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Welfare Policies and Adolescents: Exploring the Roles of Sibling Care, Maternal Work Schedules, and Economic Resources

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Abstract

This study uses data from three longitudinal experimental evaluations of US state welfare reform programs to examine whether program-induced changes in families' reliance on sibling care are linked with the effects of welfare programs on selected schooling outcomes of high risk, low-income adolescents. The findings from two of the welfare programs indicate that increased reliance on sibling care was concomitant with unfavorable effects of the programs on adolescent schooling outcomes. In the third welfare program examined, the program did not yield any increases in the use of sibling care or unfavorable effects on adolescent schooling outcomes, suggesting that sibling care is one likely contributor to the negative effects of welfare programs on adolescent schooling outcomes. These findings are discussed in terms of the pattern of the programs' effects on families' income, as well as maternal work on nonstandard schedules, aside from the programs' effects on maternal employment, which play contributory roles in shaping the extent to which welfare programs led to less favorable effects on the schooling outcomes of adolescents with younger siblings.

Keywords

Welfare policies; Maternal employment; Adolescent schooling outcomes; Economic resources; Poverty

Introduction

The strong economy of the mid-to-late 1990s and policy developments, such as the 1996 Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) and expansions of the Earned Income Tax Credit, contributed to dramatic increases in employment among single mothers (Blank 2002; Mishel et al. 2003). According to estimates from the Current Population Survey (CPS), employment rates among single mothers jumped from 69% in 1995 to 78% in 2001 (Blank 2002). This historic influx of single mothers into the workforce has raised questions among policymakers and researchers about the well-being of low-income children and sparked a burgeoning body of research on the effects of maternal employment on child development among low-income families.

Perhaps surprisingly, initial concerns about the potentially harmful effects of maternal employment were not born out in research. Rather, emergent findings point to potentially harmful effects of maternal employment on adolescents. Coupled with estimates showing that 35% of children ages 12–17 years old, or 8.8 million adolescent-aged children, lived in low-income families in 2006 (Douglas-Hall and Chau 2007), these recent findings raise pressing areas of inquiry for research. One striking example is recent evidence from experimental evaluations of anti-poverty and employment programs showing that low-income adolescent children, particularly adolescents with younger siblings, are particularly vulnerable to policy-driven increases in maternal employment (Brooks et al. 2001; Gennetian 2004; Gennetian et al. 2004), quite unlike findings among preschool-aged children (Morris et al. 2005). On the other hand, nonexperimental results among low-income samples in three cities suggest that mothers' transitions from welfare-to-work are linked with improvements in adolescent's mental health (Chase-Lansdale et al. 2003). These findings raise a variety of questions about why low-income mothers' employment might affect adolescent development differently from that of younger children.

This study addresses this gap in the literature by exploiting the variation of program-driven impacts across three experimental evaluations of welfare-to-work programs to examine the extent to which child care, in particular the use of sibling caretaking, might contribute to the effects of these programs on adolescent-aged children's schooling outcomes. We focus on a subgroup of adolescents with younger siblings at home who appear to be particularly vulnerable to the effects of such programs (Brooks et al. 2001; Gennetian 2004; Gennetian et al. 2004). Lastly, we explore the contributory roles of maternal employment characteristics, such as work hours and schedules, and economic constraints, such as family income, in shaping the effects of these programs on low-income families' reliance upon sibling caretaking arrangements for younger children in the household, as well as the effects of the programs on adolescent-aged children's schooling outcomes.

Background

Recent findings from studies synthesizing the effects of antipoverty and employment programs indicate that adolescent-aged children whose parents were in the program groups were at higher risk for difficulties in school than their counterparts in the control groups (Gennetian et al. 2004). A closer examination of subgroups of adolescents further suggests that these adverse program impacts were concentrated among adolescents who had younger siblings at home, and that these effects were not related to the fact that adolescents with younger siblings reside in larger families than adolescents without younger siblings. This was the case across a variety of schooling outcomes, including receipt of special education services, dropping out, and suspensions and/or expulsions (Gennetian 2004; Gennetian et al. 2004).

How might policy-induced increases in maternal employment, in particular mothers' transitions into work and increased work efforts, affect adolescent development? Because these welfare policies did not offer direct services to youths, but were designed to affect reliance on public assistance through increases in maternal employment and income, the effects of these policies on adolescents are likely not direct, but occur through program-driven changes in maternal employment and economic circumstances (London et al. 2004).¹ Several of these hypothesized mechanisms are described below.

¹In the Florida Transition Program, parents randomly assigned to the program condition were required to sign a pledge of school responsibility and to immunize their children, which could have directly affected adolescent well-being as well.

One common explanation is that mothers who enter into employment or increase their work effort may have less time to monitor and supervise their children, as well as tend to household chores and other caregiving activities. As such, adolescents may assume more household and adult-like responsibilities, such as caring for younger siblings, cleaning, shopping, cooking, or employment, when their mothers work (Burton 1997). Recent ethnographic findings indicate that adolescent girls take on more household duties when low-income parents work, particularly when mothers work low-wage jobs that do not pay enough to cover child care costs or other types of household assistance (Dodson and Dickert 2004).

In terms of adolescent development, taking on increased adult-like responsibilities, such as caring for younger siblings, can vary with the context and outcome of interest. Taking care of younger children in the household or taking responsibility for other household duties, on the one hand, can enhance adolescents' self-esteem and maturity (as suggested by Chase-Lansdale et al. 2003), while taking on too many adult-like responsibilities can impede adolescents' own development by interfering with the time they spend on school-related tasks and activities (as suggested by Dodson and Dickert 2004; Gennetian 2004; Heymann 2000). At the same time, adolescents who take on greater adult-like responsibilities may also spend more time unsupervised by their parents and other adult caregivers, which can lead to increased opportunities for adolescent-aged children to engage in risky behaviors, such as skipping school or taking drugs (Furstenberg et al. 1999) that undermine adolescents' academic achievement and progress in school.

The effects of welfare policies on adolescent development and families' reliance upon adolescents to fulfill household and adult-like responsibilities, such as caring for their younger siblings, can also hinge upon whether these policies induce changes in maternal employment conditions and families' economic circumstances. A growing body of research suggests that the developmental consequences of maternal employment vary with a variety of working conditions (Dunifon et al. 2005; Han 2005; Hsueh and Yoshikawa 2007; Joshi and Bogen 2007; Menaghan and Parcel 1995) or the extent to which maternal employment translates into increases in families' incomes and improvements in families' economic circumstances (Brooks-Gunn et al. 2010; Morris et al. 2005). Thus, a nuanced examination of how welfare policies influence whether mothers work, but also the characteristics of that employment and the economic outcomes of low-income families, can provide important information about the contextual factors that shape families' reliance upon sibling care and place adolescent-aged children at risk for less favorable schooling outcomes in the context of welfare reform.

Complexities and defining features of low-wage labor markets, such as the prevalence of part-time work hours, nonstandard schedules, and low wages (Loprest 1999; Presser 2003; Presser and Cox 1997; Romero 1992; Whitebook and Phillips 1999), point to characteristics of maternal employment experiences that are particularly important to explore in the context of welfare, employment, and anti-poverty policies. Adolescents may be more likely to care for younger siblings when mothers work part-time or nonstandard schedules, in part, because the child care options of parents who work such hours are constrained (Capizzano et al. 2003; Heymann 2000; Siegel and Loman 1991). For example, center-based child care arrangements are less likely to accept children on variable or intermittent schedules, which often characterize part-time work schedules of many jobs in low-wage occupational sectors (Heymann 2000). Center-based child care also tends to be less readily available during evenings and nights, and on weekends when parents who work non-standard schedules require child care. Furthermore, families with greater economic or financial resources may also be able to afford child care services and avoid using sibling care for younger children in the household (Cain and Hofferth 1989; Capizzano et al. 2000).

At the same time, the literature does not paint an entirely clear picture of the likely effects that maternal work hours and scheduling might have on the use of sibling care, as opposed to other forms of child care. The literature often points to how low-wage working mothers must put together a patchwork of providers to address their child care needs, even when they work full-time schedules, but particularly when their work schedules include overtime hours or hours that spill into evening or nighttime hours (Scott et al. 2005). Indeed, maternal work scheduling and economic resources may interact in complex ways to influence child care decisions and the extent to which sibling care is relied upon, yet these interactions remain relatively underexplored to date.

