SINGLE PARENTS, WORKING MOTHERS, AND THE EDUCATIONAL ACHIEVEMENT OF SCHOOL CHILDREN

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This paper presents new research on the effects of mother's employment and living in a one-parent family on children's achievement. We take advantage of two nationally representative data bases of students from two age groups and demonstrate the importance of model specification to the determination of effects. Results show that mother's employment and living in a one-parent family can have negative effects on school achievement but that these effects differ by age, race, and family structure. The results also demonstrate the importance of mediating variables such as income and time use.

INTRODUCTION

The research literature has clearly shown that family background variables are related to children's achievement (e.g., Coleman et al. 1966; Jencks et al. 1972). Among these background variables are parents' occupations, parents' education, family income, race, family structure, and parents' work patterns. This paper presents new evidence on the effect of two of these background variables—family structure and parents' work patterns—on students' achievement.

These two variables are particularly interesting in light of recent increases in the proportions of one-parent families and working mothers. Between 1970 and 1980, the proportion of children living in one-parent families increased from 11.9 percent to 19.7 percent (U.S. Bureau of the Census 1984). The increase among blacks was even greater: Between 1970 and 1980, the proportion of black children under age 18 living with one parent increased from 31.5 percent to 45.8 percent (U.S. Bureau of the Census 1982).

At the same time, mothers from both two-parent and one-parent families have been entering the labor force in ever-increasing numbers. In 1970, 42 percent of mothers with children under age 18 were in the labor force; by 1980, that figure had grown to 56.6 percent (U.S. Department of Labor 1971, 1983). The percentages are even higher for single mothers with children under age 18: from 59 percent in 1970 to 62.7 percent in 1980.

Over this same period, there were general declines in achievement test scores (Wirtz 1977) and in the rate of high school completion. If lower achievement is related to the absence of a parent in the home or to the partial absence of a working mother, changing family demographics provide legitimate cause for concern.

A REVIEW OF THE LITERATURE

One-Parent Families

The literature on one-parent families almost exclusively addresses father absence (the most prevalent pattern) and relates it to a number of child outcomes, including cognitive performance. The results are sufficiently mixed to have led authors of major reviews to form opposite conclusions. In a review of studies published before 1969, Herzog and Sudia (1973, p. 214) argue that there is no difference in school achievement between children from father-present homes and children from father-absent homes. But Shinn (1978, p. 295), in a review of more recent research, found that a majority of studies "have shown detrimental effects of father absence on children's intellectual performance." Hetherington, Camara, and Featherman (1981), in the most comprehensive and most recent review, found consistent differences in favor of children from two-parent families in measured aptitude, measured achievement, grade point average, and other teacher-assigned scores. (Interestingly, however, they conclude that the differences in achievement—differences of less than one year—are too small to be meaningful.)

The results and interpretations are inconsistent because the various studies have differentially

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taken into account other background variables—e.g. socioeconomic status, time spent with children, educational resources in the home—that may be correlated with one-parent families. The reviews by Herzog and Sudia (1973) and Hetherington et al. (1981) note the failure of most earlier studies to control adequately for family socioeconomic status. According to Hetherington et al., "We are unable to establish clear associations between one-parent status and depressed achievement, since many studies do not provide adequate controls for socioeconomic status or racial or ethnic backgrounds of students" (p. 27).

Given the differences in family structure among various racial groups, race is implicated as an important control variable. Since 1979, the majority of black births have occurred to single females who have either divorced or never married (Joint Center for Political Studies 1983; U.S. Bureau of the Census 1984). Moreover, black children from all types of families spend more of their childhood in one-parent families than white children. According to Hofferth (1983), black children born in 1980 have spent 59 percent of their childhood in one-parent families; white children born in 1980 have spent 31 percent of their childhood in such families.

Sex is also implicated as an important control variable by Hetherington et al. (1981). They note that negative effects of being raised in a one-parent household appear more often for boys than for girls.

While a number of socioeconomic status variables may be implicated in the gross differences in achievement between students from two-parent families and students from one-parent families, there is every reason to believe that family income is important. Data from the U.S. Bureau of the Census (1984) show that the income of female-headed families is less than half that of dual-headed families: For 1980, the figures were $10,408 and $23,141, respectively.

However, even the introduction of family income as an exogenous control for the effect of number of parents may not adequately express the appropriate relationship. It is possible that any effect of living in a one-parent family on achievement operates primarily through the lower income of these families. In such a hypothesis, number of parents is prior to family income, which is considered an intervening or mediating variable.

Other variables may intervene between number of parents (and their income) and students' achievement and may provide mechanisms through which the number of parents and their income exert an influence. Potentially important here is the amount of time parents devote to their children. This may be either related to or independent of socioeconomic status (see Benson, Medrich, and Buckley 1980) and may have an important effect on children's achievement. Studies have shown that the time spent with children—which is, by definition, less available in one-parent families—and the uses of this time are related to achievement (Leibowitz 1977; Benson et al. 1980; Clarke-Stewart 1977). However, few studies have adequately explored the relationships between parental time inputs and children's achievement in one- and two-parent families.

Working Mothers

Studies of mother's employment have also generated mixed results. The results are sufficiently inconsistent that the authors of two major reviews (Hoffman 1980; Heyns 1982) differ in their interpretation of this literature. Hoffman has argued that inconsistencies in findings result from failure to take account of differential effects in particular subgroups. She concludes that the effects of mother's employment on achievement are generally positive for children in lower-class families but potentially negative for boys in middle-class families (Hoffman 1974, 1979, 1980; Hoffman and Nye 1974).

Heyns (1982), however, reviewing much of the same literature, reaches a quite different conclusion. Citing a number of reviews of the effects of mother's employment on children, including Hoffman's, she concludes that "with very few exceptions, . . . on achievement, the children of working mothers differ very little from the children of nonworking mothers" (1982, p. 238).

