a tree—while changes in developmental trajectories can occur at any point

at which a new branch is formed, the ability of the individual to alter his or her developmental course substantially becomes increasingly difficult over time.

Transitions in development may also serve as important periods in which change may be most likely to occur. Development has been described as consisting of a series of reorganizations that occur with successive stages (Cicchetti, 1991; Sroufe, 1990). While the integration of new behaviors into prior schema would lead to continuity in development, the fact that developmental transitions involve a qualitative reorganization of an individual's organizing systems suggests that these transitions are points at which development is most in flux, and open to change in direction (Graber & Brooks-Gunn, 1996). For some developmental transitions, maternal employment may facilitate positive change, helping the child to negotiate the bridge between developmental periods. But for some developmental transitions, particularly those characterized by increasing vulnerability, changes in maternal employment may result in an accumulation of risks that exceeds a threshold for the individual child, and results in a negative change. For example, some researchers have found that early adolescence is a time of an increased number of stressful life events (Brooks-Gunn, 1991; Ge, Lorenz, Conger, Elder, & Simons, 1994). Experiencing changes in maternal employment along with the pubertal and life-events stresses that may accompany the transition to adolescence may have negative implications for the development of young adolescents.

Also important is the extent to which the interaction between the child and the environment may change with development. The potential for change in an individual comes from the interaction between the individual and the environment, and from the timing of that interaction, and not from the individual alone (Bronfenbrenner, 1979; Bronfenbrenner & Morris, 1998; Lerner, 1998). Bronfenbrenner has described the development of the individual as occurring within a nested and interactive set of systems (Bronfenbrenner & Morris, 1998). However, the nature of the interactions among these systems is affected by the developmental stage of the individual. For example, young children are primarily affected by their family context, and only indirectly, through interactions with their family, by community or neighborhood contexts. In contrast, older children may be more directly affected by their own interactions within their neighborhoods. Because welfare and employment policy interventions target changes in the family (rather than school or community contexts), they may affect older and younger children differently depending on the extent to which individual development is affected by the family system. In this case, the fact that young children are not yet selecting their own environments means that such policies may play a relatively stronger role for younger than for older children's developmental outcomes (McCall, 1981; Yoshikawa, 1994).

Similarly, the extent to which systems interact in affecting the child may also be important. Changes in the family system may or may not be offset by changes in other systems, and these interactions among systems may shape the way development is affected by employment and income change. More specifically, elementary school may provide stronger support for parents' transitions to employment than junior high school, which push children into multiple classrooms at a moment when they need additional attention (Seidman, Allen, Aber, Mitchell, & Feinman, 1994; Simmons & Blythe, 1987)

In all of these cases, differences observed in the way younger and older children respond to changes in employment and income are caused by differences in the developmental level of the children themselves. Below we describe some other ways in which differences between older and younger children may result that are not tied to their developmental responses.

Confounds of family ecology

In addition to developmental differences between younger and older children, the family ecology across childhood may also differ considerably, and may account for differences between older and younger children in their responses to increases in maternal employment among single-parent welfare recipients. Family differences associated with child age include: the demographic characteristics of parents, family composition (including family structure, the number of children, and presence of younger siblings), welfare and employment history, and the presence of varying employment barriers.

Parent demographic characteristics may explain differences in the responses of younger and older children to changes in maternal employment. That is, younger children are more likely to have younger mothers, and parents' age, rather than child's age, may matter for how employment and income affect children's development. A wealth of research has focused on the distinct risks faced by young mothers—teenagers and those in their early 20's—in making the transition to self-sufficiency (Card & Wise, 1978; Furstenberg, Brooks-Gunn, & Morgan, 1987; Mott & Marsiglio, 1985; Horwitz, Klerman, Kuo, & Jekel, 1991). Not only do younger mothers face difficulties in following a non-normative life course, but the need to negotiate the transition to adulthood along with the transition to parenthood makes this group of parents (and, in turn, their children) especially vulnerable to any other changes in the family system—like increases in employment. Older mothers may have more of the skills needed to support their children's development during this family transition.

Family composition is a second demographic confound in the explanation of why children across developmental periods are affected differently by maternal employment. In a sample of single-parent families, younger children are more likely to have never-married parents, while older children are more likely to have separated or divorced parents. A large body of research has found increased difficulties for children of divorced parents, at least in part due to the marital conflict preceding the divorce (Amato & Keith, 1991; Block, Block, & Gjerde, 1986; Cherlin, Furstenberg, Chase-Lansdale, Kiernan, Robins, Morrison, & Teitler, 1991; Hetherington, 1992; Hetherington, Cox, & Cox, 1985). The difficulties faced by children of divorced parents may be compounded when single parents go to work, making older children react more negatively than their younger peers to further family transitions. Furthermore, younger children are more likely to be part of a smaller family without younger siblings, while older children are more likely to have younger siblings and larger families. Stretching limited financial resources to meet the needs of more children may reduce the positive effects on older children of programs that increase income, and intensify the burden of programs that increase employment without increasing income.

Third, prior economic history may differ among families with older and younger children, with older children having families with a longer history of receiving welfare and less work history than younger children. Parents on welfare who have older children may face greater barriers to employment, or they may have made a commitment to parenting that keeps them from working despite their children's limited child care needs. Being forced to make the transition to employment after a long period of welfare dependence may be more difficult for them than for a parent whose dependence on welfare was more limited. And these differences in how parents react to the transition to employment may explain any differences observed in younger and older children's responses to increases in parental employment.

The present study

In our earlier work, the effects of programs that increased employment and income depended on children's ages at the time of parents' transition to employment. There were positive effects for preschool and early school-age children, but only in programs that increased both employment and income (Morris et al., 2001). A meta-analysis across several studies of welfare and employment programs demonstrated that the same programs that produced some positive effects on younger children's academic achievement had some negative effects on adolescents' schooling outcomes, whether or not income was increased (Gennetian et al., 2002). The negative impacts for adolescents depended on changes in their home and out-of-home environments, such as less supervision by adults, greater responsibility for younger siblings, and more pressure to work long hours outside the home. In contrast, the positive impacts on younger children in many of these same programs may have resulted from increases in the use of center-based child care and structured out-of-school activities, rather than changes in the quality of parenting practices.

The current study extends these findings in a couple of ways. First, in other work, we examined the effects of programs for two broad age groups—children who were preschool and early school age at the beginning of the studies and in middle childhood at the time of the follow-up assessments, and children who were pre-adolescent and early adolescent at the start of the studies and in adolescence when we assessed their outcomes. Clearly, these broad age ranges include children at more than one developmental period. Here, we examine in greater detail the age-specific impacts of welfare and employment programs, in order to estimate more precisely the pattern of impacts across differing developmental periods and to understand the extent to which effects coincide with transition points in development. Prior theoretical work leads us to expect the effects to be most pronounced during the sensitive period of early childhood and periods of developmental transition, when developmental trajectories are most open to both positive and negative change. Second, our prior work relied on study-by-study impact estimates, or meta-analytic techniques to examine average effects across studies. Here, we examine pooled estimates as well as the meta-analytic averages, the former which provide us with much greater flexibility to test competing explanations for age-specific effects of welfare and employment policies. Like meta-analysis, however, the use of this pooled data set provides a means to synthesize findings across individual studies.

We focus our analysis on the effects on children's cognitive performance and school achievement, using multiple measures of children's achievement and performance to improve the precision of our measure—including measures of teacher reports of achievement, test scores, and parental reports of children's achievement in school. Research on the effects of income and poverty suggests that these outcomes, unlike measures of social behavior and health, may be most sensitive to increases in income (Duncan et al., 1998). Moreover, unlike measures of school behavior problems (such as suspensions, expulsions, or drop out), measures of achievement and cognitive performance are salient across stages of development, allowing for the comparison across differing periods of childhood.

Notably, we conduct a series of analyses to test the robustness of our effects. For example, we examine the sensitivity of our model to the source of the achievement report used, the presence of particular cultural contexts in our data, and the presence of multiple children in the family. In addition, we examine several competing hypotheses to explain why effects vary across child age. These analyses allow us to investigate whether differences across age groups

reflect developmental differences in children's response to employment and income that are a function of their developmental stage, or of differences in the family ecology of younger and older children, including differences in family composition and prior history. Finally, because each of our studies gathers data from somewhat different age groups, we conduct a series of tests to ensure that differences across age groups are not due to the effects of individual studies.

Method

Studies

Our analysis utilizes seven random-assignment studies that together evaluate the effects of twelve welfare and employment programs. The studies represent a broad range of geographic areas in the United States and in two provinces in Canada. All were begun in the early to mid-1990s and designed to estimate the effects on low-income families and children of programs designed to increase parental employment. Many were pilot programs tested by individual states under waivers of the rules governing Aid to Families with Dependent Children (AFDC), the welfare system that was replaced in 1996 by Temporary Assistance for Needy Families (TANF). All of the treatments were designed as "employment" treatments of one form or another—all were intended to reduce welfare and increase employment, without direct intervention components targeted at parents' mental health, parenting, or outcomes for children directly. Although many policies were tested, the approaches can be grouped into two categories: *generous earnings-supplement policies* that are designed to encourage work and increase income via make-work-pay strategies; and *mandatory employment services and time-limited programs*, which attempt to encourage work via sanctions and benefit termination strategies.

More specifically, generous earnings supplements are designed to make work more financially rewarding, usually by increasing the earnings disregard (the amount of earnings that is not counted as income in calculating a family's welfare benefit) so that families can keep part of their welfare dollars when they go to work. Two programs provided earnings supplements to welfare recipients outside of the welfare system instead, and these two made the supplement conditional upon 30-hour-per-week work. Mandatory employment services are requirements that recipients participate in employment-related activities as a condition of receiving their welfare benefits. The primary tool used to enforce participation mandates is sanctioning, whereby a recipient's welfare grant is reduced if she or he does not comply with program requirements. Although many of the programs required recipients to participate in employment or employment-related activities, including basic education, only seven tested the effects of mandatory services without including generous earnings supplements. Finally, time limits are intended to reduce welfare dependence, encouraging parents to work. The federal welfare law of 1996 sets a lifetime limit of five years on cash-assistance receipt, but states may shorten or extend the limit by using state funds; the studies here both included time limits of less than five years, but one did allow extensions under certain circumstances. In the two studies included in the pooled data that include time limits, they were bundled with other program features like mandatory services and earnings supplements.