Whether maternal working conditions and economic constraints—namely, part-time work hours, nonstandard schedules, and indicators of economic well-being—play contributing roles in shaping adolescents' sibling caretaking activities and schooling outcomes is examined in this study. Based upon the literature reviewed above, we consider these analyses to be largely exploratory. In general, we expect that welfare programs that increase maternal employment on part-time schedules or at nonstandard times will likely increase the use of sibling care to a greater degree than programs that increase work on full-time schedules or during daytime, standard hours, in part, because center-based childcare tends to be more available during standard work hours (Siegel and Loman 1991). Furthermore, we expect that programs that improve families' economic circumstances may be less likely to affect the use of sibling care than those that do not improve families' economic well-being because families are able to afford alternative childcare arrangements when they have fewer economic constraints.

Study Purposes

This study contributes to the literature by examining whether families' reliance upon sibling care is a key factor that contributes to the effects of welfare policies on the academic outcomes of low-income adolescents. We further explore whether the pattern of impacts on the use of sibling care and adolescent schooling outcomes are linked with the effects of welfare policies on maternal employment, work schedules, and income.

We use data from three longitudinal experimental evaluations of employment enhancing US state welfare programs. Our analytic approach relies on an examination of the pattern of experimental impacts on the use of sibling care, maternal employment and work schedules and families' economic well-being within each study and across the studies to explore the contributing roles of these factors in shaping the effects of welfare policies on adolescent schooling outcomes. For example, if we see that one welfare program has a negative effect on adolescent schooling, a positive effect on nonstandard schedules, and a positive effect on the use of sibling care, then we can infer that the welfare program's impacts on employment and use of sibling care are linked to the program's negative impact on adolescent schooling. This approach of lining up experimental impacts across outcomes within a particular evaluation to uncover potential mediators has been effectively used in prior experimental research (e.g., Huston et al. 2001; Gennetian and Miller 2002). An examination of the variation in program impacts on outcomes across multiple evaluations can further help us identify potential mediators (e.g., Morris et al. 2001). For instance, if we see that two of the welfare programs have negative impacts on adolescent schooling, but only one of these programs increases the use of sibling care, we know that other factors likely account for some of the welfare programs' effects on adolescent schooling. The strength of this approach is that it enables us to attribute any experimental differences in mediating factors and outcomes to the effects of the welfare policies, even though the evaluations were not explicitly designed to examine such mechanisms. Thus, the three welfare programs examined here provide a unique opportunity to explore whether these factors are likely mediating processes that should be considered further by future research in this area. This is

an important first step and contribution to the literature, since we know of very few studies like these, and no other experimental evaluations of antipoverty and employment programs, that include the combination of measures about use of sibling care, maternal working and families' economic conditions, *as well as* adolescent schooling outcomes with large enough samples of low-income adolescents to make investigation of these potential pathways even possible.

Method

Data and Samples

Data for the current study were drawn from three experimental US state welfare reform program evaluations, which tested several policy approaches (e.g., earnings disregards, time limited benefits, or mandatory employment requirements) to encourage employment among low-income mothers: (a) the Jobs First Evaluation conducted in New Haven and Manchester, Connecticut; (b) the Family Transition Program conducted in Escambia County, Florida; and (c) the Indiana Welfare Reform Program conducted statewide. These experimental welfare program evaluations were selected based on the following criteria: (a) the evaluation was conducted in the United States; and, (b) the evaluation had information available on all of the main study variables, including maternal employment, sibling care arrangements for all non-adolescent-aged children in the household, and adolescent-aged children's schooling outcomes. In each of the evaluations, at the time that families newly applied or reapplied for public assistance, participants were randomly assigned to either program or control group conditions. Because families in the program and the control groups were similar in observed and unobserved characteristics when they entered the study, any differences in outcomes observed at any point during the follow-up can be attributed to the effects of the program being tested. Random assignment for each of the evaluations was conducted between 1993 and 1996. Both program and control groups were not subject to legislative changes brought about by PRWORA during the follow-up periods. Depending on the study, follow-up periods ranged from 36 to 60 months after random assignment. The study-specific samples for our analyses include only families headed by single mothers at the time of random assignment with adolescents between the ages of 13–17 at the survey follow-up who had a younger sibling present at baseline. In Indiana, because the data were unavailable, we were unable to confirm whether the adolescent or younger sibling was present in the household at study entry.² A brief description of each of the state welfare reform programs follows:

Connecticut's Jobs First (Jobs First)—Begun in 1996, Jobs First limited families to a cumulative total of 21 months of cash assistance receipt (one of the shortest time limits in the country at the time it was implemented). Participants could receive renewable six-month extensions of the time limit if they were earning less than their maximum welfare grant level or were making an effort to find work. Jobs First required welfare recipients to enroll in employment and training services that included both job search and basic education. To encourage and reward work, Jobs First provided participants with a generous financial incentive, which allowed them to keep their entire welfare check and Food Stamp benefits, as long as they were earning less than the federal poverty threshold (see Bloom et al. 2002). The full sample for the Jobs First includes 4,803 single parents who were enrolled in the study between January 2006 and February 2007. From this, 3,017 sample members were targeted for the 36-month survey, of whom 2,424 responded to the survey. This sample

²To explore whether differences in sample selection methods misidentify study-specific samples of adolescents with younger siblings, we reselected the samples in Connecticut and Florida using only the presence of younger siblings at follow-up, rather than study entry. We found few differences in the resulting samples (35 adolescents in Connecticut and 11 adolescents in Florida had younger siblings at follow-up who did not at study entry), suggesting that our study-specific samples across the three evaluations are likely comparable.

includes 2,272 parents with 4,969 children under 18 at follow-up, of whom 819 parents had 1,070 adolescents age 13 and 17 at follow-up. Of this, 553 parents and 684 adolescent-aged children had a younger sibling at home.

Florida's Family Transition Program—Under the Family Transition Program, implemented in 1994, most participants could receive cash assistance for up to 24 months in any 60-month period. Participants who were considered to be particularly disadvantaged (those who had received cash assistance for at least 36 months during the 60 months prior to enrollment or were under age 24 with no high school diploma and little or no recent work history) were limited to receiving cash assistance for up to 36 months in any 72-month period. While both Family Transition Program participants and AFDC recipients in the evaluation were subject to mandatory participation requirements in employment and training services, Family Transition Program participants were more closely monitored and were more likely to be sanctioned for noncompliance than those in the control group. The Family Transition Program also offered an enhanced earnings disregard, such that the first \$200 plus half of any remaining earnings, were disregarded in the calculation of participants' monthly cash grant level (see Bloom et al. 2000). The full sample for the Family Transition Program includes 2,815 single parents who were enrolled in the study between May 1994 and October 1996. From this, 2,160 sample members were targeted for the 48-month survey, of whom 1,729 responded to the survey. This sample includes 1,590 parents with 3,968 children under 18 at follow-up, of whom 558 parents had 741 adolescents age 13 and 17 at follow-up. Of this, 327 parents and 406 adolescent-aged children had a younger sibling at home.

Indiana's Welfare Reform Program—Begun in 1993, the Indiana Welfare Reform Program had a 24-month time limit on receipt of cash assistance for adult participants in families, while children could continue to receive cash assistance even after the 24-month time limit was up. The majority of participants in the Indiana Welfare Reform Program were required to participate in work-related activities with sanctions for noncompliance reducing participants' monthly cash grant levels by \$90/month. The Indiana Welfare Reform Program did not include an enhanced earnings disregard; instead, after its first 2 years of implementation, the Indiana Welfare Reform Program instituted a fixed-grant policy, such that once participants' cash grant levels were reduced upon entry into work, the grant was fixed at that level (Beecroft et al. 2002). The full sample for the Indiana Welfare Reform Program consists of 66,440 single parents (63,223 in the Welfare Reform group and 3,217 in the Traditional Welfare group) who were enrolled in the study between May 1995 and April 1996. From this, a random sample of 3,360 families, evenly divided across the program and control groups, was selected and targeted for the 5-year survey. This sample includes 3,217 parents with 2,359 children under 18 at follow-up, of whom 757 parents and 1,087 adolescents age 13 to 17 at follow-up. Of this, 616 parents and 861 adolescents had a younger sibling at home.