Our review of the literature cited by Hoffman and Heyns and of other studies (e.g., Gold and Andres 1978*a*; Farley 1968; Mercy and Steelman 1982) leads us to conclude that the results for white middle-class children are inconsistent at best and that mother's employment may have a negative effect on the ability and achievement of middle-class boys. This appears to be most true among elementary school boys; the evidence is weaker for high school boys. We agree with both Hoffman's (1980) and Heyns's (1982) conclusions that mother's employment may have positive effects on the achievement of lower-class and black children, although the benefits may result from other uncontrolled variables as well as mother's employment.

The inconsistencies in results again stem from inadequate use of appropriate control or intervening variables. The majority of the primary studies were conducted in the 1960s or earlier, before the major increases in the numbers of working mothers occurred. This fact, as well as the frequent absence of a control for mother's education, suggests the possible presence of spurious relationships between mother's employment and children's achievement. Earlier studies also did not examine the mediating processes through which mother's employment might affect achievement. Later studies have taken account of interactions or intervening

variables (e.g., Gold and Andres 1978*a*, 1978*b*; Mercy and Steelman 1982). For example, Mercy and Steelman (1982) demonstrate that mother's employment has negative direct effects on the I.Q. of children in white intact families but positive indirect effects working through the mechanism of smaller family size. Also, new evidence from time diaries (Timmer and O'Brien n.d.) suggests that working mothers spend less time in child-related activities than nonworking mothers, particularly on weekdays.

In general, then, a careful review of both bodies of literature demonstrates that absent fathers and working mothers have important effects on achievement; but most likely, these variables work in conjunction with or are mediated by other family background variables. The only way to determine these potential effects is to separate the various family background variables and to determine the relative importance of their direct and indirect effects. This paper attempts to do just that. We have developed a conceptual model to test the possibility that number of parents and employment of mothers work through intermediate processes to affect children's achievement.

CONCEPTUAL MODEL

The conceptual model was initially developed on a nationally representative data base of elementary school children, grades 1 through 6, and was then replicated on a second nationally representative data base of high school sophomores and seniors. To enable us to compare the effects of equivalent variables across the age groups, the conceptual model and the variables used for the high school analysis are as similar as possible to those used in the elementary school analysis.

The model is presented in Table 1. Exogenous variables are race, number of parents in the home, mother's educational attainment, and student's sex. Race and number of parents are used as partitioning variables. We have used mother's education rather than both parents' education as an exogenous control for family socioeconomic status in analyses of the effects of number of parents because we are unable to measure father's education in the one-parent samples. Although mother's education may underrepresent the effect of socioeconomic status, it is arguably the more important in its pedagogic effect on children's

Table 1. The Conceptual Model

Level				
1	2	3	4	5
Race	Mother's employment status	Number of children	Parental behavior:	Reading achievement
Number of parents		Log family income	Number of books	Math achievement
Mother's educational attainment		Parents' educational expectations of the student	Homework help[b] or Homework monitoring[c]	
Father's educational attainment[a]				
Student's sex			Parent-teacher conferences[b]	
			Student behavior:	
			Time spent doing homework	
			Time spent watching T.V.	
			Time spent reading[b] or Time spent reading for pleasure[c]	

NOTE: Race and number of parents are used as partitioning variables. All other paths among levels 1 through 5 are estimated except the paths from student's sex to number of children and to log family income.

[a]Used only in models estimating the effects of mother's employment in two-parent families.

[b]Variable is available only for elementary school students.

[c]Variable is available only for high school students.

achievement (see Leibowitz 1977; Murnane 1981). In supplementary analyses testing the effects of mother's employment on achievement in two-parent families, we have used both parents' education as controls.

Mother's employment is placed next in the model because we assume it is affected by the exogenous variables (e.g., number of parents in the home) and that it affects the rest of the variables in the model. The remaining family background variables (number of children, family income, and parents' educational attainment expectations for their child) are placed within the model, because we assume that the prior variables affect children's achievement through these variables. One may question the direction of the short-term relationship between fertility and female employment, but Cramer (1980) notes that over the longer term, employment is likely to have a substantial impact on family size. We also assume that family income is directly affected by number of parents and by mother's employment; therefore, it is also placed at this level in the model. Thus, we can estimate trade-offs between mother's contribution to children's achievement through her addition to family income and any direct effects her employment may have. We use family income rather than mother's income because we believe the entire income affects children's achievement, either directly or through subsequent variables. Parents' educational attainment expectations for their children are included in this set of variables because of their supposed relation to other family background characteristics and to achievement (Kriesberg 1967; Williams 1976).

All these variables are, in turn, likely to have direct and indirect effects on the ways in which parents spend their time and money on their children (Leibowitz 1977; Hill and Stafford 1973; Goldberg 1977) and the ways in which children spend their time with or without the supervision of their parents (Walberg 1984). Thus, several process variables constitute the next set of intervening variables. In the elementary school study, the parental input variables measure both environment and behavior and include the number of books in the home at the child's reading level, direct help with homework, and the number of parent-teacher conferences attended. Two of these variables—help with homework and number of parent-teacher conferences—were not available for the high school sample. For the high school sample, we measure the extent to which parents monitor homework. The three student input variables are time spent doing homework, time spent watching T.V., and time spent reading.

DATA

The Sustaining Effects Study of Title I (Hoepfner, Wellisch, and Zagorski 1977), carried out in 1976–77, provided data for elementary school students. All students in grades 1 through 6 in 242 randomly chosen schools were included in the initial sample. The parents of a random sample of 15,579 students were interviewed. This household sample formed the basis of the current analysis. Students with no mothers in the home, students who were neither white nor black, and students with missing data were excluded, thus reducing the usable sample size to 12,429.