The following studies were included in this analysis: Connecticut Jobs-First (CT Jobs First; Bloom et al., 2002), Florida's Family Transition Program (FTP; Bloom et al., 2000), Los Angeles Jobs First GAIN (LA GAIN; Freedman et al., 2000), Minnesota Family Investment Program (MFIP; testing the effects of two programs, Full MFIP and MFIP Incentives Only; Gennetian & Miller, 2000), National Evaluation of Welfare to Work Strategies (NEWWS;

testing the effects of six programs in three sites across two follow-up points; Hamilton et al., 2001; McGroder et al., 2000), New Hope (testing the effects of one program at two follow-up points; Bos et al., 1999; Huston et al., 2003), and the Canadian Self-Sufficiency Project (SSP; testing the effects of one program at two follow-up points; Morris & Michalopoulos, 2000; Michalopoulos et al., 2002).

All of these studies had a common design. In each study, sample members were randomly assigned at baseline to one or more program groups that was subject to a new set of welfare rules and benefits or a control group that received the prevailing AFDC welfare benefits package and rules (or other benefits largely available to low-income families). In all but one of the studies, parents were applying for welfare or renewing eligibility when they were randomly assigned. (In the case of the New Hope Study, all geographically eligible low-income parents were eligible to participate). Extensive analyses conducted on each sample as part of the original studies establish that on a variety of baseline parental and family characteristics, differences between program and control groups were extremely rare, suggesting that random assignment was implemented properly, and, therefore, that any differences in outcomes between the groups after baseline can be attributed to the program and not to any other differences between families.

Inclusion of a Canadian Study. Given the primary focus of this paper on the effects of welfare and employment policies on children, why the inclusion of the Canadian study, SSP? First and foremost, SSP was very similar in its goals to the other generous earnings supplement programs included in this study—MFIP, New Hope, and (although to a lesser extent, because of the inclusion of a time limit) Connecticut’s Jobs First Evaluation. All were intended to increase employment and income among primarily welfare-recipient parents. But the Canadian context may affect the behavior of both the program and control groups in SSP -- and is the background in which the experiment was tested. In fact, Canadian and U.S. economic policies and outcomes have many similarities. The two countries offer similar types of child care subsidies, and working mothers of young children make similar choices regarding who cares for their children (Michalopoulos & Robins, 2000). Most single mothers in both countries now work (Meyer & Rosenbaum, 2000; Dooley, 1994), and women in the two countries earn similar amounts (Blackburn & Bloom, 1993). Federal governments in both countries passed legislation that turned welfare from an entitlement program to a federally funded block grant with considerable local discretion, although benefit levels in most Canadian provinces tend to be higher than in much of the U.S. (Michalopoulos & Robins, 2002). Although many US and Canadian policies are similar, there are at least two important differences: Canadian safety net programs are more likely to be universal rather than means-tested (Blank & Hanratty, 1993), and Canada has national health insurance.

To the extent that these differences in policy lead to less take-up of the program on the part of parents (because the counterfactual is much more generous), this could lead to important differences in the effects of these policies on children. However, prior work has shown very similar effects across generous supplement policies in the US and Canada (Berlin, 2000). To the extent that this similarity holds across age groups of children, including the Canadian sample not only increases the sample size to allow for more precise estimates of the effects of policies on children, but also allows for the generalizability of the findings across diverse cultural contexts. On this latter point, it is important to note that SSP was conducted in both British Columbia (an urban location with high average wages and a high cost of living) and New Brunswick (very rural and heavily Catholic).

Sample

Our data consist of 32,872 child observations taken from 25,828 children living in 17,470 families in the seven studies (see Table 1). Children range in age from 0-15 at the point of random assignment. These children were living in primarily single-parent families, most of whom were receiving welfare at the beginning of the studies. In all but one case, families entered the studies at the time of their application or re-determination application for welfare (the only exception to this is the New Hope study, which recruited both welfare recipient and non-welfare recipient families that met income and geographic residence requirements). This means that these samples, unlike those in many other studies, do not consist of study volunteers. That is, application to the welfare system or receipt of welfare in almost all of these studies (with the exception of New Hope) *required* participation in the study effort (ie., random assignment to the program and control groups and the administrative sources of data collection). Of course, parents could opt out of the survey effort, although response rates in all studies were quite high—between 71 and 90 percent, and extensive nonresponse bias analysis conducted as part of the original studies confirmed the equivalence of program and control groups in these respondent samples (suggesting that any bias due to nonresponse is minimal; Bloom et al., 2000; Bloom et al., 2002; Bos et al., 1999; Freedman et al., 2000; Gennetian & Miller, 2000; Hamilton et al., 2001; McGroder et al., 2000; Morris & Michalopoulos, 2000).

As shown in Table 1, while the children in our sample span the entire childhood age range, our largest samples of children were age 2-5 at the beginning of the study period, with smaller samples of children under age 2 and over 12. In some cases, individual children were followed at multiple intervals.

Insert Table 1 about here

Procedures

Data Sources. Data in each study were compiled from a variety of sources. Basic demographic information is available for all sample members from a *Background Information Form* (BIF) completed just prior to random assignment. Staff in the financial offices interviewed each sample member and collected important demographic information, such as the sample member's age, educational attainment, work history prior to random assignment, and prior welfare receipt. These background data are used to control for pre-baseline family characteristics in our estimates of the effects of the welfare programs.

Data from *administrative records* are used to track families' benefit receipt and employment prior to baseline and during the follow-up periods. Public assistance benefit records include monthly information on cash welfare and food stamp benefits provided to each member of the research sample. Program records provide information on cash supplements provided in the two programs that provided supplements to working families outside of the welfare system. Unemployment insurance earnings records (for the studies in the United States) provide quarterly earnings information for every sample member, as reported by employers to the Unemployment Insurance (UI) system. (Although the system is labeled "Unemployment," the earnings records are compiled for all workers who work for any employer reporting earnings to the Social Security system.)

Information on children and families was collected from a *parent survey* administered to each family two to five years after baseline, depending on the study. Most of these surveys were conducted in the home, although some telephone surveys were conducted (if the family lived outside the interviewing area or refused an in-home interview). The individual evaluations spent considerable resources to track and interview all of the eligible families. The survey in each study had many common questions. The core section of the survey took approximately 30 minutes to administer. It was designed to obtain employment information not available from administrative records (such as hours worked and wage rates) plus more general measures of family circumstances (such as household composition, sources of income, and material hardship). The child section of the survey took approximately 45 minutes to administer and included a range of questions to assess the family environment and children's development.

Finally, in some of the studies, measures of children's development were also collected via *surveys conducted directly with children, tests administered to children, and/or surveys conducted with children's teachers* two to five years after baseline, depending on the study.

Measures

Child age at baseline. Each child's age at the point of random assignment was computed from birthdate information provided on the parent surveys and information collected regarding the date of random assignment of the family. Seven age categories were created: ages 0-1, 2-3, 4-5, 6-7, 8-9, 10-11, 12-13 and 14-15. Examination of the sample sizes suggested that the 12-13 and 14-15 year old age groups were more limited in size, and analyses indicated that these latter two groups needed to be combined for sufficient power to detect effects for this older age group. (The pattern of effects was similar across these two age groups, however).

School achievement/Cognitive performance. Children's cognitive performance or school achievement is measured using a parent or teacher report or test scores, with some studies including multiple sources per child, and three of the studies (testing eight programs) assessing children at multiple times. All studies included parent reports of children's achievement on a single-item 5-point rating of how well the child was doing in school. Teacher reports of achievement (collected in three of the studies) were based on items from the Academic Subscale of the Social Skills Rating System (Gresham & Elliot, 1990). On this 10-item measure, the teacher compares the child's performance with that of other students in the same classroom on reading skill, math skill, intellectual functioning, motivation, oral communication, classroom behavior, and parental encouragement (internal consistency $\alpha = .94$). Test scores include the Peabody Picture Vocabulary Test, a math skills test containing a subset of items from the Canadian Achievement Tests, Second Edition (CAT/2), the Bracken Basic Concepts Scale, and the Math and Reading scores from the Woodcock Johnson tests of achievement, all well validated reliable tests of children's cognitive performance. In one study, correlations of parent reports with teacher reports and test scores fell between .40 and .50. To provide comparability in outcomes across studies, we have standardized the cognitive performance and achievement outcomes using study-specific control-group standard deviations.

Earnings. The pooled data set includes quarterly earnings from UI records for all years of the follow-up period for each study conducted in the U.S. These data provide information about earnings of sample members in the state in which the study took place, but do not include earnings from other states nor from jobs not reported to the state's UI system. For the study of SSP conducted in Canada, earnings were collected via the parent surveys, computed from reports

on hourly wages, hours worked per week, and weeks worked per month. Canadian dollars are converted to American dollars. Average earnings per year were computed for the first two years of follow-up using earnings adjusted for 2001 prices using the Consumer Price Index (CPI) annual average figures.

Income. For all sample members in the studies conducted in the U.S., administrative records provided data on monthly cash assistance and Food Stamp benefits, any cash supplement payments provided by the earnings supplement programs, as well as quarterly earnings in jobs covered by the UI system. For SSP, administrative records provided information on receipt of Income Assistance (IA; Canada's welfare program) and receipt of SSP supplement payments, while the parent survey collected data on earnings from employment. The pooled data include information for each year following random assignment on average annual parent income, based on the sum of earnings, AFDC/TANF/IA and supplement payments, and Food Stamp payments. Note that this income measure omits self-employment and informal earnings, other public transfers, private transfers, and earnings from family members other than the sample member. All income amounts have been inflation-adjusted for 2001 prices using the CPI's annual average figures. In the case of the Self Sufficiency Project (SSP), Canadian dollars are converted to American dollars before being adjusted for inflation. From this information, *average annual income* per year was computed over the first two years of the follow-up.

Baseline Control Variables. Baseline surveys and administrative data sources provided a set of comparable pre-random-assignment parental and family control variables: whether the family received cash assistance in the year prior to baseline; average earnings in the year prior to baseline; whether employed in the year prior to baseline; whether the parent has a high school degree or GED; whether the parent was a teenager at the time of the child's birth; the marital status of the parent; the number of children in the family; the age of the youngest child in the family; the gender of the child; and the race/ethnicity of the parent.

Baseline Control Variables in Pooled Sample Models. When conducting models across the pooled dataset of welfare and employment experiments, we include a set of baseline control variables in addition to the sample member-specific control variables listed above. These include length of follow-up and type of assessment, as well as for the ten variables representing site/study control variables--variables were included for each of the five studies that took place in a limited geographic region and separately by site for the two studies taking place across diverse regions (SSP in New Brunswick and British Columbia, Canada; NEWWS in Atlanta, GA; Grand Rapids, MI; and Riverside, CA).