Each study collected data from a variety of sources, including a follow-up survey. Response rates for the surveys were fairly high—between 70 and 90%. Extensive analyses for nonresponse bias and differential attrition across the program and control groups were conducted as part of the original studies (for a detailed description of these analyses, see Bloom et al. 2002; Bloom et al. 2000; Beecroft et al. 2002). A comparison of respondents and non-respondents on a variety of baseline characteristics suggests that any bias based on survey non-response was minimal. In addition, there was little evidence of differential attrition across the program and control groups.

Measures

The analyses draw on a common set of measures constructed across the data sets. We relied on three types of data. Socioeconomic, demographic and human capital characteristics were collected at baseline for all of the studies. Surveys administered to mothers in the home or over the phone provided information about child care arrangements, detailed employment and job histories and maternal reports of adolescent outcomes. Unemployment Insurance and public assistance administrative records provided information about paid employment (excluding self-employment) and welfare payments in the state in which the study took place.

Background Characteristics

To increase the precision of impact estimates and adjust for any random baseline differences between program and control groups, analyses adjust for a number of demographic, family structure, and human capital characteristics. We created two continuous variables representing mothers' prior earnings and prior earnings squared, six dummy variables representing mothers' baseline characteristics, including whether she was 35 and older, whether she received AFDC in the prior quarter, whether she graduated from high school or received a GED, whether she was ever married, whether she was employed in the prior quarter, and her race/ethnicity (White (1) vs. non-White (Hispanic and/or Black; 0)). We further added two dummy variables representing the following aspects of household and family structures: whether two or more adolescent-aged children lived in the household and whether a child younger than 3-years-old lived in the household. Finally, we added a dummy variable representing sex of the adolescent-aged children (1 = boy) and a continuous variable measuring adolescent's age at follow-up.

Schooling Outcomes

Interviews with mothers at a 2- to 4-year follow-up point include data on maternal reports of adolescent schooling performance and participation outcomes. A noted weakness of maternal reports is that this method may only provide a measure of the mothers' perceptions of their adolescents' achievement rather than their adolescents' actual performance. This limitation is not unique to the current study, but research in this area more broadly with a number of studies relying exclusively on parent-reported outcomes (e.g., Dunifon et al. 2005; Gennetian et al. 2004; Joshi and Bogen 2007). Prior studies suggest that parent- and teacher-reported school achievement and progress are correlated with each other at $r = .44$ in a low-income, racially and ethnically diverse sample, indicating that parents' reports can be moderately good indicators of their children's actual school performance (Bos et al. 1999). Furthermore, biases might be particularly problematic if mothers' responses about adolescent development are related to their employment levels, which are also affected by program versus control group status. Descriptive analyses showed that correlations between these schooling outcomes and maternal employment were similar for adolescents in the program and control groups, suggesting that response bias did not vary for program and control groups. In addition, we include several schooling outcome measures, such as dropout rates and suspensions or expulsions, which tend to be less subject to perception-bias because mothers are directly informed of such occurrences through school contact.

School Performance—School performance for adolescents was assessed by a single item. Mothers were asked, "Based on your knowledge of (child's) schoolwork, including (his/her) report cards, how has (he/she) been doing in school overall?" Maternal responses were recorded on a 5-point scale ranging from "1—not well at all" to "5—very well" with "3—average." From this, two dichotomous measures of school performance were created: (a) above average school performance was coded as 1 if the mother reported that the child

performed “4—well” or “5—very well” and coded as 0 otherwise; and (b) below average school performance was coded as 1 if the mother reported that the child performed “2—below average” or “1—not well at all” and coded as 0 otherwise.

School Dropout—School dropout is measured according to maternal reports of the adolescent’s current enrollment in school, and, if not enrolled, whether the adolescent did not attend school because he or she dropped out. In Connecticut, this measure is only available for adolescents who were 16 or older at follow-up.

Suspensions or Expulsion from School—Mothers report whether the adolescent had ever been suspended or expelled, or both, from school at any point during the follow-up period.

Sibling Caretaking and Other Child Care Arrangements

In the surveys, mothers were asked to report on the types of child care used for every child younger than 13 in the household. Mothers were first asked whether each child was cared for by anyone other than herself for at least once a week for the past 4 weeks (or last month). In addition, mothers were asked about which types of child care were typically used to care for each child in the last month. For each set of questions, different types of child care, including the use of other siblings and half-siblings to provide care, were listed for the mother by the interviewer, and the mother was instructed to select all that apply. We then aggregated the information collected about the different types of child care used for each child in the past month up to the family level to measure two sibling care outcomes representing (1) whether the family used any sibling care in the last month, and (2) whether the family usually used sibling care in the last month for any children in the household who was less than 13 years old at follow-up. In Indiana, the latter measure is not available. By examining impacts on these two measures, we are able to potentially make an important distinction about the extent to which the program affects the intensity or regularity of use of sibling care, such that the latter measure may to a greater extent reflect regular and/or more intense use of sibling care than a measure of the use of any sibling care alone.

In addition to these point-in-time measures about the types of child care that families used, a subgroup of mothers with children who were between the ages of 5 and 12 years old at follow-up were asked a series of more detailed retrospective questions about the different types of child care used to care for children in this age range for at least a week per month since they first entered the study. From these questions, we constructed a continuous variable indicating the number of months since random assignment that families used sibling care for children in the household who were between 5 and 12 years old at follow-up.

Because maternal reports about child care use are collected with regard to the children in need of care and not from the perspective of which adolescent in the household engaged in sibling caretaking activities, we must infer from the available child care information whether or not the adolescent in question actually provided care for the younger child. Therefore, in instances where more than one adolescent-aged child is present in the household, there can be some uncertainty in identifying which adolescent, or even if both adolescents, in the household engaged in sibling caretaking activities. In contrast, in households with only one adolescent-aged children present, we can more directly attribute a family’s use of sibling care to the particular adolescent in question.

We also used information, aggregated up to the family level on other types of child care that mothers reported using for each child in the household to construct two measures detailing the use of home- and center-based care for at least a week in the last month. Whether the family had used any center-based care for at least a week in the last month included the use

of the following care arrangements: Head Start, preschool, day care center, extended-day or wraparound care, or summer day care. Whether the family used any home-based care for at least a week in the last month included any care provided by the other biological parent, partner, grandparent, sibling or other relatives, or non-relative care in the home.

Maternal Economic and Employment Outcomes

We assessed maternal economic and employment outcomes primarily with data from administrative records, although the sources of this data varied by program. The evaluations in Connecticut and Florida drew this information from Unemployment Insurance, AFDC/TANF and Food Stamps records, while the Indiana evaluation drew this information from Unemployment Insurance and AFDC/TANF records. We calculated average annual income over the follow-up period by summing earnings, AFDC/TANF, supplement payments, and Food Stamp payments from administrative records.

With survey information we also created several measures about mother's employment based on responses to questions regarding employment histories, job characteristics, and additional sources of income since random assignment. We created dichotomous variables representing whether mothers worked part-time hours (defined as working between 1 and 30 hours per week) at their current or most recent job with the default group being mothers who worked full-time hours (defined as 30 or more hours per week).

Using data on usual weekly work schedules during the prior month/last month at the follow-up interview, we are also able to assess shift work or work during nonstandard hours. The response categories are: regular daytime shift, regular evening shift, regular night shift, rotating shift (one that regularly includes day shifts and evening or night shifts), or split shift (one consisting of two distinct periods each day). Based on these data, we constructed a discrete variable representing regular daytime shifts with the default category including mothers who did not work or worked nonstandard schedules. Similarly, we constructed a second discrete variable representing nonstandard schedules (1 = regular evening, night, rotating or split shifts) with the default category including mothers who worked regular daytime shifts. Whether mothers did not work at follow-up is used as a covariate in the analyses examining impacts on maternal work schedules.

Analyses

To test whether the use of sibling care for younger children in the household is a key mediator of the effects of welfare programs on adolescents with younger siblings, we restricted our sample for analyses to the group of families with adolescent-aged children with younger siblings at home.

We used logistic regressions to examine the program's impacts on categorical dependent variables, such as adolescent schooling outcomes and sibling care. We used OLS regressions for continuous dependent variables. All of the analyses adjusted for the background covariates previously described and all standard errors are adjusted to account for the presence of multiple adolescents per family.