The High School and Beyond (HSB) study (National Opinion Research Center 1980, 1981) provided data for high school students. The HSB is a longitudinal study of 58,270 high school sophomores and seniors randomly selected through a stratified cluster sampling scheme. We used the base-year (1980) data for these analyses. Data from parents were collected for about 10 percent of the sample. This sample of parents was used because of the low reliability of some of the family background measures provided by the students (Rosenthal et al. 1983). Family income, mother's education, mother's employment status, and parents' marital status were taken from the parent questionnaire; the remainder of the measures were obtained from the student questionnaire. Students who had no natural parents present, students who were neither white nor black, and students with missing data were excluded, thus reducing the actual number of cases used in the analysis to 2,720.

VARIABLES

To the extent possible, the variables in each data base were selected and coded to conform to the conceptual model and to facilitate comparisons between age groups. The coding of each variable is presented in Table 2. Differences between data bases in coding for particular variables are outlined in the table. Here, we describe the construction of our two major independent variables—number of parents and mother's employment—and the achievement outcome variables.

The variable defining number of parents differs between data bases. In the HSB study, we were able to identify natural parents and thus deleted all cases in which natural parents were absent. We were unable to make this distinction in the Sustaining Effects Study (SES); therefore, the sample may include male and female heads of households who are not natural parents. One-parent households headed by males were omitted from both samples.

Mother's employment was measured differently in the two studies. This results in very different metrics for the variable in the two samples, and therefore the size of the coefficients should not be compared directly. From the SES, we estimated the average number of hours mother worked per week in the previous year. The HSB study does not

provide actual hours, but it does provide retrospective measures of mother's employment (full-time, part-time, or not at all) at three periods in the child's life: before elementary school, during elementary school, or during high school. We have combined these measures to estimate cumulative work: full-time during all three periods; full-time during one or two periods or part-time during one to three periods; or never worked. These were coded into two indicator variables; "never worked" was the excluded category. Unfortunately, in black families, particularly in black one-parent families, there were very few cases in which the mother had never worked, and this variable is not estimated well for these groups.

The achievement data in the SES are scores on the reading and math subtests of the Comprehensive Test of Basic Skills (CTBS). These were converted into vertical scale scores in the original study to create a linear scale across grade levels and test forms (see Hemenway et al. 1978). In the HSB, the achievement measures were taken from reading and math tests constructed by the Educational Testing Service (ETS) for the original study. For all tests, we have standardized the scores within grades to a mean of 50 and a standard deviation of 10.

Finally, we note two other points about these data bases. First, both are cross-sectional and thus preclude many inferences that could be drawn from retrospective or longitudinal data. The greatest handicap in this respect is our inability to measure how long the missing parent was absent. We have retrospective data on mother's employment history for the high school students but not for the elementary school students.

Second, both data bases are school-based rather than population-based samples. This is not likely to create problems in analyses of the elementary school students, but it is likely to reduce the high school sample, because some students (primarily lower achievers) would have dropped out prior to the survey.

The means and standard deviations of the variables used in our analyses are also presented in Table 2.

METHODS

The literature suggests that race, number of parents, and sex (exogenous variables) may interact with one another and with other variables in the model. Therefore, they should be considered partitioning variables. To test the statistical validity of this conceptual approach, we estimated the equations for the recursive model depicted in Table 1 for each age group with four-way and all lower-order interaction terms to determine whether interactions add significantly to explanatory power. For the elementary school students, race and number of parents contributed significant interactions, but sex did not. Some sex interactions were significant for high school students, but they were few in number and sample sizes were already too small to permit partitioning by sex. Thus, we decided to estimate separate models for white two-parent, white one-parent, black two-parent, and black one-parent families. (Students who were neither white nor black were eliminated from all analyses.)

We estimated total, direct, and indirect effects in the structural equation models using ordinary least squares (OLS). Estimation of some of the OLS equations for the high school sample is problematic. The two equations for mother's employment and the equations for mother's educational attainment expectations and the number of books in the home contain dichotomous dependent variables. The use of OLS in the context of a dichotomous dependent variable is hindered by the presence of heteroskedasticity and a potentially inappropriate functional form (Hanushek and Jackson 1977). These equations could be estimated as probit or logit equations, but the calculation of total, direct, and indirect effects from this large model would be quite tedious. Further, provided that between 25 and 75 percent of the observations of most of the dichotomous dependent variables are coded 1, we believe that the use of OLS provides reasonable results (Goodman 1975).

Total effects for two-parent and one-parent families were estimated across models within race. (For the precise methodology used, see Myers and Rosenthal [1984].) The total effects of mother's employment on student's achievement are the sums of the direct and indirect effects net of mother's educational attainment and student's sex. All models were estimated within each race/marital-status group. The direct effects are the effects of mother's employment when all other variables in the model are controlled. The indirect effects are the effects mediated by each of the variables that intervene between mother's employment and student's achievement (e.g., number of books).

To obtain standard errors for all effects, the entire system, including the decomposition, was "bootstrapped" (Freedman and Peters 1984). The bootstrap approach allows us to estimate standard errors of all total and indirect effects as well as standard errors of total effects in models that are not fully recursive.