Analysis Strategy

We examine individual study estimates as well as two form of aggregation—metaanalytic and pooled sample estimates. Our aggregation across studies is appropriate if each study is considered to be a realization of a larger population of policy experiments, the general properties of which we seek to explain (Cooper & Hedges, 1994). In this view, meta-analytic approaches and pooling across studies reduces sampling variation inherent in any individual study and enables us to make comparisons across types of studies.

Individual study impacts by child age. We test our hypotheses by estimating OLS models in which treatment status (e.g., whether in the experimental or control group) varies with children's age, within each study and separately by length of follow-up for those studies with multiple follow-up waves. We accomplish this by constructing a set of interaction terms of child

age group (0-1, 2-3, 4-5, 6-7, 8-9, 10-11 and 12-15 at baseline) with the experimental dummy for each program model tested. We also include dummy variables for these age groups and type of test, plus baseline control variables. Our regression model is:

$$(1) \quad Y = a + b_1A_1 + b_2A_2 + b_4A_4 + b_5A_5 + b_6A_6 + b_7A_7 + c_1 A_1 * EXP + c_2 A_2 * EXP + c_3 A_3 * EXP + c_4 A_4 * EXP + c_5 A_5 * EXP + c_6 A_6 * EXP + c_7 A_7 * EXP + d_1 \text{ Control Variables} + \varepsilon_1$$

where Y is child achievement, mother's earnings or family income, $A_1 - A_7$ are dummy variables for the seven age groups, EXP is the experimental/control group dummy and Control Variables are our set of baseline control variables.

Note that A_3 is omitted from the age dummy group but not from the age-by-treatment interaction groups, and there is no main effect term for EXP (This model is equivalent to that using the more typical specification with a main effect of experimental status and the interaction with all but one of the age group terms, but has the distinct advantage of formally deriving impacts for each age group relative to the grand mean rather than relative to the randomly-selected omitted age group). A_3 was chosen as the reference category because all of our data sets provide observations on children who were ages 4 or 5 at baseline. With this formulation c_1 is the difference between the adjusted mean of the dependent variable for control group members ($a + b_1$) in the A_1 age group (i.e., ages 1-2 at baseline) and A_1 experimental group members ($a + b_1 + c_1$), c_2 is the difference between the adjusted mean of the dependent variable for A_2 control group ($a + b_2$) and A_2 experimental group ($a + b_2 + c_2$) and likewise for A_4 , A_5 , A_6 and A_7 . In the case of A_3 , c_3 is the difference between the adjusted mean of the dependent variable for A_3 control group (a) and A_3 experimental group ($a + c_3$). Thus, coefficients c_1 to c_7 show experimental/control group differences by age, controlling for baseline characteristics.

Huber-White methods are employed to adjust standard errors for nonindependence of multiple reports per child and multiple children per family, clustering the findings at the family level. Sensitivity tests were conducted to examine the extent to which clustering by child rather than family changed the results; results were very similar with either approach. Therefore, findings are presented that allow for the nonindependence of siblings and children within families, rather than of reports on the same child only.

Meta-analytic analysis. We do not have the power in this study to determine the exact cause of the differing effects across the individual studies (because we cannot disentangle specific features of program implementation from site-specific effects). However, as noted earlier, this set of studies can be clustered into two groups—those that were aimed at moving parents from welfare into employment through mandates and time limits, and those that had the added objective of increasing family income, through the use of financial incentives. The goal of this study was to understand the effects across individual welfare and employment programs, all aimed at increasing self-sufficiency among welfare recipient and low-income parents, and to understand whether differing patterns might be observed for these two broad groups of studies. As indicated earlier, the meta-analytic approach is useful in reducing the sampling variation that might be observed in any set of individual studies.

To this end, we used meta-analytic approaches to examine the average impact across the individual studies for each of the child age groups listed above. For this technique, we used the study-specific regression-adjusted impact analyses described in equation 1 above (the c_1 - c_7 coefficients for each study). These impact estimates were then averaged using meta-analytic techniques (see Lipsey & Wilson, 1996 for further details about meta-analytic calculations).

More specifically, we compute an average impact by multiplying each impact for each age group (that is already in standardized units because of the standardization of the outcome measure) by a weight, which we call w_i , where $w_i = \frac{1}{v_i}$, where v_i is the variance of the impact estimate. The

overall average impact was calculated by multiplying each impact estimate by its weight, summing the weighted impacts, and dividing this sum by the sum of the weights, or:

$$\frac{\sum_i w_i (\text{impact}_i)}{\sum_i w_i}, \text{ with a standard error equal to: } \sqrt{\frac{1}{\sum_i w_i}}$$

Pooled data regression analysis. Finally, we conduct pooled-sample estimates that allow us to more flexibly test the sensitivity of the model to other specifications, and to test for other possible sources of the age differences in the patterns of effects. These models take the form of equation 1 above, but are conducted on a data set that pools the microdata from each of the individual studies. In addition to the control variables mentioned above, critical cross-study control variables are included in the model as well, such as a measure of the time between baseline and the given achievement assessment and a study/site indicator. Because of the clustering of achievement reports by child, children within families, and families within study, Huber-White methods are employed to adjust standard errors for nonindependence. The combination of the study/site control variables and this standard-error adjustment achieves the same purpose as hierarchical modeling approaches, by correcting for nonindependence of individual observations across multiple levels, and controlling for the “study” effect. REFER TO HUBER-WHITE COMPARISON WITH SEM FROM HOWARD

A series of robustness tests were conducted to test for the sensitivity of the results to the inclusion of the Canadian sample, the source of achievement report (parent report or test score), and the non-independence of children within families (by randomly selecting a single child). We also tested the sensitivity of the findings to the inclusion of studies representing smaller subsets of the age distribution of children.

Finally, the pooled analysis is critical to test whether age differences in experimental impacts are accounted for by differences in impacts by family and parent characteristics associated with child age. In these models, *interactions* between parent/family characteristics and the experimental dummy were included in the models along with the age-by-experiment interaction terms (along with control variables for each of these characteristics). We also examined whether differences in the effects could be explained by experimental *interactions* with source of report (teacher, parent, test score), by experimental *interactions* with follow-up length, and by experimental *interactions* with country (Canada vs US). To enhance interpretation, all parent/family characteristics, source or reporter, follow-up length, and country variables were centered with mean zero before interacting with the experimental dummy.

Results

Descriptive statistics

Means and standard deviations on all of the baseline demographic variables as well as our three outcome measures -- earnings, income and child achievement -- are presented in Table 2. We include descriptive statistics for the full sample of children across the seven random-assignment studies, and separately for families assigned to the program and control groups.

Insert Table 2 about here

Sample baseline characteristics across the seven studies are relatively similar. This similarity is one reason we feel confident in pooling these data (in addition to the common study design and the common set of measures collected). More specifically, almost all of the families in the studies are female-headed, single-parent families, with proportions of male-headed families ranging from 0-7.2 percent across the 7 studies. Generally, the families are evenly distributed between separated/divorced and never-married parents (the percent of never married parents ranges from 46.3-67.1 percent across the 7 studies). Two-thirds to three quarters of parents have received welfare prior to the start of these studies for more than 2 years. The youngest child in the family is about 4 years of age (ranging from 3.7 to 5.6 across the studies), and families have on average about 2.5 children (ranging from 2.0 to 2.6 across the studies). Studies do differ on the proportion of families of differing ethnic groups (e.g., SSP has primarily white families, while others, like New Hope, have more mixed racial-ethnic composition). Also, some variation exists in employment rates prior to random assignment (ranging from 26-67 percent across the studies) and in educational attainment (with the proportion of those with a high school diploma or GED ranging from 46 to 74 percent). NEED TO CHECK NUMBERS THAT IS THE ACHIEVEMENT SAMPLE. ALSO ADD TABLE?

Impacts across age by individual program and follow-up length

We used OLS to estimate model to estimate model (1), using child achievement as the dependent variable, by study. Control variables for baseline family differences and source of achievement report were included.

Insert Table 3 about here

As shown in Table 3, significant experimental impacts for any age group are not common. Generally, however, coefficients are generally positive (with some statistically significant) for the 2-3 and 4-5 year olds. Effects are generally negative for the children older than 10 years of age, and for the 0-1 year olds. Effects are generally weaker and more variable for the children in middle childhood at parents' entry into the programs. Although not shown, effects across age groups are very similar across the two Canadian provinces in which SSP was conducted. SHOULD WE SHOW EFFECTS ON EARNINGS AND INCOME? RIGHT NOW, WE ONLY HAVE THEM IN THE POOLED RESULTS, WHICH SEEMS ODD.

Meta-analytic average effects.

Meta-analytic averages are critical to reduce sampling variation in the individual study estimates and determine the pattern of effects that is consistent across studies and program models. Coefficients and standard errors for each of the age groups derived from this analysis are presented in Table 4.

Insert Table 4 about here

These results show a consistent positive pattern of effects for the 2-3 year old children and the 4-5 year old children, and for the 2-3 year old children and 4-5 year old children in the programs with generous earnings supplements. We find significant impacts of .075 for the 4-5 year olds and .096 for the 4-5 year olds in programs with generous earnings supplements. We find a trend-level positive effect for the 2-3 year old children. In addition, consistent with the observations of the individual study estimates, effects are negative for the older children, independent of program model approach. We find significant impacts of -.111 for the 10-11 year olds. Both the positive coefficients for the younger children and the negative coefficients for the older children are small in size, amounting to approximately a 10 percent standard deviation change in achievement associated with the parents' assignment to the experimental program.

Pooled sample estimates

We then conducted the same OLS model described in equation (1), but this time pooling across the sample members in the individual studies (Table 5). As before, control variables for baseline family differences and source of achievement report were included, as well as study/site indicators and follow-up length.

Insert Table 5 about here

Program impacts are statistically significant for two of the seven child age groups examined—4-5 year olds and 10-11 year olds, with marginally significant effects for the 2-3 year olds and the 12-15 year olds. Significant positive effects are observed for the younger children and negative effects for the older children. Again, the effects observed are small—a .07 of a standard deviation increase in school achievement for the 4-5 year olds and a .10 standard deviation decrease in school achievement for the 10-11 year olds, brought about by assignment to the experimental program.

Differences in the coefficients between the age groups were tested. The effects for the 2-3 year olds and the 4-5 year olds differ from the effects for the 10-11 year olds ($p < .01$ for the 2-3's and $p < .001$ for the 4-5's); the 12-15 year olds ($p < .05$ for the 2-3's and $p < .01$ for the 4-5's); and the 0-1 year olds ($p < .05$ for the 2-3's and $p < .05$ for the 4-5's). The effect for the 10-11 year olds also differs from those for the 6-7 year olds and the 8-9 year olds ($p < .05$ for the 6-7's and $p < .05$ for the 8-9's). All other differences between the age groups were not statistically significant.