The conceptual framework guiding our analyses hypothesizes that the unfavorable effects of the welfare policies on adolescents are not direct, but occur through program-driven changes in maternal employment and income, and, in turn, the use of sibling care for younger children in the household. However, testing the hypothesized mediational model within an experimental framework can be challenging because randomization did not occur on the basis of the mediator variables (MacKinnon et al. 2007). To test the hypothesized mediational model, we use a series of experimental analyses that separately test the impact of the welfare programs on employment, work schedules, income, child care, including

sibling care, and adolescent schooling outcomes. Our first set of analyses assesses impacts of the welfare programs on adolescents' schooling outcomes. We next examine the impacts of these welfare programs on the families' use of sibling care, as well as the use of center- and home-based child care for children younger than 13 in the household. Lastly, we examine the impacts of these same welfare programs on maternal employment, work schedules, and income.

A common criticism of this analytic approach is that we do not empirically test the influence of the hypothesized mediators on adolescent schooling outcomes in line with a wealth of nonexperimental mediational research (e.g., Baron and Kenny 1986; Kenny et al. 1998; MacKinnon et al. 2002). However, with these nonexperimental approaches, it is difficult, and often impossible, to determine the appropriateness of a hypothesized mediational model because one cannot rule out omitted third variables or directionality of relationships (Spirtes et al. 1993). Even in the context of a random assignment research design, such unmeasured selection processes can seriously bias attempts to model the direct influence of the mediator on adolescents' schooling outcomes. As a result, nonexperimental observed associations between the hypothesized mediators and outcomes of interest are not likely to be accurate reflections of the true underlying relationships. In contrast, using a series of separate impacts to test the potential contributory role of each mediator in accounting for the negative effects of welfare program on adolescents with younger siblings can improve causal inferences by minimizing the introduction of omitted variable biases, which can bias nonexperimental estimates of associations between hypothesized mediators and outcomes of interest (MacKinnon et al. 2002).

We present control group means, unstandardized regression coefficients (b) with 95% confidence intervals, effect sizes for coefficient estimates for continuous dependent variables (ES), and exponentiated b 's for categorical dependent variables. Unstandardized regression coefficients in logistic regressions represent the net change in the logit of a dependent variable as a result of membership in the program group compared with the control group. The exponentiated b (odds ratio) assesses the increase (or the decrease) of the odds of being in the predicted outcome occurring in the program group compared with the control group. An odds ratio equal to one means an equal likelihood of the predicted outcome occurring in the program and control groups. If the program increases the likelihood of a predicted outcome occurring, then the odds ratio will be greater than one. If the program decreases the likelihood that a predicted outcome occurs, then the odds ratio will be less than 1. Results are then discussed in terms of a percent increase or decrease in the probability of the outcome occurring in the program relative to control group. This is calculated by taking the absolute difference in the predicted probabilities of the outcome occurring for an average participant in the program and control groups and dividing this amount by control group level, and then multiplying this value by 100. All results were tested for statistical significance at $p < .05$ based on a two-tailed test. We note findings at $p < .10$ based on a two-tailed test as a trend indicating a "marginal level" of significance.

Results

Descriptive Analyses

Having an adolescent-aged and a younger child is correlated with a variety of other family characteristics, with the most obvious one being family size. Table 1 presents a summary of sample characteristics for families with adolescents who had a younger sibling and, for comparison, the sample of families with adolescents who did not have younger siblings. We see that the average spacing between adolescents and their eldest younger siblings ranged from 3.7 to 3.8 years, with nearly half of the births of the eldest younger sibling occurring within 2 years of the birth of the adolescent-aged child (ranging from 40 to 50% across the

three programs). In general, families with younger siblings are more likely to be headed by mothers who were younger at random assignment and were Black or Hispanic compared with families with adolescents and no younger siblings. There is some evidence to suggest that mothers in families with adolescents and a young sibling had lower earnings, but higher incomes, than their counterparts in families with adolescents and no younger siblings. In Florida, we also find that mothers in families with adolescents and younger siblings are more likely to be on welfare and are less likely to have ever been married compared with their counterparts of adolescents and no younger siblings. Not surprisingly, families with adolescents and younger siblings have more children in the household than families with adolescents and no younger siblings.

Characteristics and Patterns of Sibling Care in These Samples

Because so little is known about sibling care arrangements among low-income families, we first note that the rates of sibling care vary considerably across the sites with these state welfare programs (see Table 2). In Connecticut, about 16% of families with adolescents and a younger sibling in the control group used sibling care in the last month. In Florida and Indiana, far fewer adolescents appeared to care for younger siblings; in the control groups, approximately 4% and 5% of families with adolescents and younger siblings used sibling care in both states, respectively. Mothers in these three studies report relatively low rates of center-based care for this sample, ranging from about 4 to 8%. Rates of home-based care (including sibling care) in the control group in the Connecticut, Florida and Indiana samples ranged from 23 to 27%. Rates of sibling care use were not easily predicted from our set of socioeconomic and demographic characteristics as well. The large variability in rates of use of sibling care by control group members is reflective of the variability in the use of different types of child care arrangements across states that has been documented in the 1997 National Survey of America's Families (NSAF), suggesting that large variations may be attributable to differences in the costs and supply of child care, availability of organized afterschool activities that may also occupy adolescents' time, as well as variations in labor force patterns and child care and child care subsidy policies (Capizzano et al. 2000; Capizzano et al. 2000).

Program Impacts on Schooling Outcomes for Adolescents with Younger Siblings at Home

Table 2 presents program impacts of each state welfare reform program on schooling outcomes for adolescents with a younger sibling. In Connecticut, the program had no significant impact on any of the schooling outcomes examined. In Florida, the program did not have a significant impact on parent-reported adolescent school performance or dropout rates, however the program did affect rates of suspensions and expulsions over the follow-up period; the Florida program led to a 32.0% increase in the probability that adolescents with younger siblings were ever suspended and/or expelled from school between program and control groups (odds ratio = 1.7, $p < .05$). In Indiana, the program decreased the probability that adolescents with a younger sibling showed above average school performance by 18.0% (odds ratio = -0.7, $p < .05$), but did not have a significant impact on the extent to which adolescents dropped out or were suspended and/or expelled.³

We also examined the impacts of the state welfare programs on schooling outcomes for adolescents with and without younger siblings at home (see "Appendix"). Though

³We took the additional step of estimating an overall average program impact for each schooling outcome across the three programs using meta-analytic techniques (see Lipsey and Wilson 1996) in order continued to establish that there is an overall negative impact of the welfare program on adolescent schooling outcomes that warrants further exploration. Our results indicate that two of the four pooled impacts (program-driven decrease on above average school performance and increase on suspensions and/or expulsions) were statistically significant. These results reinforce earlier findings by Gennetian et al. (2004) regarding the overall negative effects of welfare programs on adolescents with younger siblings at home.

substantially smaller sample sizes make it difficult to detect significant program impacts for this subgroup of adolescents without younger siblings, we found little evidence to suggest that the schooling outcomes of adolescents without younger siblings were adversely affected by the welfare programs. We did not find any significant impacts on the schooling outcomes of adolescents who did not have younger siblings, though we also did not find any evidence to suggest that the effects of the welfare programs on adolescents without younger siblings were significantly different than those on adolescents with younger siblings.

Program Impacts on Use of Sibling Care Among Families with Adolescents and Younger Siblings

Do unfavorable impacts of state welfare programs on school outcomes among adolescents with younger siblings align with program impacts on sibling care? Two of the state welfare programs with negative impacts on selected adolescent schooling outcomes also significantly increased the use of sibling care among families with adolescents and a younger sibling, suggesting that sibling care could be a mediator of the effects of state welfare programs on the achievement outcomes of adolescents with younger siblings. In Florida, the program marginally increased the probability that families with adolescents and younger siblings ever used sibling care by 53.3% (odds ratio = 2.16, $p < .10$). Similarly, the probability that families with adolescents and younger siblings usually used sibling care was 66.4% higher in the Florida program than in the control group (odds ratio = 2.69, $p < .05$), suggesting that the program not only marginally affected whether mothers of adolescents with younger siblings used sibling care, but also significantly affected the regularity and intensity with which they used sibling care. In Indiana, the probability that families with adolescents and younger siblings ever utilized sibling care was 38.0% higher in the program group than in the control group (odds ratio = 2.33, $p < .05$). In contrast, the Connecticut welfare program did not significantly affect the extent to which families with adolescents and younger siblings relied upon sibling care as a viable care arrangement for younger children in the household, nor did the program have a discernable negative effect on the schooling outcomes of adolescents with younger siblings.