RESULTS

The results described here relate to our variables of primary interest—number of parents and mother's employment—and their effects on students' reading and math achievement. We are particularly interested in the ability of the intervening variables in the model to mediate the effects of these background variables. Tables 3 through 8 present

Table 2. Coding and Means of Variables

	Elementary School Students					High School Students				
		White		Black			White		Black	
Variable	Coding	Two-Parent	One-Parent	Two-Parent	One-Parent	Coding	Two-Parent	One-Parent	Two-Parent	One-Parent
Race	1 = white, 0 = black (other races excluded)	—	—	—	—	1 = white, 0 = black (other races excluded)	—	—	—	—
Number of parents	1 = both adults present, 0 = one adult present	—	—	—	—	1 = both parents present, 0 = one parent present (natural parents only)	—	—	—	—
Mother's educational attainment	Estimated years of schooling	12.24 (2.42)	11.81 (2.50)	11.33 (2.51)	10.80 (2.27)	Estimated years of schooling	12.95 (2.02)	13.23 (2.10)	12.83 (2.09)	12.67 (2.07)
Father's educational attainment	Estimated years of schooling	12.55 (3.00)	—	10.98 (2.77)	—	Estimated years of schooling	13.72 (2.75)	—	12.49 (2.54)	—
Student's sex	1 = female, 0 = male	.49 (.50)	.49 (.50)	.46 (.50)	.55 (.50)	1 = female, 0 = male	.52 (.50)	.59 (.49)	.56 (.50)	.64 (.48)
Mother's employment	Estimated number of hours worked per week in previous year	10.83 (14.45)	19.83 (17.30)	15.61 (16.14)	13.05 (15.95)	Full-time: 1 = full-time for three periods (before student was in elementary school, during elementary school, and during high school), 0 = otherwise;	.10 (.31)	.24 (.43)	.40 (.49)	.38 (.49)
						Part-time: 1 = worked full- or part-time during any of above periods, but not full-time during all; 0 = otherwise	.66 (.48)	.71 (.45)	.52 (.50)	.59 (.49)
Number of children	Number of children in family (maximum = 11)	2.99 (1.40)	2.96 (1.55)	3.79 (2.01)	3.96 (2.08)	Number of siblings + 1 (maximum = 11)	3.70 (1.77)	3.76 (1.97)	4.40 (2.37)	4.56 (2.70)
Log family income	Natural log of family income (maximum = $100,000)	9.62 (1.20)	8.77 (1.04)	9.35 (1.06)	8.42 (1.10)	Natural log of family income (maximum = $100,000)	10.29 (1.10)	9.17 (1.79)	9.73 (2.02)	8.49 (2.47)
Parents' educational expectations of the student	Number of years of schooling parents expect student to complete	14.10 (2.03)	13.69 (1.98)	14.01 (2.11)	13.47 (1.98)	1 = mother expects student to go to college, 0 = otherwise	.72 (.45)	.68 (.47)	.76 (.43)	.70 (.46)

Number of books	Number of books in the home at the student's reading level	32.79 (19.87)	27.65 (20.30)	17.94 (18.03)	12.28 (14.09)	1 = more than 50 books in the home, 0 = less than 50 books	.89 (.31)	.85 (.36)	.86 (.35)	.79 (.41)
Homework help[a] or homework monitoring[b]	0 = parents never help, 1 = parents help sometimes, 1 = parents help often, 3 = parents help very often	1.80 (1.01)	1.69 (1.02)	2.15 (0.96)	2.09 (1.00)	Number of parents (0, 1, 2) who monitor homework	1.70 (.62)	.83 (.38)	1.65 (.65)	.92 (.27)
Parent-teacher conferences[a]	Number of conferences between parents and teacher(s) or principal in previous year	1.23 (1.06)	1.11 (1.05)	1.19 (1.28)	1.20 (1.30)	Not available	---	---	---	---
Time spent doing homework	Estimated number of hours student spends on homework per day	.87 (.71)	.86 (.73)	1.40 (.84)	1.40 (.83)	Estimated number of hours student spends on homework per day	4.06 (3.35)	4.10 (3.55)	4.53 (3.53)	4.04 (3.28)
Time spent watching T.V.	Estimated number of hours student spends watching T.V. per day	2.48 (1.00)	2.61 (1.03)	2.64 (1.04)	2.75 (1.08)	Estimated number of hours student spends watching T.V. per day	3.05 (1.65)	3.15 (1.75)	3.90 (1.55)	3.74 (1.61)
Time spent reading[a] or time spent reading for pleasure[b]	Estimated number of hours student spends reading per day	1.03 (.69)	1.04 (.74)	1.17 (.77)	1.22 (.86)	0 = rarely, 1 = less than once per week, 2 = once or twice per week, 3 = every day or almost every day	1.30 (1.15)	1.33 (1.15)	1.46 (1.16)	1.56 (1.09)
Reading achievement	Reading achievement test scores (standardized within grade to mean = 50, SD = 10 [CTBS])	51.57 (9.60)	49.46 (9.68)	43.67 (8.99)	41.13 (8.48)	Reading achievement test scores (standardized within grade to mean = 50, SD = 10 [ETS])	50.82 (9.94)	50.35 (10.61)	43.60 (8.54)	42.12 (8.42)
Math achievement	Math achievement test scores (standardized within grade to mean = 50, SD = 50 [CTBS])	51.41 (9.69)	49.50 (9.61)	44.28 (9.49)	41.98 (9.08)	Math achievement test scores (standardized within grade to mean = 50, SD = 10 [ETS])	50.99 (9.78)	50.00 (9.93)	42.77 (9.31)	40.89 (8.52)
N		9,450	1,140	1,017	822		2,097	341	147	135

NOTE: Standard deviations are in parentheses.

[a]Variable is available only for elementary school students.

[b]Variable is available only for high school students.

Table 3. Estimates of Total, Direct, and Indirect Effects of Living in a One-Parent Family on Achievement, for Elementary School Students.