Control variables produced predictable effects, with parents' educational attainment positively associated with children's achievement, and number of children in the family, the age of the youngest child, and length of time on AFDC prior to baseline negatively associated with children's achievement (Appendix Table 1). Interestingly, the site/study dummies included in the model were rarely significant in the prediction of child achievement (even in the case of the control variables for the Canadian sites, suggesting similar *levels* of achievement across sites).

Models were also conducted to test the extent to which effects differed for boys and girls. These results (not shown) find a similar pattern of effects for both genders.

The similarity of effects from the meta-analytic approach to the pooled sample estimates lends confidence in the pooled results. However, the pooled sample estimates are needed to

flexibly examine the sensitivity of the model to other specifications and to test for the possible role of family characteristics in explaining child age-related differences in the effects of policies.
UPDATE WITH REAL DATA ONCE METAANALYSIS IS DONE

By program type

We next examined how age-related program effects on child achievement, mothers' earnings and family income differed by program model. These results are presented in the second through seventh columns of Table 5.

Effects on parents' earnings and income of programs with generous earnings supplements are presented in columns four and six, while effects of programs without generous earnings supplements are presented in columns five and seven. Consistent with the goals of the programs, both program models significantly increase earnings for the parents of many of the age groups of children. Earnings impacts per year over the first two years following random assignment ranged from about \$500 to about \$1,400 across the two sets of programs. Effects on earnings are most consistently significant across the age groups for the generous earnings supplement programs, suggesting the power of the financial incentive these programs provided in encouraging employment for families regardless of the age of their children. For the programs without an earnings supplement, effects were statistically significant for only four of the child age groups, although the magnitude of the increase in earnings did not vary consistently across the age groups of children.

While impacts on earnings did not differ considerably across the program types, effects on family income did differ, consistent with the differences in program design. Thus effects on income were significantly higher for all age groups of children in the generous earnings supplement programs compared with the other program models. Programs with generous supplements increased income by about \$1,500 to \$2,000 per year over the first two years, whereas programs without supplements did not increase income significantly for any age group.

With regard to achievement, the positive effects observed for the younger children in the full sample of programs are concentrated in the programs with generous earnings supplements (column 2 shows the effects of programs with generous supplements and column 3 shows those for other program models). We find statistically significant positive effects of generous earnings supplement policies on 2-3 and 4-5 year old children. Effects in these generous earnings supplement programs were in the range of a .07-.11 standard-deviation change resulting from assignment to the program group.

For older children, negative effects are observed in both program types, although the negative effect among 10-11 year olds is most pronounced in the generous earnings-supplement programs. Even in these programs that increase employment and income, we find significant negative effects of a .11 standard-deviation change for the 10-11 year old children. For the programs without an earnings supplement, there were no effects for 10-11 year old children, although effects for the oldest children (12-15 year olds) approach statistical significance.

Split sample analyses comparisons were conducted to test for differences in the coefficients between the two program types. Note that this split sample analysis is comparable to the more conventional three-way interaction approach, although allowing for potential heterogeneity of variance across subgroups. The test statistic used to compare impacts is the weighted sum of squares of the impact estimates for the subgroups and has a chi-squared

distribution (Greenberg, Meyer, & Wiseman, 1993; Cooper & Hedges, 1994). Despite this different patterning of effects across the two program types, comparisons between the coefficients on the experiment by age interactions across the two program types finds no significant differences for any of the age groups ($p = .21$ for the 0-1's; .45 for the 2-3's; .12 for the 4-5's; .32 for the 6-7's; .79 for the 8-9's; .64 for the 10-11's; and .28 for the 12-15's). Thus, while the effects are more pronounced in the generous supplement programs, none of the estimates of the differences in the effects across program models attain statistical significance.

Robustness of model to varying specifications.

Analyses were conducted to examine the robustness of the findings to varying differences of model specification. These results are presented in Table 6.

The first column of Table 6 presents results without the inclusion of the SSP study. While positive coefficients are still observed for the 2-3 and 4-5 year olds, neither of these positive effects reach statistical significance. In part this is due to the large sample contributed by the Canadian study. Negative effects are still observed for the children ages 10 and older. In later analyses we test the significance of a country by treatment interaction effect.

Insert Table 6 about here

The second and third columns of Table 6 present the results by source of the achievement report—parent report only (which was nearly an identical measure across studies) or test score (which included a more varying group of tests conducted directly with children, and therefore may be viewed more cautiously). (There were too few studies that included teacher report measures to conduct a full model for this outcome measure). Effects using the parent report measure, for which the largest sample was available, were very similar to those presented in Table 5, with significant positive effects of welfare and employment programs for 2-3 and 4-5 year olds, and significant negative effects for the 10-11 and 12-15 year olds. Given that this is a similar measure across studies, this analysis is the most powerful for the examination of cross-age effects. The test score data differed both by study and by child age, but show similar results for the younger children as the parent report data—with positive results for the 4-5 year old children. The negative results for the 10-11 year olds were not reproduced using the test score data, but the results were based on only fewer studies and sample children, and therefore should be viewed as more tenuous.

The final column of Table 6 presents the results for models in which only one randomly selected child from each family was included in the analysis, to determine whether the inclusion of siblings affected the results. Here too, positive effects for the 4-5 year olds and negative effects for the 10-11 year olds are observed.

Controlling for differential effects by parent/family characteristics

Analyses were also conducted to examine the extent to which interactions between the experimental group dummy and parent or family characteristics accounted for differences in the impacts across the age groups. We also examined in these models whether the inclusion of interactions between source of test and program/control group indicator; the interaction between

length of follow-up and program/control group indicator; and the interaction between country (Canada vs US) and program/control group indicator, changed the pattern of effects across age.

These findings are presented in Table 7, for all programs in the first column, and separately for generous earnings supplement and non-earnings supplement programs in the second and third columns of the table. The overall pattern of age effects does not differ with the inclusion of baseline-control-by-experimental-dummy interaction terms. For all program models, significant positive effects are still observed for the 4-5 year old children and negative effects for the 10-11 year old children. None of the demographic/family characteristic by experimental dummy interaction terms reached statistical significance at conventional levels.

NEED TO ENSURE SAME CONCS WITH CANADA BY EXP INTERACTION

Insert Table 7 about here

A similar pattern is observed when we examine impacts by program type, as shown in the second and third columns of Table 7. For programs with generous supplements, significant positive effects are still observed for 2-3 and 4-5 year old children, and negative effects for the 10-11 year old children, and none of the interactions with family/parent characteristics are statistically significant. For the programs without these generous supplements, negative effects for the 0-1 year olds emerge with the inclusion of the interaction effects (although it can be seen from Table 1 that this effect is driven by a single study—Florida's FTP), and the magnitude of the effects on other age groups is largely unchanged from the original models.

Subset regressions

In order to confirm that our age-related results generalize within and across studies, we conducted a series of subset regressions. In each of these regressions, we limited the sample of studies to those in which all age ranges examined were represented. In this way, we could assure that any differences across age groups would not be driven by the representation of a particular study for a particular age group. These results are shown in Table 8.

Insert Table 8 about here

As is clear from a comparison across the columns, in all of these subset regressions, positive effects for the 4-5 year olds and negative effects for the 10-11 year olds emerged. More specifically, Column 1 presents the effects for the four studies that include all of the age ranges. For this subgroup of studies, we find positive effects for children 2-3 and 4-5 and negative effects for 10-11 year old children. The second column adds one study and examines the effects for all children except the 0-1 year olds. Here we find an identical pattern of effects (positive and significant for children ages 2-3 and 4-5 and negative and significant for 10-11 year olds). Findings in the third column are from an additional study (for a total of 6 studies) for children ages 4-15. Here we still find positive effects for 4-5 year olds and negative effects for 10-11 year olds. The final column includes 7 studies for children ages 4-11. Here too we find the same two age groups affected as in earlier models. In all cases, effects are as large as or larger than those found in the models presented in Table 5 that include all of the studies.

Discussion

Our analyses point to two sensitive periods of children's development in which the effects of welfare and employment programs are strongest, both of which correspond to transition points in children's development. We find small positive effects of welfare and antipoverty policies for children making the transition *into* middle childhood, and small negative effects of these same policies for children making the transition *out of* middle childhood and into early adolescence, even while these policies have similar effects on parents employment and income across age groups of children. Effects are more pronounced for generous earnings supplement policies than other welfare and employment strategies. Our effects are robust across various program groupings and cannot be attributed to family characteristics that differ for children of different ages. These findings have implications for developmental science as well as for policy.

Prior work has pointed to the importance of developmental transitions for changes in individual developmental trajectories (Graber & Brooks-Gunn, 1996). Here we have identified two important developmental transition points for the effects of changes in maternal employment and increases in income brought about by welfare and antipoverty policies. Because of the reorganization that occurs with developmental transitions (Cicchetti, 1991; Sroufe, 1990), children's development may be most open to change during these periods.

But why these two transition periods in development in particular? For young children, the increased plasticity of development during early childhood may have contributed to the positive effects observed. That early childhood is affected by income-enhancing policies is consistent with prior nonexperimental work on the effects of poverty across childhood (Duncan et al., 1998). Moreover, the fact that the family system has such a strong direct effect on early childhood development (Bronfenbrenner & Morris, 1998) makes this period of development most sensitive to policy changes targeting the parent and family.

We suspect that the other systems affecting sample children may have interacted with changes in maternal employment in ways that affected individual development. For preschoolers, the transition to elementary school may have supported children's development during their parents' increased employment. Regardless of whether or not a parental transition to employment occurs, these children will make the transition to elementary school. In contrast, infants' and toddlers' child care status may depend, at least in part, on parents' employment status. Unlike the low-income child care environment, school may provide a stable context for young children's development as parents in poverty make the transition into employment. That effects were more pronounced for younger (2-3 year old) children in the generous supplement programs may be a result of the parents' increased ability to purchase similarly stable child care with the increased benefit of these programs.

For children making the transition to adolescence, however, negative effects of work policies were observed. The transition to early adolescence has been characterized by significant biological as well as socio-emotional growth (Brooks-Gunn & Petersen, 1983; Hamburg, 1974), and research has pointed to the challenge of this period for self-system development (Seidman et al., 1994). Moreover, the middle to junior high school transition that occurs at this time may exacerbate the difficulties faced during this developmental period, and researchers have found that the transition to junior high may be associated with declines in grade point average (Simmons & Blythe, 1987). The impersonal nature of the junior high school context may not

support the developmental tasks of the transition to adolescence, requiring a restructuring of social roles at the moment in development when adolescents are trying to establish their identity.