We also used retrospective reports of child care histories to explore how the programs affected the use of sibling care arrangements over the follow-up period for the subgroup of families with adolescents and younger siblings between the ages of 5 and 12 years old at follow-up (elementary school-aged children) for whom longitudinal child care information was collected. In Florida, the families with adolescents and elementary school-aged younger siblings in the control group used sibling care for about one month, on average, and the program marginally increased the extent to which sibling care was used by 0.9 months ($p < .10$). In Indiana, families with adolescents and elementary school-aged younger siblings in the control group used sibling care for about 3 months, and the program increased the duration that sibling care was used by 2.4 months ($p < .01$). The findings suggest that the Florida and Indiana program, to varying degrees, increased the intensity with which mothers used sibling care. The Connecticut program did not significantly affect the number of months that sibling care was used over the follow-up period. The results for this subgroup of adolescents with elementary school-aged younger siblings suggest that program-driven increases in sibling care occurred over time and were not isolated to the month prior to the follow-up assessment as we found for the broader group of adolescents with younger siblings.

Program Impacts on the Use of Other Child Care Arrangements Among Families with Adolescents and Younger Siblings⁴—We also considered whether the programs' impacts on sibling care were related to the use of other center- and home-based child care arrangements among families with adolescents and younger siblings. The

Florida program had no significant effects on the use of center- or home-based child care among families with adolescents and younger siblings. Two marginally significant impacts were found in Connecticut and Indiana. The Connecticut program marginally increased the likelihood that center-based arrangements were used by 48.5% (odds ratio = 1.99, $p < .10$). In Indiana, the program did not affect the use of center-based care arrangements, but marginally increased the likelihood that families with adolescents and younger siblings utilized home-based care arrangements by 19.4% (odds ratio = 1.48, $p < .10$).

Program Impacts on Maternal Employment, Work Schedules, and Economic Well-being Among Families with Adolescents and Younger Siblings—Why

some single mothers rely upon sibling care could be related to whether they were employed, their working conditions, and their economic well-being. To explore these possibilities, we examined program impacts on maternal rates of employment at follow-up among families with adolescents and younger siblings. The Connecticut and Indiana control groups showed fairly similar rates of maternal employment (about 54 and 55%, respectively) and both of these programs increased rates of maternal employment at follow-up among families with adolescents and younger siblings; in Connecticut, the probability that mothers were employed was 18.2% higher in the program group than in the control group (odds ratio = 1.46, $p < .05$); in Indiana, the probability that mothers were employed was 20.7% higher in the program group than in the control group (odds ratio = 1.54, $p < .05$). In Florida, however, somewhat higher rates of maternal employment were found; about 60% of mothers in the control group employed at the follow-up, but the welfare program had no discernable impact on the rates of maternal employment. To our surprise, program impacts on maternal employment do not appear to align with program impacts on the use of sibling care, suggesting that there is not a clear link between maternal employment and the use of sibling care and other factors may play important contributing roles.

We next explored whether impacts on maternal work hours and schedules, such as part-time work hours or non-standard work schedules, shaped single mothers' decisions to use sibling care arrangements. In Connecticut, Florida, and Indiana, 26, 8 and 10% of working mothers in the respective control groups being employed part-time at their current or most recent job. Yet, the three state welfare programs did not have discernable impacts on whether working mothers were employed part-time versus full-time hours among families with adolescents and younger siblings.

In contrast, rates of employment at nonstandard times showed less variability across the three studies with about 35 to 36% of working mothers in the control group reporting that they were employed on nonstandard schedules across the three states. The Connecticut and Florida welfare programs showed no significant impact on the extent to which working mothers were employed at non-standard times. In Indiana, the probability that maternal work occurred at nonstandard times was 23.0% higher in the program than in the control group among families working mothers and adolescents with younger siblings (odds ratio = 1.60, $p < .05$).

Economic constraints could limit the affordability of alternative child care options, which in turn increased the extent to which mothers relied upon older siblings to care for younger children in the household. To examine this possibility, we examined program impacts on mothers' average yearly income. In Connecticut, where we found no effects on use of

⁴We explored a set of potential mediating variables for a subgroup of families with adolescents with younger siblings between the ages of 5 and 12 years old at follow up (a group for whom more detailed measures are available on parental mental health and family functioning). We explored program impacts on regularity of family mealtimes, maternal depression, and parenting stress. The program-specific impacts on these three measures were not significant, suggesting that they are not likely contributors to the negative effects of the welfare programs on the schooling outcomes of adolescents with younger siblings.

sibling care, the average yearly income in the control group was \$12,680, and the state welfare program increased this amount by \$2,344 ($p < .01$). The Florida and Indiana programs showed no significant impacts on families' average yearly incomes.

We also examined whether program impacts on employment and economic outcomes differed for families with adolescents who did and did not have younger siblings at home (see "Appendix"). We found no significant differences in program impacts between these two subgroups, though our power to detect such variation in program impacts is somewhat limited by the small sample sizes for the group of families with adolescents who did not have younger siblings at home.

Supplemental Analyses

Disentangling Whether the Presence of More Than One Adolescent Moderates the Effects of Welfare Policies on Adolescents with Younger Siblings—A

challenge of linking program-driven impacts on the use of sibling care with impacts on adolescents' schooling outcomes is that more than one adolescent is present in some families, and we cannot directly infer which adolescent in the household might have been called upon to care for younger siblings in the home. Furthermore, it is possible that having another adolescent in the household could spread the burden and reduce the impact that engaging in caretaking responsibilities has on adolescents. That is, in families where more than one adolescent is present, the programs may have less of a negative impact on the schooling outcomes of adolescents with younger siblings than among families where only one adolescent is present.

To explore these possibilities, we pooled the data across the three studies to examine how program impacts might vary for subgroups of families with only one versus more than one adolescent and younger siblings present. While pooling the data across the study samples allows us to leverage larger subgroup sample sizes and to increase our power to detect significant subgroup impacts defined by the number of adolescents present in the household, doing so limits our ability to leverage the heterogeneity of study-specific program impacts on the mediators and outcomes of interest to inform the hypothesized mechanisms.

Using the pooled dataset, we found additional support linking the policy-driven increases in the use of sibling care to the programs' impacts on adolescents' schooling outcomes among families with younger siblings and more than one adolescent present. However, it appears that some other factors, not explored here, might also contribute to the ill effects of welfare programs on adolescents with younger siblings in one-adolescent households. Lastly, we identified differential effects of the welfare programs on parents' reliance upon sibling care for younger children based upon whether one or more than one adolescent is present in the household.

In our subgroup impact analysis among single adolescents with younger sibling households using the pooled data across the three studies, we found that the welfare programs had a negative effect on the likelihood that adolescents exhibited above average school achievement ($b = -.55$, odds ratio = 0.58, $p < .01$), but did not have a significant impact on the use of sibling care, suggesting that factors other than the use of sibling might also influence adolescents' schooling outcomes. In terms of impacts on maternal employment and economic outcomes, we found that the welfare programs marginally increased maternal employment ($b = .31$, odds ratio = 1.36; $p < .10$) and significantly increased families' yearly incomes over the follow-up period ($b = \$1,236/\text{year}$, $p < .01$) among one-adolescent with younger sibling households using the pooled data.

In our subgroup impact analysis among two-or-more-adolescent-with-younger-sibling households using the pooled data across the three studies, we found that the welfare programs had marginally significant negative effects on the likelihood that adolescents exhibited above average academic achievement ($b = -0.31$, odds ratio = 0.73, $p < .10$). The programs also increased the use of sibling care ($b = 0.82$, odds ratio = 2.27, $p < .05$) in this subgroup. The effects of the welfare programs on the use of sibling care were significantly different across subgroups of families with one versus more than one adolescents and younger siblings present, suggesting that parents as a function of the welfare programs may be more likely to rely upon adolescents to care for younger siblings when more than one adolescent is present. With regard to impacts on maternal employment and economic outcomes, among two-or-more-adolescent-with-younger-sibling households, the welfare programs also increased maternal employment ($b = 0.48$, odds ratio = 1.62, $p < .05$) and families' incomes ($b = \$1,362/\text{year}$, $p < .01$). The impacts on maternal employment and economic outcomes did not significantly differ across the two subgroups of families with younger siblings defined by whether one or more adolescent was present.

Discussion

This study contributes to the existing literature by examining whether program-induced changes in maternal employment, work schedules, income, and reliance on sibling care could account for the effects of welfare programs on adolescent schooling outcomes (pathways not previously examined by prior research synthesizing the effects of welfare programs on adolescent schooling outcomes [Gennetian 2004; Gennetian et al. 2004]).