	White		Black	
	Reading	Math	Reading	Math
Total effects	1.535**	1.489**	2.285**	2.068**
	(.286)	(.281)	(.421)	(.444)
Direct effects	.460	.426	.756	.884
	(.300)	(.292)	(.487)	(.524)
Indirect effects				
Mother's employment	.358**	.332**	.017	-.023
	(.065)	(.063)	(.034)	(.033)
Number of children	.008	.000	.003	.001
	(.027)	(.004)	(.036)	(.020)
Log family income	.329**	.428**	.977**	.741**
	(.063)	(.075)	(.249)	(.270)
Parents' educational expectations of the student	.286**	.283**	.305**	.293**
	(.075)	(.073)	(.084)	(.087)
Number of books	.335**	.242**	.306**	.178**
	(.064)	(.050)	(.094)	(.068)
Homework help	-.117**	-.129**	.007	.010
	(.039)	(.043)	(.045)	(.061)
Parent-teacher conferences	-.034	-.039	.021	.078
	(.023)	(.027)	(.032)	(.056)
Time spent doing homework	-.035	-.017	.001	.000
	(.024)	(.013)	(.034)	(.013)
Time spent watching T.V.	.008	-.007	.006	.016
	(.008)	(.008)	(.041)	(.044)
Time spent reading	-.062	-.032	-.114	-.109
	(.047)	(.024)	(.068)	(.068)

NOTE: Standard errors are in parentheses.

*Significant at the .05 level.

**Significant at the .01 level.

the total, direct, and indirect effects of these two variables.[1]

First, we examine the effects of number of parents on achievement for both elementary school and high school students. Second, we examine the effects of mother's employment for both groups. Finally, we examine the effects of mother's employment in two-parent families using models with and without father's education.

Effects of Number of Parents

In general, students from two-parent families have higher scores on reading and math achievement tests than students from one-parent families. This is true for white and black students in elementary school and high school. The total effects of number of parents are significant in all cases for elementary school students and are in the same direction but generally nonsignificant for high school students. However, the direct effects are small and nonsignificant in all cases. Thus, the negative effects on achievement of living in a one-parent family are almost entirely mediated by other variables, particularly by income.

As shown in Table 3, the total effects of number of parents on reading and math achievement are significant for both white and black elementary school students, but they are higher for black students than for white students. The direct effects are much smaller (about one-third the size of the total effects) and are all nonsignificant. Thus, the negative effects of living in a one-parent family work primarily through other variables in our model.

Examination of the indirect effects shows that

[1] Parameter estimates for the recursive models used here are available from the authors upon request.

the patterns of mediated effects are somewhat different for white and black students. In two-parent families, family income mediates most of the effect for black students but less of the effect for white students. Also, in two-parent white families, mothers tend to work less; therefore, these at-home mothers mediate part of the beneficial effects of two-parent families.

Parents' educational expectations for students are significant mediators of the effect of number of parents for both black and white students. The number of books in the home at the child's reading level is also important. Finally, for white elementary school students, we note negative indirect effects of residing in a two-parent family transmitted through parental help with homework. Parental help with homework has negative direct effects (not shown) on achievement for elementary school students, presumably because parents are compelled to help their children with homework when they are not doing well academically. Thus, for these white elementary school students, it is possible that the relationship between help with homework and achievement should be specified in reverse.

As shown in Table 4, the pattern of effects of number of parents on achievement for high school students is similar to the pattern for elementary school students, but there are fewer significant results. Again, the total effects are positive and larger than the direct effects, but the presence of two parents significantly enhances only math achievement for white students. The three major intervening variables, significant only for whites, are family income, mother's employment, and mother's educational expectations for the student.

The relative lack of significant effects for high school students may be the result of a number of factors. First, we have no retrospective data indicating how much time any of these students spent in one-parent families and how old they were when their parents separated. As Hetherington et

Table 4. Estimates of Total, Direct, and Indirect Effects of Living in a One-Parent Family on Achievement, for High School Students

	White		Black	
	Reading	Math	Reading	Math
Total effects	.945	1.240*	1.232	1.635
	(.635)	(.580)	(.957)	(.941)
Direct effects	−.179	−.002	.501	−.322
	(.558)	(.611)	(1.389)	(1.213)
Indirect effects				
Mother works full-time	.555**	.350**	.004	−.008
	(.134)	(.125)	(.085)	(.108)
Mother works part-time	.100	.090*	.050	.130
	(.055)	(.046)	(.124)	(.173)
Number of children	.036	.022	.136	.175
	(.028)	(.022)	(.204)	(.282)
Log family income	.481*	.787**	.750	.298
	(.238)	(.205)	(.503)	(.496)
Mother's educational expectations of the student	.259*	.288*	.082	.101
	(.123)	(.134)	(.138)	(.224)
Number of books	.023	.009	.044	.082
	(.068)	(.034)	(.157)	(.157)
Homework monitoring	−.152	−.156	−.863	.575
	(.255)	(.273)	(.818)	(.818)
Time spent doing homework	−.077	−.130	.333	.337
	(.073)	(.116)	(.489)	(.489)
Time spent watching T.V.	.042	.046	.191	.206
	(.057)	(.063)	(.175)	(.175)
Time spent reading for pleasure	−.143	−.064	.005	.001
	(.189)	(.084)	(.095)	(.095)

NOTE: Standard errors are in parentheses.

*Significant at the .05 level.

**Significant at the .01 level.

al. (1981) note, children adjust over time to family breakup. These authors also point out that older children may have peer and job supports that are not available to younger children. Finally, the lack of significant effects for black high school students may be a result of sample selectivity. Black students are more likely than white students to drop out of high school (Myers and Ellman 1983); therefore, the black students who remain in high school tend to be a more homogeneous, higher-achieving group.

Effects of Mother's Employment

We consistently find that mother's employment has a negative effect on achievement for white students from two-parent families. This is true for both reading and math and for both elementary school and high school students. Furthermore, the more the mother works, the stronger the effect. The significant total effects are somewhat offset or enhanced (depending on the age group) by the intervening variables, but the direct effects are negative and significant in all cases.

For other groups of elementary school students, the effects of mother's employment are inconsistent. For black elementary school students from one-parent families, the effects of mother's employment are positive and significant. For other groups of high school students, the effects are negative and, in some cases, significant.