These difficulties may be exacerbated by increases in maternal employment. First, maternal employment results in the absence of the parent at the moment when children are making a transition to a less attentive school environment, leaving children unsupported in navigating the transition to adolescence. Second, parents' employment may restructure children's own roles in the household, by requiring them to take on greater responsibilities, for example (Gennetian et al., 2002), making it more difficult to establish an identity just when identity development is so critical. However, the fact that effects were more pronounced in the generous supplement programs rather than the other program models suggest that the increase in welfare income may also be playing a role here. A preliminary examination of this issue suggests that welfare income may indeed be negative for the school achievement of this group of adolescents (Morris, Duncan, & Rodrigues, 2004).

Data limitations forced us to focus on chronological age rather than grade in school. While most 10-11 year olds may be in 5th and 6th grade at study entry, and making the transition to junior high school over the course of the follow-up period of these studies, a sizeable proportion may have repeated an early grade in their school careers and will be making later transitions out of elementary school. (We suspect few children will be ahead of their grade for their age in this high-risk sample). This means that some of these children may be making this transition later in the follow-up period of these studies (but likely still within the 2-5 years of follow-up we observe). Also, this means that some of the 12-15 year old children may also be making this difficult school transition—which would be consistent with the negative, but weaker, effects we observe for this older age group of children.

Other, nonexperimental research has also pointed to age differences in the effects of changes in maternal employment, although most of the work has focused on early childhood (Brooks-Gunn, et al., 2002; Harvey, 1999; Waldfogel et al., 2002). A recent paper that examines the effects on young children and adolescents finds benefits to mental health for the older age group of children, but neutral effects on other adolescent outcomes (Chase-Lansdale et al., 2003). A number of sample and design differences exist between the two sets of studies, the implications of which are twofold. First, the Chase-Lansdale study examines the effects of voluntary transitions to employment, while the current study examines the effects of changes in welfare policies. Second, positive effects observed in the Chase-Lansdale study were limited to mental health outcomes not examined here. Policies may have very different effects on cognitive as compared to socioemotional outcomes (in fact, it is possible that maternal employment makes it difficult for children to go to school and do schoolwork, but provides them with the self-system benefits of taking increased responsibility in the household (Gennetian et al., 2002)). Further work examining the policy impacts on behavioral and emotional outcomes is a critical next step.

Magnitude of the effects

How large are our estimated effects? In the case of our positive program effects on younger children, an important issue is whether effect sizes on the order of .07 of a standard deviation are economically meaningful. The answer depends on how permanent these achievement gains are. Even small effect sizes may be profitable if, as research suggests, small increases in achievement result in substantial increases in lifetime earnings. Krueger (1999), for

example, estimates that the one-fifth standard deviation increase in tests scores from the Tennessee STAR class-size experiment could increase future earnings by between \$5,000 and \$50,000, depending on assumed discount and future earnings growth rates. Our .07 effect size, if permanent, would increase earnings by one-third of these amounts. Conversely, the negative effects for the older children may decrease earnings by similar amounts.

We do not know how permanent the achievement gains and losses we estimate are, although evidence is emerging from several of our studies that positive effects for younger children may be sustained to five years beyond the point of random assignment. For example, there is evidence that the positive achievement effects found in the New Hope program two years after baseline were just as strong five years after baseline (Huston et al., 2003). The effects of the Self Sufficiency Project were also found to be sustained for young children in a four-and-a-half year follow-up (Michalopoulos, et al., 2002). Longer-run follow-ups on other studies we include here are currently underway to provide additional information to answer this question.

Even with these potential benefits, these programs are probably not the best way to help most low-income children. Past research indicates that some early-education programs are cost-effective methods of promoting the achievement of young children (Shonkoff & Phillips, 2000). Our results suggest that certain kinds of welfare and employment programs may benefit certain subgroups of children, but the effects sizes are much smaller than those of direct interventions.

Limitations

While policy experiments do a very good job of providing causal estimates of the effects of a particular policy approach, their designs are not as strong for determining the developmental nuances of how those effects occurred. In this study we were forced to draw on prior research to speculate about the patterns of positive effects for children transitioning to elementary school, and the negative effects of those transitioning to adolescence.

Moreover, while our experimental design provides us with considerable confidence in attributing differences between program and control groups to policy, we note that these effects were observed in a particular economic context – the U.S. and Canada in the 1990s. While the studies span a period of about 8 years, most of the regions during the study periods observed enjoyed economic vitality, and effects might well be different under other economic conditions. Not to mention that these findings are applicable only to single-parent welfare-recipient families, rather than low-income families more generally.

Finally, the small size of these effects warrants caution in over-interpreting the results. While we are more confident in the pooled sample estimates than those from any individual study, given sampling variation, effects are still not strong and are confined to only a couple of the age groups of children. Replication with other data sets will lend further support for the conclusions we draw here.

Implications for science and policy

Since developmental transitions are critical periods for policy change, these periods are important for studying changes in developmental trajectories and for the focus of intervention efforts designed to alter such trajectories. Prior research has pointed out the importance of developmental transitions for exactly these kinds of effects; yet, most research into the effects of changes in maternal employment and income has focused on the effects on broad age groupings of children, rather than on children at the bridge between developmental periods. Moreover,

policy interventions have focused more exclusively on groups of children at a distinct developmental stage or on families without regard to children's developmental stage. As our findings attest, developmental transitions appear key to understanding both the positive and negative impacts of family interventions on children's development.

References

- Alvarez, W. (1985). The meaning of maternal employment for mothers and the perceptions of their three-year-old children. *Child Development, 56*, 350–360.
- Amato, P. R., & Keith, B. (1991). Parental divorce and the well-being of children: A meta-analysis. *Psychological Bulletin, 110* (1), 26-46.
- Baydar, N., & Brooks-Gunn, J. (1991). Effects of maternal employment and child-care arrangements in infancy on preschoolers' cognitive and behavioral outcomes, evidence from the children of the NSLY. *Developmental Psychology, 27*(6), 932–945.
- Becker, G. (1981). *A treatise on the family*. Cambridge, MA: Harvard University Press.
- Bergstrom, T. (1997). A survey of theories of the family. In *handbook of family and household economics*. Ann Arbor, MI: University of Michigan.
- Block, J. H., Block, J., & Gjerde, P. F. (1986). The personality of children prior to divorce: A prospective study. *Child Development, 57*, 827-840.
- Bloom, D., Kemple, J.J., Morris, P., Scrivener, S., Verma, N., & Hendra, R. (2000). *The Family Transition Program: Final report on Florida's initial time-limited welfare program*. New York: MDRC.
- Bloom, D., Scrivener, S., Michalopoulos, C., Morris, P., Hendra, R., Adams-Ciardullo, D., & Walter, J. (2002). *Jobs First: Final report on Connecticut's welfare reform initiative*. New York: MDRC.
- Bolger, K. E., Patterson, C. J., Thompson, W. W., & Kupersmidt, J.B. (1995). Psychosocial adjustment among children experiencing persistent and intermittent family economic hardship. *Child Development, 66*, 1107–1129.
- Bos, J., Huston, A., Granger, R., Duncan, G., Brock, T., & McLoyd, V. (1999). *New Hope for people with low incomes: Two-year results of a program to reduce poverty and reform welfare*. New York: MDRC.
- Bradley, R. H., & Corwyn, R. (2002). Socioeconomic status and child development. *Annual Review of Psychology, 53*, 371-399.
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, Mass.: Harvard University Press.
- Bronfenbrenner, U., & Morris, P. (1998). The ecology of developmental processes. In R. M. Lerner (Ed.), *Theoretical Models of Human Development*. Vol. 1 of the *Handbook of Child Psychology (5th ed.)* (pp. 993-1028). Editor-in-chief: William Damon. New York: Wiley.
- Brooks-Gunn, J. & Petersen, A. C. (Eds.). (1983). *Girls at puberty: Biological and psychosocial perspectives*. New York: Plenum Press.
- Brooks-Gunn, J. (1991). How stressful is the transition to adolescence for girls? In M. E. Colten & S. Gore (Eds.), *Adolescent Stress: Causes and Consequences* (pp. 131-149). Hawthorne, NY: Aldine de Gruyter.
- Brooks-Gunn, J., Han, W., & Waldfogel, J. (2002). Maternal employment and child cognitive outcomes in the first three years of life: The NICHD study of early child care. *Child Development, 73*(4), 1052-1072.

Card, J. J., & Wise, L. L. (1978) Teenage mothers and teenage fathers: The impact of early childbearing on the parents' personal and professional lives. *Family Planning Perspectives, 10* (4), 199-205.

Chase-Lansdale, L., & Pittman, L. (2002). Welfare reform and parenting: Reasonable expectations. *Future of Children, 12*, 1867-186.

Chase-Lansdale, P.L., Moffitt, R. A., Lohman, B. J., Cherlin, A. J., Coley, R. L., Pittman, L. D., Roff, J., Votruba-Drzal, E. (2003). Mothers' transitions from welfare to work and the well-being of preschoolers and adolescents. *Science, 299*, 1548-1552.

Cherlin, A. J., Furstenberg, F. F., Chase-Lansdale, P. L., Kiernan, K. E., Robins, P. K., Morrison, D. R., & Teitler, J. O. (1991). Longitudinal studies of effects of divorce on children in Great Britain and the United States. *Science, 252*, 1386-1389.

Cicchetti, D. (1991). Fractures in the crystal: Developmental psychopathology and the emergence of self. *Developmental Review, 11*, 271-287.

Coleman, J.S. (1988). Social capital in the creation of human capital. *American Journal of Sociology, 94*, S95-S120.

Cooper, H. & Hedges, L. (1994). *The Handbook of Research Synthesis*. New York: Russell Sage Foundation.

Dearing, E., McCartney, K., & Taylor, B. A. (2001). Change in family income-to-needs matters more for children with less. *Child Development, 72*, 1779-1793.

Duncan, G. J., & Brooks-Gunn, J., (Eds.) (1997). *Consequences of growing up poor*. New York: Russell Sage Foundation.

Duncan, G. J., Yeung, W., Brooks-Gunn, J., & Smith, J. R. (1998). Does poverty affect the life chances of children? *American Sociological Review, 63*(3), 406-423.

Eccles, J. S., Midgley, C., Wigfield, A., Buchanan, C. M., Reuman, D., Flanagan, C., & MacIver, D. (1993). Development during adolescence: The impact of stage-environment fit in young adolescents' experiences in schools and in families. *American Psychologist, 48*, 90-101.