The pattern of experimental impacts across the welfare programs examined here indicates that most, but not all welfare programs examined here led to unfavorable effects on selected schooling outcomes of adolescents with younger siblings. The findings further suggest that the effects of the welfare policies on the schooling outcomes of adolescents with younger siblings are linked with several factors including whether the welfare policies affected sibling caretaking, and to some degree families' economic resources and whether mothers worked nonstandard schedules. In doing so, this study provides new evidence about intrafamilial processes related to low-wage work and the use of sibling care that place low-income adolescents at developmental risk for less favorable schooling outcomes in the context of welfare, antipoverty and employment policies. This is an important advancement of the literature in this area where sparse evidence about the mechanisms that account for the effects of welfare policies on low-income adolescents currently exists. In doing so, this study highlights areas in which future experimental studies (perhaps using double randomization research designs) can further validate the mediating processes identified here that place low-income adolescents at risk.

As with prior evaluations of welfare, employment, and antipoverty programs (Gennetian et al. 2004), we found small unfavorable effects of two of the three state welfare programs examined here on selected adolescent schooling outcomes with evidence of heterogeneity in impacts across programs. Specifically, the Florida state welfare program had unfavorable impacts on school performance and the Indiana state welfare program increased the likelihood of suspensions and expulsions among adolescents with younger siblings.

Using the available information about child care, we explored whether sibling caretaking is one factor linked with the unfavorable effects of these state welfare programs on adolescents with younger siblings. The two state welfare reform programs in Florida and Indiana with negative impacts on selected schooling outcomes also increased the use of any sibling care (trend level of significance in Florida) among families with adolescents and younger siblings, as well as the intensity and regularity with which sibling care was used (as

evidenced by impacts on the usual use of sibling care in Florida and months of sibling care use among the subgroup of adolescents with elementary school-aged younger siblings in Florida [trend level of significance] and Indiana). In Connecticut, the state welfare program did not increase school-related difficulties, nor did the program increase the use of sibling care among adolescents with younger siblings.

The results from the Florida and Indiana studies are in line with prior research illustrating that some low-income working mothers adopt work-family management strategies that entail relying upon older children in the household to fulfill household duties and care for younger children (Burton 1997; Dodson and Dickert 2004), suggesting that adolescent involvement in sibling care can interfere with adolescents' school-related activities. Yet, because we only examine a limited number of adolescent schooling outcomes, it could still be that taking on adult-like responsibilities, such as caring for younger siblings, help adolescents define their own identities as burgeoning adults and has beneficial implications for their own self-esteem and mental health as they make the transition from adolescence to adulthood as suggested by some researchers (Chase-Lansdale et al. 2003).

To unpack why some, but not all, of the state welfare programs examined here encouraged single mothers to rely upon sibling care arrangements for younger children in the household, we examined the potential roles of maternal employment, work hours and schedules, and economic resources. Contrary to our expectations, policy induced effects on maternal employment alone did not appear to be linked with the programs' effects on use of sibling care and adolescent schooling outcomes. Only one of the two programs that increased the use of sibling care also increased overall rates of maternal employment. In addition, none of the programs affected whether mothers worked full- or part-time hours among families with adolescents and younger siblings. From these results, it is clear that whether the welfare programs encouraged mothers to work or whether they worked full- or part-time hours are not likely driving families' reliance upon sibling care and other child care decisions among adolescents with younger siblings. This is in line with prior research that suggests low-wage working mothers, regardless of the work hours, require a patchwork of care to address their child care needs (Scott et al. 2005).

Whether policy-induced changes in maternal employment translated into increases in families' incomes appears to play a greater role in shaping the extent to which the programs encouraged families to rely upon adolescents to care for younger siblings at home and the extent to which the programs negatively affected the schooling outcomes of adolescents with younger siblings. The two programs that did not increase maternal income increased the use of sibling care and the regularity of use of sibling care among families with adolescents and younger siblings. In contrast, the Connecticut program increased maternal income, yet it did not increase families' use of sibling care, but modestly increased families' use of center-based child care.

To understand the extent to which such program-driven increases in families' incomes might have influenced their child care decisions, we consider how the magnitude of the increase in families' incomes lines up with the costs of child care in Connecticut. Although we do not have data available on child care costs for the time period that the Connecticut evaluation was conducted, we can look to 2010 data compiled by the National Association of Child Care Resource and Referral Agencies regarding the costs of child care for a comparison of how the costs of child care might align with the program-driven increases in families' incomes. We focus primarily on the state-wide statistics on the costs of child care in Connecticut for school-aged children—the age at which younger siblings in the study sample are most likely to be at the follow-up point (as shown in Table 1, most younger siblings in this sample were older than 5 years old at follow-up [based on finding that about

25% of families with adolescents and younger sibling have child less than 3 years old present in the household at study entry and the follow-up period is 48 months long]). Based upon these state-level statistics in Connecticut, the average annual fees paid by families for before-and-after school care for a school-aged children in a center was \$5,206/year (or \$433/month) and in family or home-based child care was \$4,285/year (or \$357/month). Assuming that the total increase in families' incomes in Connecticut is used to pay for child care (recall, the welfare program increased families' annual incomes by \$2,344/year [or roughly \$200/month]), the increase in families' incomes represents approximately one-half of the out-of-pocket costs of child care for school-aged children in Connecticut. This suggests that Connecticut's program-driven increase in family income is unlikely the sole determinant of the increased use of center-based care among program group families relative to their counterparts in the control group.

It is also important to consider whether there are specific supports provided by the different state welfare programs that might also account for the heterogeneity in the program impacts on the use of sibling care. A review of the main impacts for the full samples of these welfare studies indicates that program-driven increases in the receipt of child care subsidy assistance might also have played a role in shaping the programs' impacts on the use of sibling care. The Connecticut welfare program had a significant impact on families' receipt of child care subsidy assistance (Bloom et al. 2002), which further reduced the out-of-pocket costs for child care paid by program group families. In Florida, the program did not increase the receipt of child care subsidy assistance (see Gennetian and Michalopoulos 2003). And, unfortunately, in Indiana, the evaluators of the welfare program did not examine the program's impact on receipt of child care subsidy assistance (see Beecroft et al. 2002).

Findings regarding Connecticut's program-driven increase in families' incomes among families with adolescents and younger siblings, coupled with earlier findings regarding the program's impact on receipt of child care subsidy assistance, point to potential reasons why the Connecticut program might not have increased the use of sibling care, though further research in this area is needed to flush out the contributory roles of the various influences. The program loosened families' economic constraints and reduced the out-of-pocket costs for child care paid by program group families through the receipt of child care subsidy assistance. It therefore could be that families in Connecticut did not increase their reliance upon sibling care because they were able to afford alternative care arrangements for younger children in the household. In Florida and Indiana, mothers might have increased their use of sibling care because financial resources were not enough to cover the costs of child care and other work-related expenses, as suggested by Dodson and Dickert (2004).

We found mixed support for the hypothesis that maternal nonstandard work schedules are a contributing factor that accounts for the increased use of sibling care. Only one of the programs that increased the use of sibling care also increased maternal employment on nonstandard schedules. This finding falls amid a growing body of ethnographic research indicating that low-income mothers who work evening, night-time, irregular or odd hours are more likely to rely upon informal child care for their children than those who work standard hours of the day, in part, because center-based care is less readily available outside of regular business hours (Henly and Lambert 2005).

Taken together, the pattern of impacts across the three studies suggests that constrained economic resources is likely one factor contributing to the effects of the programs on families' child care decisions and reliance upon sibling care arrangements, as well as the adverse effects of state welfare programs on adolescents' school-related outcomes. However, readers should interpret these results with caution as we are unable to disentangle the unique contributing roles of each of these factors, given that a limited number of studies

are explored. Even so, our findings highlight new directions and research questions that are ripe for future research.