As shown in Table 5, the effects of mother's employment are negative and significant for white elementary school students from two-parent families, positive and significant for black elementary school students from one-parent families, and mixed and primarily nonsignificant for the other groups.

Table 5. Estimates of Total, Direct, and Indirect Effects of Mother's Employment on Achievement, for Elementary School Students

	White				Black			
	Two-Parent		One-Parent		Two-Parent		One-Parent	
	Reading	Math	Reading	Math	Reading	Math	Reading	Math
Total effects	−.038**	−.035**	.015	.027	.011	−.014	.051**	.064**
	(.006)	(.006)	(.014)	(.016)	(.020)	(.018)	(.017)	(.018)
Direct effects	−.046**	−.041**	−.020	−.008	−.019	−.035*	.037*	.057**
	(.006)	(.006)	(.015)	(.018)	(.019)	(.017)	(.017)	(.019)
Indirect effects								
Number of children	.006**	.000	.003	.000	.010**	.004	.006	.002
	(.001)	(.001)	(.002)	(.002)	(.003)	(.004)	(.003)	(.003)
Log family income	.002**	.003**	.014**	.016**	.012**	.009*	.001	−.002
	(.001)	(.001)	(.005)	(.006)	(.004)	(.004)	(.005)	(.005)
Parents' educational expectations of the student	−.003	−.003	.008*	.009*	.003	.003	.004	.003
	(.002)	(.002)	(.003)	(.004)	(.003)	(.003)	(.004)	(.002)
Number of books	.002	.001	.008*	.007*	.004	.003	.001	.001
	(.001)	(.001)	(.004)	(.003)	(.003)	(.002)	(.002)	(.002)
Homework help	.002*	.002*	.000	.000	.001	.001	.003	.005
	(.001)	(.001)	(.001)	(.000)	(.002)	(.002)	(.002)	(.003)
Parent-teacher conferences	.002**	.002**	.003	.004*	.001	.002	.000	−.002
	(.001)	(.000)	(.002)	(.002)	(.001)	(.002)	(.002)	(.003)
Time spent doing homework	−.001*	−.001	.000	.000	.000	.000	.000	−.001
	(.001)	(.000)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Time spent watching T.V.	.000	.000	.000	.000	.000	.000	.000	.000
	(.000)	(.000)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Time spent reading	.000	.000	−.003	−.001	.000	.000	.000	.000
	(.001)	(.000)	(.002)	(.001)	(.002)	(.002)	(.001)	(.001)

NOTE: Standard errors are in parentheses.

*Significant at the .05 level.

**Significant at the .01 level.

For white students from two-parent families, both the total and direct effects of mother's employment are negative and significant. The size of the effect varies with the amount of time worked: e.g., the reading achievement of a child whose mother worked full-time (40 hours per week) is 0.15 standard deviation lower than the reading achievement of a child whose mother did not work.

For white elementary school students from two-parent families, none of the effects of mother's employment mediated by the intervening variables are large. However, the cumulative impact of the intervening variables offsets the negative direct effect, resulting in a slightly reduced negative total effect. The effects on achievement of the greater income and fewer children of families with working mothers are in the expected direction. The effects mediated by homework help and parent-teacher conferences reflect the negative direct effects of these intervening variables. Working mothers appear to benefit their children by providing less help with homework and by attending fewer parent-teacher conferences. However, the relationship between these behaviors and achievement is probably reciprocal: The parents of low-achieving students are likely to feel compelled to provide more help with homework and are invited to more parent-teacher conferences. Nonworking mothers have more time for both.

There are no significant effects for white students from one-parent families. For black students from two-parent families, the negative direct effects of mother's employment (significant only for math achievement) are offset by intervening variables, reducing the total effects to zero. In this case, the important mediator is family income.

The positive effect of mother's employment on the achievement of black elementary school students from one-parent families is both a total and a direct effect. None of the indirect effects are significant, but in the aggregate, they tend to enhance the total effect.

As shown in Table 6, the effects of mother's employment on achievement for white high school students in two-parent families are negative and significant. The negative effects of working full-time over the child's lifetime are greater than the negative effects of working full- or part-time at some time.

The pattern of effects for these white high school students from two-parent families differs from the pattern found among their counterparts in elementary school. The effects transmitted through the intervening variables tend to be negative and thus tend to enhance the negative total effect. This pattern occurs primarily because time spent doing homework, time spent reading for pleasure, and time spent watching T.V. have direct effects (not shown) in the expected direction on achievement for high school students: The first two cause higher achievement, the latter, lower achievement. In white two-parent families, children whose mothers work full-time spend less time on homework and reading and more time watching T.V. than children whose mothers do not work; therefore, their achievement is lower. Mother's part-time employment has a smaller negative effect partly because children whose mothers work only part-time spend more time on homework and less time watching T.V. than children whose mothers work full-time.

For all other groups of high school students, the effects of mother's employment are negative, and they are significant in a number of cases.[2] Unlike black elementary school students from mother-headed families, black high school students from such families do not appear to benefit from mother's employment. In fact, the direct effects on achievement of both full-time and part-time employment are negative and significant in all but one case, and the total effects on reading achievement are significant. Indirect effects through income and mother's educational expectations of her child somewhat lessen the negative total effects. As noted, we do not believe that these estimates are particularly stable, given the small number of black, single, nonworking mothers in the omitted group.

In contrast to the pattern of effects for elementary school students, the effects of mother's employment on the achievement of all groups of high school students are negative. It may be that the negative effects of mother's employment, particularly full-time employment, are cumulative over the child's lifetime.[3]

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[2] The effects of mother's employment on the achievement of black high school students must be interpreted with caution because so few of these students had mothers who never worked, particularly in the sample of one-parent families. (That is, the reference category for mother's employment includes a limited number of observations in which the mother never worked.) This may produce a strong linear dependency between the intercept and the two mother's employment dummy variables included in the equations. This linear dependency can generate inflated standard errors of the parameter estimates for the effects of mother's employment and thus can make it difficult to ascertain the statistical significance of individual parameters.