Farel, A. M. (1980). Effects of preferred maternal roles, maternal employment, and sociodemographic status on school adjustment and competence. *Child Development, 51*, 1179-1196.

Freedman, S., Knab, J., Gennetian, L.A., & Navarro, D. (2000). *The Los Angeles Jobs-First GAIN Evaluation: Final report on a work first program in a major urban center*. New York: MDRC.

Furstenberg, F. F. Jr., Brooks-Gunn, J., & Morgan, S.P. (1987). *Adolescent mothers in later life*. New York: Cambridge University Press.

Ge, X., Lorenz, F. O., Conger, R. D., Elder, G. H., Jr., & Simmons, R. L. (1994). Trajectories of stressful life events and depressive symptoms during adolescence. *Developmental Psychology, 30*, 467-483.

Gennetian, L. A., & Miller, C. (2000). *Reforming welfare and rewarding work: Final report on the Minnesota Family Investment Program. Vol. 2: Effects on children*. New York: MDRC.

Gennetian, L. A., Duncan, G., Knox, V., Clark-Kauffman, B., & Vargas, W. (2002). *How welfare and work policies for parents affect adolescents: A synthesis of research*. New York: MDRC.

Gennetian, L. A., Huston, A. C., Crosby, D. A., Chang, Y. E., Lowe, E. D., & Weisner, T. (2002). *Making child care choices: How welfare and work policies influence parents' decisions*. New York: MDRC.

Graber, J.A., & Brooks-Gunn, J. (1996). Transitions and turning points: Navigating the passage from childhood through adolescence. *Developmental Psychology, 32*(4), 768-776.

Greenberg, D., Meyer, R.H. & Wiseman, M. (1993). Prying the lid from the black box: Plotting evaluation strategy for welfare employment and training programs. Madison, WI: University of Wisconsin, Institute for Research on Poverty.

Greenough, W. T., Black, J. E., & Wallace, C. S. (1987). Experience and brain development. *Child Development, 58*, 539-559.

Gresham, F., & Elliott, S. (1990). *Social skills rating system*. Circle Pines, MN: American Guidance Service.

Hamburg, B. A. (1974). Early adolescence: A specific and stressful stage of life. In G. V. Coelho, D. A. Hamburg, & J. E. Adams (Eds.), *Coping and adaptation* (pp. 101-124). New York: Basic.

Hamilton, G., Freedman, S., Gennetian, L.A., Michalopoulos, C., Walter, J., Adams-Ciardullo, D., Gassman-Pines, A., McGroder, S., Zaslow, M., Brooks, J., & Ahluwalia, S. (2001). *How effective are different welfare-to-work approaches? Five-year adult and child impacts for eleven programs*. Washington, DC: U.S. Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation and Administration for Children and Families, and U.S. Department of Education.

Harvey, E. (1999). Short-term and long-term effects of early parental employment on children of the National Longitudinal Survey of Youth. *Developmental Psychology, 35*(2), 445-459.

Hetherington, E. M. (1992). Coping with marital transitions: A family systems perspective. In E. M. Hetherington & W. G. Clingempeel (Eds.), *Monographs of the Society for Research in Child Development, 57* (2-3), 1-14.

Hetherington, E. M., Cox, M., & Cox, R. (1985). Long-term effects of divorce and remarriage on the adjustment of children. *Journal of the American Academy of Child Psychiatry, 24*, 518-530.

Horwitz, S., Klerman, L., Kuo, H., & Jekel, J. (1991). School age mothers: Predictors of long term educational and occupational outcomes. *Pediatrics, 87*, 862-868.

Huston, A. (2002). Reforms and child development. *Future of Children, 12*(1), 59-78.

Huston, A., Duncan, G., Granger, R., Bos, H., McLoyd, V., Mistry, R., Crosby, D., Gibson, C., Magnuson, K., Romich, J., & Ventura, A. (2001). Work-based anti-poverty programs for parents can enhance the school performance and social behavior of children. *Child Development, 72*(1), 318-337.

Huston, A. C., Miller, C., Richburg-Hayes, L., Duncan, G. J., Eldred, C. A., Weisner, T. S., Lowe, E., McLoyd, V. C., Crosby, D. A., Ripke, M. N., Redcross, C. (2003). *The New Hope Project Effects on Families and Children After Five Years*. New York: MDRC.

Klerman, L. (1991). "The Health of Poor Children: Problems and Programs." In A. Huston (Ed.), *Children and poverty*. Cambridge, Eng., and New York: Cambridge University Press.

Korenman, S., & Miller, J.E. (1997). Effects of long-term poverty on physical health of children in the National Longitudinal Survey of Youth. In G. J. Duncan & J. Brooks-Gunn (Eds.), *Consequences of growing up poor* (pp. 70–99). New York: Russell Sage Foundation.

Krueger, A. B. (1999). An economist's view of class size research. Unpublished working paper.

Lerner, R. M. (1998). Theories of human development: Contemporary perspectives. In R. M. Lerner (Ed.), *Theoretical Models of Human Development*. Vol. 1 of the *Handbook of Child Psychology (5th ed.)* (pp. 1-24). Editor-in-chief: William Damon. New York: Wiley.

Mayer, S.E. (1997). *What money can't buy: Family income and children's life chances*. Cambridge: Harvard University Press.

McCall, R. B. (1981). Nature-nurture and the two realms of development: A proposed integration with respect to mental development. *Child Development*, 52, 1-12.

McGroder, S. M., Zaslow, M. J., Moore, K.A., & LeMenestrel, S. M. (2000). *The national evaluation of welfare to work strategies: Impacts on young children and their families two years after enrollment: Findings from the child outcomes study*. Washington, DC: U. S. Department of Health and Human Services.

McLoyd, V. C. (1997). The impact of poverty and low socioeconomic status on the socioemotional functioning of African American children and adolescents: Mediating affects. In R. D. Taylor & M. C. Wang (Eds.), *Social and emotional adjustment and family relations in ethnic minority families*. (pp. 7-34). Mahwah, NJ: Lawrence Erlbaum.

McLoyd, V. C. (1998). Children in poverty, development, public policy, and practice. In I. E. Siegel & K. A. Renninger (Eds.), *Handbook of child psychology* (4th ed.), New York: Wiley.

McLoyd, V. C. (1990). The impact of economic hardship on black families and children: psychological distress, parenting and socioemotional development. *Child Development*, 61, 311-346.

McLoyd, V. C., Jayartne, T. E., Ceballo, R., & Borquez, J. (1994). Unemployment and work interruption among African-American single mothers, effects on parenting and adolescent socioemotional functioning. *Child Development*, 65, 562–589.

Michalopoulos, C., Tattire, D., Miller, C., Robins, P. K., Morris, P., Gyarmati, D., Redcross, C., Foley, K., Ford, R. (2002). *Making work pay: Final report on the Self Sufficiency Project for long-term welfare recipients*. New York: MDRC.

Moore, K., & Driscoll, A. (1997). Effects of low-wage employment on family well-being. *Future of Children*, 7(1), 116–121.

Moore, K., & Driscoll, A. (1997). Low-wage maternal employment and outcomes for children: A study. *Future of Children*, 7(1), 122–127.

Morris, P., & Michalopoulos, C. (in press). Findings from the Self Sufficiency Project: Effects on children and adolescents of a program that increased employment and income. *Applied Developmental Psychology*.

Morris, P., & Michalopoulos (2000). *The Self Sufficiency Project at 36 Months: Effects on Children of a Program that Increased Employment and Income*. New York: MDRC.

Morris, P., Huston, A., Duncan, G., Crosby, D., & Bos, H. (2001). *How welfare and work policies affect children: A synthesis of research*. New York: MDRC.

Mott, F. L., & Marsiglio, W. (1985). Early childbearing and completion of high school. *Family Planning Perspectives*, 17 (5), 234-237.

Parcel, T. L., & Menaghan, E. G. (1994). *Parent's jobs and children's lives*. New York: Aldine de Gruyter.

Sampson, R. J., & Laub, J. H. (1994). Urban poverty and the family context of delinquency: A new look at structure and process in a classic study. *Child Development*, 65, 523-540.

Seidman, E., Allen, L., Aber, J. L., Mitchell, C., & Feinman, J. (1994). The impact of school transitions in early adolescence on the self-system and perceived social context of poor urban youth. *Child Development*, 65, 507-522.

Shonkoff, J. P., & Philips, D. A. (2000). *From neurons to neighborhoods: The science of early childhood development*. Washington, DC: National Academy Press.

Simmons, R. G., & Blythe, D. A. (1987). *Moving into adolescence: The impact of pubertal change and school context*. New York: Aldine de Gruyter.

Sroufe, L. A. (1979). The coherence of individual development: Early care, attachment and subsequent developmental issues. *American Psychologist*, 34 (10), 834-841.

Sroufe, L. A. (1990). An organizational perspective on the self. In D. Cicchetti & M. Beeghly (Eds.), *The self in transition: Infancy to childhood* (pp. 281-307). Chicago: University of Chicago Press.

Waddington, C. H. (1957). *The strategy of genes*. London: Allen & Unwin.

Waldfoegel, J., Han, W. & Brooks-Gunn, J. (2002). The effects of early maternal employment on child cognitive development. *Demography*, 39 (2), 369-392.

Waters, E., & Sroufe, L. A. (1983). Social competence as a developmental construct. *Developmental Review*, 3, 79-97.

Yoshikawa, H. (1994). Prevention as cumulative protection: Effects of early family support and education on chronic delinquency and its risks. *Psychological Bulletin*, 115, 28-54.

Zaslow, M. J., & Emig, C. A. (1997). When low-income mothers go to work: Implications for children. *Future of Children*, 7(1), 110–115.

Table 1. Sample Sizes by Child's Age at Baseline and by Program

	Age at Baseline								Total
	0-1	2-3	4-5	6-7	8-9	10-11	12-13	14-15	
All Programs	1,803	9,021	10,029	3,985	3,409	2,558	1,498	569	32,872
All Earnings Supplement Programs									
MFIP	133	1,037	970	821	730	537	408	156	4,792
New Hope—2-year follow-up	3	171	295	259	240	175	72	68	1,283
New Hope—5-year follow-up	174	356	238	255	213	101	0	0	1,337
CT Jobs-First	135	780	798	773	658	444	324	97	4,009
SSP—3-year follow-up	431	1,163	1,633	1,248	1,028	876	376	135	6,890
SSP—4.5-year follow-up	586	1,229	512	0	0	0	0	0	2,327
Total	1,462	4,736	4,446	3,356	2,869	2,133	1,180	456	20,638
All Non-Earnings Supplements Programs									
Los Angeles Jobs-First GAIN	0	0	169	230	194	171	155	113	1,032
NEWWS—2-year follow-up	0	1,275	1,622	0	0	0	0	0	2,897
NEWWS—5-year follow-up	0	2,392	3,236	0	0	0	0	0	5,628
FTP	341	618	556	399	346	254	163	0	2,677
Total	341	4,285	5,583	629	540	425	318	113	12,234

Notes:

Because of their small sizes, age groups 12-13 and 14-15 were combined for the purposes of the analyses in this paper.