A question still remains as to what program-driven changes might contribute to program-induced increases in the use of sibling care and increases in suspensions and expulsions among adolescents with younger siblings in Florida, given that the program did not result in changes in maternal employment or family incomes. Analyses conducted as part of the overall evaluation of the Florida's welfare program indicate that the program led to small increases in maternal employment immediately after random assignment with these effects disappearing over time as increasing numbers of control group members moved into employment over the follow-up period (Bloom et al. 1999). It could be that the Florida program pushed mothers into employment before they had adequate work supports in place. As a result, mothers in the Florida program group may have quickly cobbled together a patchwork of child care arrangements (Scott et al. 2005), which included relying to a greater extent upon older siblings to care for younger children in the household. Once these arrangements were in place, mothers continued to rely upon older siblings as a viable child care solution for younger children in the household throughout the follow-up period. In contrast, control group members who delayed their transition into employment might have had more time to search out alternative child care options prior to entering the workforce, and were consequently less likely to utilize sibling care arrangements. The Florida program also increased participation in employment-related activities, such as job search and training programs, which might have affected participants' needs for child care and account for the program-driven increases in the use of sibling care arrangements (Bloom et al. 2000).

In this study, we were not able to examine other equally important and possible models of influence that could also account for the effects of welfare policies on adolescents, such as parental monitoring, supervision, or adolescents' engagement in other adult-like responsibilities and out-of-school activities (factors that are likely correlated with sibling caretaking activities). For example, in an evaluation of a Canadian welfare and employment program, the Self-Sufficiency Project, researchers found that adolescents whose parents were subject to the conditions of the program were more likely to work 20 hours or more per week than their counterparts in the control group (Morris and Michalopoulos 2003). A relatively heavy workload could also interfere with adolescent schooling as well.

Furthermore, using a pooled dataset, we were able to find additional support linking the policy-driven increases in the use of sibling care to the programs' impacts on adolescents' schooling outcomes among families with younger siblings and more than one adolescent present. However, it appears that some other factors, not explored here, might also contribute to the ill effects of welfare programs on adolescents with younger siblings in one-adolescent households.

Lastly, the current study provides a descriptive exploration of sibling care arrangements in samples of very low-income, welfare receiving families. There was tremendous heterogeneity in the rates of sibling care use in the control groups across states—variation that did not directly correspond to rates of use of other types of care arrangements, rates of employment at follow-up, work schedules, or income levels in the control group of these state welfare studies. Rates of sibling care were also not easily predicted from our set of socioeconomic and demographic characteristics, including maternal education at baseline, a common predictor of other types of child care (Huston et al. 2002). Furthermore, in our subgroup analyses defined by the number of adolescents present in the family with younger siblings using a pooled dataset, the programs increased the use of sibling care only when more than one adolescent was present in the household. This finding suggests that parents may be more likely to rely upon adolescents to care for younger siblings when more than

one adolescent is present. This may be in part because parents feel that their adolescent-aged children are better able to handle the demands of caring for a younger sibling when the responsibility is spread across more than one adolescent.

These findings have potential measurement and data implications for future studies in this area. First, these findings point to the importance of capturing nuanced measures of household and family structure. Second, the findings point to the need for more nuanced measures of factors that influence parents' child care decisions. For example, local variations in the cost, availability of different types of child care by child's age, and state differences in child care subsidy assistance policies might contribute to the heterogeneity in use of sibling care across the studies (Capizzano et al. 2000; Capizzano et al. 2000; Early and Burchinal 2001; Knox et al. 2003; Lowe and Weisner 2004). In Connecticut, access to child care assistance was provided as an entitlement to all eligible recipients regardless of program status. In Florida and Indiana, the child care subsidy system was consolidated in an effort to streamline access to subsidies and child care assistance was provided to all eligible recipients regardless of program status. State-level variation in child care subsidy policies and other local conditions could be one reason why we saw lower rates of sibling care use in the Florida and Indiana than in Connecticut and are important areas of inquiry for future research. Furthermore, measuring parents' awareness of child care subsidy assistance and perceived difficulties in navigating the subsidy system are also important to consider in the context of parents' child care decisions (see Adams et al. 2002; Gennetian et al. 2002). Moreover, in recent years, an emerging body of research points to the importance of considering parents' child care preferences for different types and quality of child care (Peyton, et al., 2001), which suggests that even independent of the availability of free/low-cost child care options, subsidies, and proximity of various child care arrangements, parents may prioritize certain child care features and characteristics in making these decisions for their children. Lastly, it is important to consider the social and emotional development, as well as other characteristics of the children in need of care and the adolescents providing the care. Recently, researchers and policy makers have drawn attention to the high rate of emotional and behavioral difficulties among young, low-income children (Raver 2002), which can also be linked with higher rates of expulsion from early child care settings (Gilliam 2005). It may be more difficult for parents with young children who have emotional and behavioral difficulties to find child care leading them to rely more heavily upon older adolescent-aged children to care for younger children in the household. At the same time, parents who feel that their adolescent-aged children are more able and mature to take on household and caretaking responsibilities may be more likely to rely upon them to care for younger children in the household (Vandell and Shumow 1999).

In summarizing this study's findings, several additional caveats are in order. We were unable to use more complex estimation strategies, such as instrumental variables techniques, or to cleanly assess the temporal ordering of the variables. Admittedly, the available measures of adolescent schooling outcomes and the use of sibling care are relatively weak, and though our findings are congruent with findings by other investigators in this area (e.g., Dodson and Dickert 2004), the validity of these measures can be questioned. Our sample consisted of low-income families headed by single mothers that were applying or recertifying their eligibility for welfare receipt. While this sample is similar in many ways to the larger population of low-income families, future studies should investigate the extent to which our findings can be generalized to the broader population of low-income families and the current policy context. Furthermore, the welfare policy regimes examined in the current study only represent a handful of current TANF policies that are being used by various states, and the extent to which the experimental manipulations of the policy features in the current study's data can be generalized to the current welfare policies and practices is unclear. Such questions are interesting avenues for future research.

Thus, findings of this study aim to build upon existing knowledge about the development of adolescents in low-income working families in the context of welfare reform. Very little data is currently available that is capable of informing and teasing apart the mechanisms that account for the effects of welfare policies on low-income adolescents. The current study, while not allowing us to make definitive conclusions about the influence of maternal work schedules, economic constraints and sibling caretaking in shaping the effects of welfare policies on adolescent schooling outcomes, raise several mediating relationships that warrant further exploration in future research. These findings highlight the importance of considering sibling caretaking activities and economic constraints when attempting to flush out the processes that place low-income adolescents at developmental risk.

Appendix

See Table 3.

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Table 1

Selected characteristics of adolescents with and without younger siblings, by study

	Connecticut		Florida		Indiana	
	With younger siblings	No younger siblings	With younger siblings	No younger siblings	With younger siblings	No younger siblings
Sample size (<i>n</i>)						
Total number of families	553	184	327	130	616	211
Total number of adolescents	684	256	406	181	861	226
Parent characteristics prior to RA						
Age	34.2	38.4**	32.2	36.4**	-	-
35 years old or older (%)	-	-	-	-	19.2	42.9**
Race (%)						
Black	44.1	41.9	65.3	54.6*	46.8	39.1
White	30.0	38.0*	32.5	44.6*	49.1	55.2
Hispanic	25.9	19.6 [†]	1.5	0.0	3.5	2.9
Never married	56.0	55.0	44.0	34.9f	47.2	47.6
Parent education, employment, and income						
High school or GED	62.3	60.7	51.2	55.4	60.5	54.3
Employed in quarter prior to RA	33.5	40.1	30.9	36.2	35.8	31.4
Earnings in quarter prior to RA (\$)	666	978*	629	702	421	469
Income in quarter prior to RA (\$)	2,892	2,544**	2,465	1,857**	-	-
AFDC receipt in quarter prior to RA (%)	78.7	73.1	75.5	63.1**	74.9	73.3
Family composition						
Number of children in family	3.1	1.6**	3.2	1.7**	-	-
3 or more children in household (%)	-	-	-	-	52.2	12.4**
Youngest child is 3-years-old or younger	27.9	-	26.9	-	24.6	-
Adolescent's characteristics at follow-up						
Age	14.8	14.7	14.8	14.6	14.7	14.7
Boy (%)	48.1	53.5	53.7	54.5	46.7	48.1
Spacing between adolescent and eldest younger sibling	3.7	-	3.7	-	3.8	-

Dashes indicate that dependent variable is not available

The *p*-level indicates a significant difference in outcomes between groups with and without younger siblings within each of the study samples

- † *p* < .10.
- * *p* < .05.
- ** *p* < .01.