[3] An alternative explanation is that mother's employment has a lagged effect that continues into high school. This explanation is consistent with Coleman, Hoffer, and Kilgore's (1982) finding that only mother's employment during preschool has negative effects on the child's high school achievement. The relative merits of the "cumulative work" and "critical period" hypotheses are difficult to disentangle because of the tendency of women who worked before their children were in school to work during later periods also.

Table 6. Estimates of Total, Direct, and Indirect Effects of Mother's Employment on Achievement, for High School Students

	Two-Parent Families				One-Parent Families			
	Mother Works Full-Time		Mother Works Part-Time		Mother Works Full-Time		Mother Works Part-Time	
	Reading	Math	Reading	Math	Reading	Math	Reading	Math
White								
Total effects	-4.079**	-2.570**	-1.850**	-1.667**	-5.116**	-4.940**	-4.240**	-3.054**
	(.666)	(.706)	(.413)	(.432)	(1.335)	(1.189)	(1.174)	(1.108)
Direct effects	-2.691**	-1.425*	-1.451**	-1.310**	-4.353**	-4.619**	-3.862**	-2.612**
	(.586)	(.664)	(.400)	(.424)	(1.372)	(1.300)	(1.222)	(1.153)
Indirect effects								
Number of children	.081	.050	.070	.043	-.333	.150	-.077	.035
	(.053)	(.041)	(.043)	(.034)	(.272)	(.262)	(.127)	(.089)
Log family income	-.017	-.028	-.018	-.029	.488	.165	.347	.118
	(.040)	(.063)	(.022)	(.035)	(.649)	(.597)	(.452)	(.423)
Mother's educational expectations of the student	-.206	-.228	-.070	-.078	-.193	-.291	-.278	-.419
	(.169)	(.193)	(.084)	(.096)	(.247)	(.355)	(.245)	(.361)
Number of books	-.106	-.042	-.045	-.018	.057	.050	.054	.048
	(.073)	(.040)	(.041)	(.023)	(.163)	(.123)	(.176)	(.146)
Homework monitoring	.014	.014	.005	.005	.150	.111	.276	.204
	(.023)	(.030)	(.011)	(.011)	(.155)	(.153)	(.218)	(.179)
Time spent doing homework	-.243**	-.409**	-.112	-.189*	-.014	-.025	-.060	-.106
	(.094)	(.133)	(.060)	(.089)	(.110)	(.193)	(.101)	(.163)
Time spent watching T.V.	-.147*	-.162*	.014	.016	.070	.054	.109	.085
	(.067)	(.076)	(.045)	(.048)	(.121)	(.120)	(.134)	(.150)
Time spent reading for pleasure	-.764**	-.340**	-.243*	-.108*	-.989*	-.536*	-.749	.406
	(.193)	(.109)	(.098)	(.049)	(.445)	(.236)	(.407)	(.225)
Black								
Total effects	.291	-.507	-.827	-2.146	-5.459**	-.678	-5.178**	-1.491
	(1.322)	(1.591)	(1.362)	(1.583)	(1.478)	(1.520)	(1.539)	(1.659)
Direct effects	-.979	-1.550	-1.296	-2.415	-9.412**	-2.501	-9.037**	-3.854*
	(1.749)	(1.660)	(1.609)	(1.721)	(2.142)	(2.132)	(1.709)	(1.965)
Indirect effects								
Number of children	1.557*	2.008*	1.371*	1.768*	.187	.256	.182	.248
	(.728)	(.817)	(.667)	(.763)	(.229)	(.307)	(.258)	(.315)
Log family income	.520	.207	.158	.063	3.335*	.418	2.777*	.348
	(.358)	(.350)	(.261)	(.176)	(1.425)	(1.492)	(1.228)	(1.217)
Mother's educational expectations of the student	.076	.149	-.115	-.227	1.164*	.571	.606	.297
	(.209)	(.303)	(.203)	(.276)	(.552)	(.405)	(.512)	(.296)
Number of books	-.047	-.088	-.037	-.069	-.165	-.063	-.196	-.075
	(.151)	(.165)	(.172)	(.200)	(.339)	(.393)	(.383)	(.391)
Homework monitoring	.130	-.087	.081	-.054	.291	.752	.335	.866
	(.225)	(.217)	(.168)	(.192)	(.292)	(.528)	(.376)	(.534)
Time spent doing homework	-1.552*	-1.568*	-1.591*	-1.608*	.535	.566	.975	1.033
	(.732)	(.711)	(.750)	(.732)	(.616)	(.672)	(.682)	(.784)
Time spent watching T.V.	.366	.396	.337	.364	.004	-.004	-.025	.027
	(.399)	(.311)	(.316)	(.277)	(.165)	(.176)	(.274)	(.242)
Time spent reading for pleasure	.220	.026	.265	.031	-1.398*	-.672	-.795	-.382
	(.218)	(.201)	(.274)	(.238)	(.610)	(.623)	(.454)	(.473)

NOTE: Standard errors are in parentheses.

*Significant at the .05 level.

**Significant at the .01 level.

Effects of Mother's Employment when Father's Educational Attainment is Controlled

Because of our inability to measure any possible residual effect of father's educational attainment in one-parent families and our desire to develop consistent models for comparative purposes, we have described to this point models that include only mother's education as a control for socioeconomic status. However, there is reason to be concerned about the possible misspecification of socioeconomic status in the model for two-parent families, particularly in analyses of the effects of mother's employment on achievement. Thus, for white and black two-parent families, we have included a measure of father's educational attainment and have reestimated the effects of mother's employment. The total and direct effects for both models—with and without this control—are shown in Tables 7 and 8.