MFIP = Minnesota Family Investment Program; CT = Connecticut Jobs-First; SSP = Canadian Self-Sufficiency Project; NEWWS = National Evaluation of Welfare-to-Work Strategies; FTP = Florida's Family Transition Program

Table 2. Means and Standard Deviations (in parentheses for continuous measures) of Baseline Sample Characteristics and Outcome Measures

	Total Sample	Experimental Group	Control Group
Parent Characteristics			
Age	30.1 (6.3)	30.1 (6.3)	30.2(6.3)
Teenager at time of child's birth	.098	.094	.103
Race			
Black	.356	.371	.337
White	.454	.451	.458
Latino	.113	.104	.125
Other	.082	.079	.085
Marital Status			
Never married	.554	.562	.543
Separated/Divorced	.421	.415	.428
Married	.022	.019	.025
Parent Education, Employment, and Income			
High school graduate	.568	.577	.556
Employed in year prior to random assignment	.413	.406	.422
Earnings in year prior to random assignment	\$2,217 (\$5,034)	\$2,102 (\$4,959)	\$2,362 (\$5,125)
Years on AFDC prior to random assignment			
0-2	.055	.056	.055
2-5	.214	.222	.208
5+	.731	.722	.737
Child Characteristics			
Child's age (in years)	5.88 (3.16)	5.88 (3.19)	5.89 (3.14)
Child has younger sibling	.374	.367	.383
Family Composition			
Age of youngest child in family (in years)	4.18 (2.83)	4.13 (2.87)	4.16 (2.79)
Number of children in family	2.37 (1.21)	2.36 (1.21)	2.37 (1.22)
Outcome Measures			
Child achievement scores ^a	-.000 (1.00)	-.008 (1.00)	.006 (.999)
Average yearly earnings ^b	\$4,135 (\$5,936)	\$4,404 (\$5,947)	\$3,796 (\$5,904)
Average yearly income ^b	\$11,648	\$12,097	\$11,103

(\$5,695)	(\$5,939)	(\$5,320)
-----------	-----------	-----------

Notes:

^a Child achievement reports from parents, teachers, and achievement tests were standardized.

^b Average yearly earnings and income were calculated over the first two years of program participation.

Table 3. Regression Models Testing the Interaction of Child Age and Treatment Status on Child Achievement by Study

	Earnings Supplement Programs					Non-Earnings Supplement Programs				
	MFIP	New Hope 2-year follow-up	New Hope 5-year follow-up	CT Jobs- First	SSP 3-year follow- up	SSP 4.5-year follow- up	Los Angeles Jobs-First GAIN	NEWWS 2-year follow-up	NEWWS 5-year follow-up	FTP
Exp * age 0-1	.105 (.166)	^a	-.214 (.186)	-.134 (.146)	-.053 (.100)	.011 (.080)	-	-	-	-.186 (.098)
Exp * age 2-3	-.004 (.057)	.289* (.136)	-.012 (.115)	.092 (.074)	.060 (.057)	.031 (.059)	-	.080 (.058)	-.021 (.060)	.176* (.083)
Exp * age 4-5	.026 (.064)	.036 (.135)	-.098 (.133)	-.010 (.070)	.196** (.057)	.263** (.092)	.012 (.162)	.075 (.047)	.044 (.048)	.040 (.089)
Exp * age 6-7	-.074 (.073)	.271* (.136)	.113 (.149)	-.070 (.076)	.065 (.064)	-	.053 (.130)	-	-	-.127 (.098)
Exp * age 8-9	.059 (.081)	-.051 (.154)	.144 (.151)	.110 (.088)	-.091 (.072)	-	.082 (.144)	-	-	.047 (.119)
Exp * age 10-11	-.196 (.104)	-.330* (.150)	.237 (.265)	-.162 (.103)	-.037 (.073)	-	.019 (.155)	-	-	-.143 (.132)
Exp * age 12-15	.030 (.104)	-.269 (.182)	-	-.297** (.114)	.084 (.093)	-	-.055 (.122)	-	-	-.366* (.165)
R ²	.0646	.0844	.0573	.0516	.0449	.0246	.0461	.0823	.0561	.0543
F-statistic	10.41**	4.36**	3.16**	6.93**	9.06**	2.90**	2.30**	15.49**	9.40**	5.60**
N	4,594	1,274	1,321	3,926	6,806	2,300	1,030	2,867	5,580	2,554

Notes:

Standard errors are in parentheses.

*p<.05 **p<.01

“Exp” notes the experimental dummy

“-“ not included in analysis

^a The number of New Hope observations in age group 0-1 was too small for this analysis.

Dummy variables for six of the seven age groups were included in all the models.

Models control for study/site dummies (where appropriate), source of achievement report, and the following baseline characteristics: follow-up length, prior earnings, prior earnings², prior AFDC receipt, prior years of employment, high school degree, teen parent, marital status, number of children, age of youngest child in family, and race.

MFIP = Minnesota Family Investment Program; CT = Connecticut Jobs-First; SSP = Canadian Self-Sufficiency Project; NEWWS = National Evaluation of Welfare-to-Work Strategies; FTP = Florida’s Family Transition Program

Table 4: Regression Models Testing the Interaction of Child Age and Treatment Status on Child Achievement using Metaanalytic Techniques

	All Programs	Earnings Supplement Programs	Other Programs
Age 0-1	-.067 (.046)	-.033 (.052)	-.186 (.098)
Age 2-3	.046 (.023)	.045 (.029)	.061 (.037)
Age 4-5	.075** (.022)	.096* (.032)	.056 (.031)
Age 6-7	-.001 (.034)	.013 (.038)	-.060 (.078)
Age 8-9	.025 (.038)	.017 (.042)	.061 (.092)
Age 10-11	-.111* (.043)	-.119* (.048)	-.134 (.072)
Age 12-15	-.085 (.049)	-.058 (.056)	-.165 (.098)

Notes:

Standard errors are in parentheses.

*p<.05 **p<.01

Table 5: Regression Models Testing the Interaction of Child Age and Treatment Status on Child Achievement, Earnings, and Income for All Programs and by Program Type

	Achievement			Earnings (in \$1,000s)		Income (in \$1,000s)	
	All Programs	ES Programs	Other Programs	ES Programs	Other Programs	ES Programs	Other Programs
Exp * age 0-1	-.062 (.047)	-.040 (.053)	-.181 (.097)	.974** (.270)	.676 (.434)	1.566** (.272)	.749 (.472)
Exp * age 2-3	.046 (.024)	.067* (.029)	.030 (.039)	.775** (.167)	.879** (.168)	1.523** (.156)	.298 (.169)
Exp * age 4-5	.069** (.023)	.112** (.032)	.038 (.033)	1.107** (.187)	.493** (.172)	2.040** (.183)	.230 (.169)
Exp * age 6-7	.007 (.034)	.018 (.038)	-.072 (.080)	.802** (.221)	1.45** (.375)	1.718** (.213)	.184 (.383)
Exp * age 8-9	.023 (.039)	.016 (.043)	.043 (.092)	1.199** (.266)	.787 (.500)	2.189** (.253)	.201 (.486)
Exp * age 10-11	-.102* (.044)	-.110* (.049)	-.057 (.100)	.650* (.284)	.631 (.501)	1.505** (.268)	-.140 (.513)
Exp * age 12-15	-.089 (.049)	-.058 (.056)	-.186 (.102)	.702* (.334)	1.141* (.548)	1.941** (.311)	.129 (.520)
Control Variables:							
Baseline demographics	YES	YES	YES	YES	YES	YES	YES
Source of achievement report	YES	YES	YES	NO	NO	NO	NO
Study dummies	YES	YES	YES	YES	YES	YES	YES
R ²	.0310	.0340	.0429	.3453	.3003	.2899	.3351
F-statistic	21.33**	18.60**	11.67**	98.78**	34.18**	85.01**	43.22**
N	32,255	20,224	12,031	20,165	12,031	20,224	12,031

Notes:

Standard errors are in parentheses.

* $p < .05$ ** $p < .01$

ES=Earnings supplement

“Exp” notes the experimental dummy

Dummy variables for six of the seven age groups were included in all models.

Baseline demographic control variables included in all models: follow-up length, prior earnings, prior earnings², prior AFDC receipt, prior years of employment, high school degree, teen parent, marital status, number of children, age of youngest child in family, and race.

Table 6. Regression Models Testing the Interaction of Child Age and Treatment Status on Child Achievement with Control Variables for Interactions between Baseline Characteristics and Treatment Status

	All Programs	Earnings Supplement Programs	Other Programs
Treatment Status * Age			
Exp * Age 0-1	-.055 (.052)	-.003 (.060)	-.284** (.106)
Exp * Age 2-3	.047 (.027)	.096** (.034)	.038 (.050)
Exp * Age 4-5	.073** (.024)	.134** (.036)	.076 (.044)
Exp * Age 6-7	.004 (.037)	.031 (.043)	-.079 (.083)
Exp * Age 8-9	.009 (.043)	.003 (.049)	.050 (.097)
Exp * Age 10-11	-.097* (.048)	-.107 (.056)	-.031 (.107)
Exp * Age 12-15	-.077 (.056)	-.037 (.066)	-.144 (.111)
Treatment Status * Demographic Characteristics			
Exp * Parent age	-.004 (.003)	-.001 (.003)	-.007 (.005)
Exp * Parent never married	-.022 (.030)	-.042 (.037)	.021 (.051)
Exp * Number of children in family	.005 (.014)	.018 (.017)	.002 (.021)
Exp * Younger sibling present	-.018 (.032)	.014 (.038)	-.131* (.060)
Exp * Years on AFDC	-.006 (.024)	.003 (.029)	-.015 (.045)
Exp * Parent employed in year prior to baseline	.003 (.028)	-.005 (.035)	.001 (.047)
Treatment Status * Follow-up Length			
Exp * Follow-up Length	-.024 (.014)	.005 (.025)	-.024 (.016)

Treatment Status * Source of Achievement Report			
Exp * Teacher report of achievement	-	-	-
Exp * Parent report of achievement	-.004 (.045)	-.071 (.071)	.097 (.080)
Exp * Achievement test score	-.004 (.043)	.012 (.079)	.005 (.052)
R ²	.0320	.0355	.0459
F-statistic	15.86**	13.26**	9.07**
N	30,047	18,406	11,641

Notes:

Standard errors are in parentheses.