Table 2 Impacts for adolescents ages 13 to 18 with a younger sibling, by outcome

Variable	Connecticut					Florida					Indiana							
	<i>n</i> _{families} = 553					<i>n</i> _{families} = 327					<i>n</i> _{families} = 616							
	CGM	<i>b</i> ^{<i>a</i>}	ES ^{<i>b</i>}	OR ^{<i>c</i>}	LL	UL	CGM	<i>b</i> ^{<i>a</i>}	ES ^{<i>b</i>}	OR ^{<i>c</i>}	LL	UL	CGM	<i>b</i> ^{<i>a</i>}	ES ^{<i>b</i>}	OR ^{<i>c</i>}	LL	UL
95% C ^{<i>d</i>}																		
School outcomes																		
Above avg. school performance (%)	63.61	-0.31	-	0.74	-0.67	0.06	50.71	-0.23	-	-0.80	-0.68	0.23	60.70	-0.38	-	0.68	-0.72	-0.04 [*]
Below avg. school performance (%)	9.52	0.13	-	1.13	-0.44	0.69	9.95	0.34	-	1.41	-0.32	1.01	12.10	0.31	-	1.36	-0.14	0.76
Dropped out (%) ^{<i>e</i>}	11.72	0.14	-	1.15	-0.68	0.96	1.90	0.55	-	1.73	-1.37	2.46	6.29	0.77	-	2.17	-0.36	1.91
Suspended or expelled (%)	28.75	0.19	-	1.21	-0.17	1.74	28.44	0.53	-	1.69	0.05	1.00 [*]	34.74	-0.04	-	0.96	-0.39	0.32
Child care arrangements																		
Any sibling care in last month (%)	15.66	0.16	-	1.17	-0.33	0.64	4.71	0.77	-	2.16	-0.12	1.67 [†]	3.94	0.84	-	2.33	0.03	1.66 [*]
Usually use sibling care in last month (%)	13.25	0.16	-	1.17	-0.36	0.68	3.53	0.99	-	2.69	0.00	1.98 [*]	-	-	-	-	-	-
Number of months used sibling care	5.98	1.25	0.14	-	-0.63	3.13	1.25	0.90	0.26	-	-0.12	1.91 [†]	3.03	2.43	0.34	-	0.70	4.16 ^{**}
Any center-based care in last month	4.42	0.69	-	1.99	-0.09	1.46 [†]	8.24	-0.514	-	-0.59	-1.44	0.41	4.30	0.14	-	1.15	-0.79	1.08
Any home-based care in last month	27.31	0.32	-	1.38	-0.07	0.71	22.35	-0.18	-	0.83	-0.74	0.37	22.58	0.39	-	1.48	-0.04	0.83 [†]
Maternal employment outcome																		
Currently employment (%)	54.09	0.38	-	1.46	0.01	0.74 [*]	60.00	0.09	-	1.09	-0.37	0.55	55.20	0.43	-	1.54	0.06	0.81 [*]
Maternal work schedule outcomes ^{<i>f</i>}																		
Employed part-time hours (%)	26.46	0.03	-	1.04	-0.35	0.42	8.24	0.10	-	1.10	-0.70	0.89	10.39	0.00	-	1.00	-0.59	0.59
Worked nonstandard schedule (%)	35.41	-0.14	-	0.87	-0.64	0.36	35.29	0.19	-	1.21	-0.50	0.88	35.84	0.47	-	1.60	0.07	0.87 [*]
Maternal economic outcome																		
Avg. yearly income over follow-up (\$)	12,680	2,344	0.40	-	1,381	3,307 ^{**}	9,636	27	0.01	-	-986	1,039	9,734	456	0.09	-	-474	1,386

Sources MDRC calculations based on follow-up survey data from the following studies: FTP, Jobs First, Indiana Welfare Reform Program

Samples vary for each outcome tested due to missing data on dependent variables. Dashes indicate that dependent variable is not available or information is not relevant for outcome. *CGM* observed control group mean; *ES* effect size; *OR* odds ratio; *CI* confidence interval; *LL* lower limit; *UL* upper limit

The *p*-level indicates a significant difference in outcomes between program and control groups within each of the study samples

^a Coefficients in this table represent the effect of the respective welfare reform program on each outcome as estimated in separate OLS regressions for continuous dependent variables and logits estimated in separate logistic regressions for binary dependent variables. Each set of analyses adjusts for background characteristics encompassing areas of demographics, family structure and human capital characteristics of mothers and their adolescent-aged children

^b The effect size is calculated for continuous dependent variables by dividing the program coefficient by the standard deviation of the outcome for the control group

^c The odds ratio represents the exponentiated logit for binary dependent variables

^d Confidence intervals are presented for the OLS regression coefficients for continuous dependent variables and logits for binary dependent outcomes

^e Whether adolescents dropped out of school was available for children who were 16 and older at follow-up in Connecticut

^f Assessed for mothers who are employed at follow-up

[†] $p < .10$
^{*} $p < .05$
^{**} $p < .01$.

Impacts for adolescents ages 13 to 18 without a younger sibling, by outcome

Variable	Connecticut						Florida						Indiana					
	$n_{\text{families}} = 184$			$n_{\text{adolescents}} = 256$			$n_{\text{families}} = 130$			$n_{\text{adolescents}} = 181$			$n_{\text{families}} = 211$			$n_{\text{adolescents}} = 226$		
	CGM	b^a	ES^b	OR^c	LL	UL	CGM	b^a	ES^b	OR^c	LL	UL	CGM	b^a	ES^b	OR^c	LL	UL
School outcomes																		
Above avg. school performance (%)	60.64	0.02	-	1.02	-0.59	0.62	58.82	0.13	-	1.14	-0.57	0.83	41.67	0.09	-	1.09	-0.56	0.74
Below avg. school performance (%)	7.45	0.64	-	1.89	-0.44	1.72	9.41	0.09	-	1.09	-0.98	1.16	26.19	-0.29	-	0.75	-1.09	0.52
Dropped out (%) ^e	10.00	1.33	-	3.79	-1.44	4.10	5.88	-0.27	-	0.06	-6.78	1.29	1.19	-	-	-	-	-
Suspended or expelled (%)	31.43	-0.31	-A	0.73	-0.92	0.30	32.94	0.19	-	1.21	-0.53	0.90	38.10	0.13	-	1.14	-0.57	0.83
Maternal employment outcome																		
Currently employed (%)	53.66	-	0.66	1.94	-0.03	1.36 ^f	59.38	-0.26	-	0.77	-1.12	0.59	52.08	0.60	-	1.83	-0.31	1.52
Maternal work schedule outcomes ^f																		
Employed part-time hours (%)	20.73	0.27	-	1.31	-0.51	1.04	6.25	1.32		3.74	-0.08	2.72 ^f	10.42	0.41	-	1.50	-1.38	2.20
Worked nonstandard schedule (%)	29.27	0.36	-	1.43	-0.67	1.39	40.62	-0.02	-	0.98	-1.50	1.46	41.67	-1.00	-	0.37	-2.29	0.29
Maternal economic outcome																		
Avg. yearly income over follow-up (\$)	11,892	1,176	0.18	-	-657	3,008	7,923	541	0.10	-	-1,428	2,609	7,168	2,242	0.46	-	141.61	4,342*

Samples vary for each outcome tested due to missing data on dependent variables. Dashes indicate that dependent variable is not available or information is not relevant for outcome. *CGM* observed control group mean; *ES* effect size; *OR* odds ratio; *CI* confidence interval; *LL* lower limit; *UL* upper limit

Each set of analyses adjusts for background characteristics encompassing areas of demographics, family structure and human capital characteristics of mothers and their adolescent-aged children. The *p*-level indicates a significant difference in outcomes between program and control groups within each of the study samples.

7. Coefficients in this table represent the effect of the respective welfare reform program on each outcome as estimated in separate OLS regressions for continuous dependent variables and logits estimated in separate logistic regressions for binary dependent variables

² The effect size is calculated for continuous dependent variables by dividing the program coefficient by the standard deviation of the outcome for the control group.

The odds ratio represents the exponentiated logit for binary dependent variables

¹Confidence intervals are presented for OLS regression coefficients for continuous dependent variables and logits for binary dependent outcomes

^e Whether adolescents dropped out of school was available for children who were 16 and older at follow-up in Connecticut. In Indiana, we were not able to examine the program's impact on drop out rates among adolescents without younger siblings because the experimental versus control group comparison perfectly predicted ever having dropped out

^f Assessed for mothers who are employed at follow-up

[†] $p < .10$
^{*} $p < .05$
^{**} $p < .01$