As can be seen from inspection of these tables, the inclusion of a control for father's educational attainment (while retaining mother's educational attainment) diminishes but does not dissipate the effects of mother's employment. With one exception, in those equations in which either the total or direct effects were significant without father's education in the model, the effects of mother's employment remain significant when father's education is included as a control variable. Thus, the direction of the effect of mother's employment on the achievement of students from two-parent families is the same, although the magnitude of the effects is reduced.

CONCLUSIONS

In this study, we have used two nationally representative data bases, which allow us to generalize findings across age groups, races, and family structures. Analyses of these data have shown that the variables of primary interest—the number of parents in the home and the employment status of the mother—have significant and important effects. For example, the maximum effects on achievement of number of parents can be as high as 0.25 standard deviation, or about 9 percentile points at the mean. The maximum effects of mother's employment can be even higher.

As we hypothesized from the literature, these effects differ by students' age, race, and family structure. They are also somewhat dependent on the specification of the model. The benefits of having two parents in the home are greater for elementary school students than for high school students and are greatest for black elementary school students.

However, it is clear that for both age groups and races, the effect of number of parents is primarily transmitted through the intervening variables. Family income stands out as the most important of the intervening variables, particularly for black students. Earlier studies that failed to control for income have clearly understated the importance of this variable in one-parent families. However, simply controlling for income, rather than testing its mediating power, can obscure the effect of living in a one-parent family by masking the total effects. That type of model specification fails to recognize that low income is virtually a structural characteristic of one-parent families and by itself mediates a large part of the effect on achievement of the absence of the father. Clearly, these findings suggest that an important policy would be more stringent enforcement of child-support payments by absent parents, a policy that has been adopted by many states.

Table 7. Effects of Mother's Employment on Achievement, With and Without Control for Father's Educational Attainment, for Elementary School Students in Two-Parent Families

	Without Father's Education		With Father's Education	
	Reading	Math	Reading	Math
White				
Total effects	−.038**	−.035**	−.027**	−.026**
	(.006)	(.006)	(.006)	(.007)
Direct effects	.046**	−.041**	−.041**	−.036**
	(.006)	(.006)	(.006)	(.007)
Black				
Total effects	.011	−.014	.006	−.020
	(.020)	(.018)	(.016)	(.018)
Direct effects	−.019	−.035	−.018	−.036
	(.019)	(.017)	(.017)	(.019)

NOTE: Standard errors are in parentheses.

*Significant at the .05 level.

**Significant at the .01 level.

Table 8. Effects of Mother's Employment on Achievement, With and Without Control for Father's Educational Attainment, for High School Students in Two-Parent Families

	Without Father's Education				With Father's Education			
	Mother Works Full-Time		Mother Works Part-Time		Mother Works Full-Time		Mother Works Part-Time	
	Reading	Math	Reading	Math	Reading	Math	Reading	Math
White								
Total effects	-4.079**	-2.570**	-1.850**	-1.667**	-3.073**	-1.473*	-1.430**	-1.214**
	(.666)	(.706)	(.413)	(.432)	(.708)	(.665)	(.407)	(.395)
Direct effects	-2.691**	-1.425*	-1.451**	-1.310**	-2.310**	-.959	1.272	-1.101**
	(.586)	(.664)	(.400)	(.424)	(.675)	(.635)	(.411)	(.378)
Black								
Total effects	.291	-.507	-.827	-2.146	.710	.526	-.453	-1.220
	(1.322)	(1.591)	(1.362)	(1.583)	(1.435)	(1.543)	(1.312)	(1.388)
Direct effects	-.979	-1.550	-1.296	-2.415	-.755	-.384	-1.106	-1.421
	(1.749)	(1.660)	(1.609)	(1.721)	(1.703)	(1.726)	(1.469)	(1.576)

NOTE: Standard errors are in parentheses.

*Significant at the .05 level.

**Significant at the .01 level.

As suggested in the literature, the effect of mother's employment also varies by students' age, race, and family structure and by the amount of time mother works. The significant effects of mother's employment are primarily negative. However, mother's employment has a significant positive effect on the achievement of black elementary school students from one-parent families.

In all cases, the more the mother works, the stronger the effect. Thus, studies that simply examine whether or not a mother works fail to account for the effects of either the intensity or the duration of the work. In particular, retrospective data on mother's employment history for the high school sample allow us to demonstrate an apparent cumulative effect of mother's employment over the student's lifetime.

We have been less successful in identifying intervening variables that mediate the effect of mother's employment. Thus, we are less able to suggest behaviors or policies to mitigate the effect. That is, given the variables in our model, a strong negative direct effect persists. The moderating intervening effects that do appear suggest the probable importance of parents' and students' time use. Thus, parents, either working or not working, should encourage their children, particularly when they are in high school, to spend more time reading and doing homework and less time watching T.V.

Also, the negative total effect is somewhat reduced in smaller families. Thus, today's smaller families may enable a working mother to spend more of her limited time with each of fewer children.

Nothing in our results implies that the time devoted to children must be the mother's time. We did not have data available to test the independent or combined effect of father's employment. However, other data (Timmer and O'Brien n.d.) demonstrate that working mothers spend less time with children than nonworking mothers and that fathers in the former homes do not step in to close the gap.

Other intervening variables that mediate the effect of mother's employment—e.g., mother's attitude toward her work, her degree of professionalism, or the quality (or even presence) of alternative day care—were not available in the data bases used here. Such process variables are often absent from large, nationally representative surveys. If the various federal agencies that support large-scale data collection would cooperate in one another's efforts, the quality and comprehensiveness of the data available on these issues could perhaps be improved. This would help us overcome the gaps that occur because no single agency has overall responsibility for research on the family.

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