*p<.05 **p<.01

“Exp” notes the experimental dummy

“-“ not included in analysis

Dummy variables for six of the seven age groups and for 9 of the 10 studies/sites were included in all models.

Baseline demographic control variables included in all models: follow-up length, prior earnings, prior earnings², prior AFDC receipt, prior years of employment, high school degree, teen parent, marital status, number of children, age of youngest child in family, and race.

All control variables are mean-centered for this analysis.

Table 7. Regression Models Testing Robustness of Achievement Impacts

	1	2	4	5
	Excluding SSP	Parent Report Only	Test Score Only	One Randomly Selected Child
Exp * Age 0-1	-.121 (.070)	-.059 (.052)	-.026 (.099)	-.064 (.055)
Exp * Age 2-3	.040 (.029)	.059* (.030)	.045 (.037)	.038 (.027)
Exp * Age 4-5	.025 (.027)	.092** (.032)	.069* (.032)	.072** (.027)
Exp * Age 6-7	-.020 (.040)	-.013 (.036)	.063 (.082)	-.006 (.048)
Exp * Age 8-9	.070 (.045)	.030 (.041)	-.061 (.091)	.031 (.056)
Exp * Age 10-11	-.125* (.056)	-.149** (.048)	.094 (.093)	-.186** (.064)
Exp * Age 12-15	-.134* (.061)	-.104 (.054)	.179 (.140)	-.019 (.070)
R-squared	.0365	.0370	.0576	.0353
F Statistic	18.88**	19.47**	17.44**	15.76**
Observations	22,860	18,546	10,635	16,956

Notes:

Standard errors are in parentheses.

*p<.05 **p<.01

Table 8. Regression Models Testing the Interaction of Child Age and Treatment Status on Child Achievement for Subsets of Programs Representing Specific Child Age Groups

	1	2	3	4
	All Ages 4 Studies	Ages 2-15 5 Studies	Ages 4-15 6 Studies	Ages 4-11 7 Studies
Exp * Age 0-1	-.086 (.061)	-	-	-
Exp * Age 2-3	.093** (.033)	.102** (.032)	-	-
Exp * Age 4-5	.099** (.034)	.095** (.033)	.093** (.033)	.081* (.032)
Exp * Age 6-7	-.034 (.038)	-.009 (.036)	.000 (.035)	.010 (.034)
Exp * Age 8-9	.010 (.043)	.010 (.042)	.017 (.040)	.026 (.039)
Exp * Age 10-11	-.128** (.048)	-.134** (.046)	-.117** (.044)	-.100* (.044)
Exp * Age 12-15	-.083 (.056)	-.098 (.054)	-.091 (.049)	-
R ²	.0372	.0378	.0308	.0249
F-statistic	18.40**	19.67**	13.46**	10.28**
N	17,880	18,148	15,506	14,313

Notes:

Standard errors are in parentheses.

*p<.05 **p<.01

“Exp” notes the experimental dummy

“-“ not included in analysis

Dummy variables for the appropriate age groups were included in each model.

Control variables include study/site dummies, sources of achievement report, and the following baseline characteristics: follow-up length, prior earnings, prior earnings², prior AFDC receipt, prior years of employment, high school degree, teen parent, marital status, number of children, age of youngest child in family, and race.

Appendix Table 1: Complete Results from Regression Models Testing the Interaction of Child Age and Treatment Status on Child Achievement for All Programs and by Program Type

	Achievement			Earnings (in \$1,000s)		Income (in \$1,000s)	
	All Programs	ES Programs	Other Programs	ES Programs	Other Programs	ES Programs	Other Programs
Age Groups							
Age 0-1	.017 (.039)	.080 (.046)	.107 (.079)	-.160 (.244)	-.272 (.334)	.064 (.236)	-.327 (.382)
Age 2-3	.023 (.025)	.136** (.033)	-.073 (.040)	.138 (.167)	-.247 (.180)	.292 (.150)	-.094 (.183)
Age 4-5	-	-	-	-	-	-	-
Age 6-7	.048 (.031)	.105** (.036)	-.030 (.064)	-.047 (.193)	-.593* (.267)	-.044 (.174)	.078 (.276)
Age 8-9	-.078* (.035)	-.005 (.040)	-.214** (.075)	-.075 (.210)	.032 (.344)	-.178 (.193)	.305 (.330)
Age 10-11	-.125** (.040)	-.094* (.045)	-.087 (.083)	.310 (.252)	.145 (.368)	.300 (.230)	.409 (.374)
Age 12-15	-.218** (.045)	-.217 (.053)	-.100 (.087)	.194 (.300)	-.526 (.415)	-.000 (.273)	-.132 (.398)
Exp * Age 0-1	-.062 (.047)	-.040 (.053)	-.181 (.097)	.974** (.270)	.676 (.434)	1.566** (.272)	.749 (.472)
Exp * Age 2-3	.046 (.024)	.067* (.029)	.030 (.039)	.775** (.167)	.879** (.168)	1.523** (.156)	.298 (.169)
Exp * Age 4-5	.069** (.023)	.112** (.032)	.038 (.033)	1.107** (.187)	.493** (.172)	2.040** (.183)	.230 (.169)
Exp * Age 6-7	.007	.018	-.072	.802**	1.45**	1.718**	.184

	Achievement			Earnings (in \$1,000s)		Income (in \$1,000s)	
	All Programs	ES Programs	Other Programs	ES Programs	Other Programs	ES Programs	Other Programs
Exp * Age 8-9	(.034) .023 (.039)	(.038) .0162 (.043)	(.080) .043 (.092)	(.221) 1.199** (.266)	(.375) .787 (.400)	(.213) 2.189** (.253)	(.383) .201 (.486)
Exp * Age 10-11	-.102* (.044)	-.110* (.049)	-.057 (.100)	.650* (.284)	.631 (.501)	1.505** (.268)	-.140 (.513)
Exp * Age 12-15	-.089 (.049)	-.058 (.056)	-.186 (.102)	.702* (.334)	1.14* (.547)	1.941** (.312)	.129 (.520)
Baseline Demographic Characteristics							
Parent had high school diploma	.175** (.014)	.147** (.017)	.211** (.024)	1.590** (.116)	1.429** (.117)	.984** (.117)	.905** (.119)
Parent was teenager when child was born	.015 (.022)	-.009 (.026)	.053 (.037)	-.239 (.139)	-.126 (.159)	-.078 (.142)	.136 (.156)
Number of children in family	-.056** (.007)	-.040** (.008)	-.074** (.010)	-.138* (.064)	-.054 (.052)	1.059** (.069)	1.358** (.059)
Age of youngest child in family	-.011** (.003)	-.010** (.004)	-.011 (.007)	.021 (.398)	-.005 (.039)	-.038 (.024)	-.041 (.040)
Parent's marital status							
Never married	-.020 (.042)	-.028 (.048)	-.012 (.084)	-.004 (.397)	-.479 (.520)	1.856** (.455)	.755 (.581)
Separated/Divorced	-.012 (.042)	-.012 (.049)	-.020 (.083)	.250 (.398)	-.108 (.521)	1.497** (.457)	.663 (.587)
Married	-	-	-	-	-	-	-

Parent's race							
Black	.012 (.030)	.070* (.034)	-.125 (.083)	.801** (.229)	-1.170* (.526)	.938** (.236)	.590 (.526)
White	.007 (.026)	.011 (.027)	-.072 (.082)	.812** (.160)	-1.303* (.523)	.416* (.170)	-.007 (.526)
Latino	.008 (.034)	.142** (.040)	-.224** (.085)	1.391** (.294)	-.568 (.532)	1.18** (.294)	.537 (.545)
Other	-	-	-	-	-	-	-
Parent's yearly earnings in year prior to random assignment (in \$1,000s)	-.002 (.003)	-.007* (.004)	.0125* (.006)	.388** (.049)	.223** (.045)	.134* (.054)	.038 (.047)
Parent's yearly earnings in year prior to random assignment squared	.000 (.000)	.000 (.000)	-.000 (.000)	.003 (.002)	.010** (.002)	.008** (.002)	.014** (.002)
Parent was employed in year prior to random assignment	.000 (.000)	.000 (.000)	-.000 (.000)	.013** (.002)	.008** (.002)	.012** (.002)	.005** (.002)
Time on AFDC prior to random assignment ^a	-.101** (.012)	-.080** (.014)	-.138** (.023)	-.238 (.126)	-.263* (.132)	.563** (.118)	.517** (.135)
Study/Site Characteristics							
CT	-	-	-	-	-	-	-
FTP	.002 (.031)	-	-	-	-.221 (.324)	-	-3.663** (.326)
LA	.094 (.042)	-	.178** (.055)	-	-	-	-
MFIP	-.041 (.026)	.004 (.027)	-	-.979** (.206)	-	-.557** (.209)	-
New Hope	-.004 (.030)	.008 (.031)	-	2.704** (.259)	-	1.116** (.239)	-
SSP-New Brunswick	-.013 (.029)	.031 (.031)	-	-1.51** (.206)	-	-2.369** (.209)	-

SSP-British Columbia	-.016 (.029)	.024 (.031)	-	-.914** (.233)	-	1.779** (.229)	-
NEWS-Atlanta	-.050 (.035)	-	.044 (.039)	-	-.634 (.330)	-	-2.745** (.326)
NEWS-Grand Rapids	-.068 (.038)	-	-.015 (.039)	-	-.951** (.343)	-	-2.076** (.338)
NEWS-Riverside	-.109** (.036)	-	-	-	-1.773** (.313)	-	-.912** (.316)
Source of Achievement Report							
Parent	.022 (.018)	.026 (.021)	.070 (.042)	-	-	-	-
Teacher	-.008 (.021)	-.030 (.036)	-.002 (.025)	-	-	-	-
Test	-	-	-	-	-	-	-
Follow-up Length	-.014* (.007)	-.045** (.010)	.005 (.009)	-.046 (.076)	-.023 (.039)	-.124 (.073)	-.058 (.038)
R ²		.0340	.0429	.3453	.3003	.2899	.3351
F-statistic		18.60	11.67	98.78	34.18	85.01	43.22
N		20,224	12,031	20,165	12,031	20,224	12,031

Notes:

Standard errors are in parentheses.

*p<.05 **p<.01

“-“ not included in the analysis

ES=Earnings supplement

^a Time on AFDC is a categorical variable for which 1=0-2 years, 2=2-5 years, and 3=5+ years

