

**Using Siblings to Investigate the Effects of Family Structure  
on Educational Attainment**

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## **Abstract**

This paper examines the effects of family structure on educational attainment after controlling for common family influences, observed and unobserved, using data from siblings. The use of sibling data permits us to examine whether the apparent effects of family structure are due to unmeasured characteristics of families that are common to siblings. The data come from pairs of siblings in the National Longitudinal Survey of Youth, 1979–1992. The results suggest that taking into account the unmeasured family characteristics yields estimates of the effects of family structure on educational attainment that are smaller, but still statistically significant, than estimates based on analyses that do not take unmeasured family influences into account.

## Using Siblings to Investigate the Effects of Family Structure on Educational Attainment

### INTRODUCTION

Recent research has demonstrated a clear association between family structure during childhood and various measures of well-being. The research is less clear about whether family structure causes well-being. We know, for example, that individuals who grow up in a single-parent family are less likely to graduate from high school than those who grow up in a family with their original parents, after controlling for the effects of family income, parental education, family size, and race and ethnicity (McLanahan, 1985; Astone and McLanahan, 1991; Sandefur, McLanahan, and Wojtkiewicz, 1992; McLanahan and Sandefur, 1994). The existence of this association, however, does not establish causality.

One reason that researchers have been cautious about concluding that family structure during childhood influences well-being is the fear that some unmeasured characteristics of families may affect the well-being of children, leading to upward bias in the estimated effects of family structure. For example, the children in disrupted families characterized by high conflict may do less well in school than children from intact families characterized by low conflict. But, the cause of the lower educational attainment of the children could be the conflict between the parents, and the estimated effect of residing in an intact versus nonintact family may be biased upward.

Researchers have employed a number of strategies to respond to these concerns. One strategy is to measure and control for as many family characteristics as possible. Yet, some aspects of families, such as conflict, mental illness, and alcoholism, are difficult to measure. Further, most of the surveys used by researchers in this area do not include measures of these complicated phenomena.

A second strategy is to employ various statistical tools that attempt to adjust for unmeasured characteristics of the families. Manski, Sandefur, McLanahan, and Powers (1992), for example, discuss models that allow for the presence of unmeasured variables that may affect both family structure and children's well-being. These models involve instrumental variables that might affect either family structure or children's well-being, but not both.

In this paper, we take another approach to dealing with the possible presence of unmeasured family influences by taking advantage of the presence of pairs of siblings in the National Longitudinal Survey of Youth (NLSY). Sibling data permit us to control for the presence of common family factors that might affect both siblings. The presence of the effects of family structure after controlling for common family influences, measured and unmeasured, would provide further evidence that the effects of family structure are not completely due to their association with unmeasured characteristics of the family. The central research question, then, is: Does family structure affect children's well-being after controlling for common family influences?

## ALTERNATIVE EXPLANATIONS OF THE EFFECTS OF FAMILY STRUCTURE

The concept of family structure that we use in this paper refers to the presence of a parent or parents. Thus, we ignore other aspects of family structure including the presence of extended family members. A number of theoretical perspectives suggest why family structure defined in this way might affect child well-being. Some theoretical perspectives, including social capital theory and social control theory, suggest that it is the presence of parents that is most critical in determining child well-being. Coleman (1990) argues that parents represent social capital and that the absence of a parent or parents dramatically reduces the contact with the absent parent and deprives the child of many of the benefits of the social networks and relationships of the absent parent. Further, the presence of two parents

strengthens social control; it creates a system in which the parents provide more supervision and support for the children, but also serves as a check on each other's tendency to be too permissive or too authoritarian (McLanahan, 1985).

Other theoretical perspectives suggest that it is stress caused by the disruption in family structure that is most critical to the well-being of children (McLanahan, 1985; Wu, 1996). Disruptions, including divorces and remarriages, can create stress for the parents and their children. This stress may lead not only to less effective parenting but also to changes in the behavior of the child. According to this perspective, it is not so much who one lives with, but how often and how intensely one must deal with the stress of family disruption, that is the critical influence on the child.

The recent collection of retrospective childhood histories in data sets such as the National Survey of Families and Households and the NLSY has permitted researchers to develop several alternative measures of family structure during childhood. Wojtkiewicz (1993) and McLanahan and Sandefur (1994) found that among children living in a single-parent family, the likelihood of high school graduation did not vary with the number of disruptions, the length of time spent in a single-parent family, or the age at which a child experiences a family disruption. Wu and Martinson (1993) and Wu (1996), on the other hand, found weak and statistically insignificant associations between a young woman's exposure to a single-parent family and the risk of a premarital birth, but a strong and statistically significant association between frequent changes in the numbers and types of parental figures with whom a young woman has lived. They concluded that this provides stronger support for the stress hypothesis than for the social control hypothesis.

The apparently contradictory results of these studies may be due to differences in their design. First, McLanahan and Sandefur (1994) examined the effects of family change among single-parent families only, while Wu and Martinson (1993) and Wu (1996) looked at changes among all types of families. Second, McLanahan and Sandefur (1994) focused on high school graduation and teen

premarital births, while Wu and Martinson (1993) and Wu (1996) focused on premarital births during and beyond the teen years. Child well-being is multidimensional, including social, emotional, and cognitive development; behavior; and school performance. Consequently, the effects of parental presence and number and nature of disruptions may differ depending not only on how family structure is measured but also on the dimension of well-being under investigation.

In this analysis, we focus on educational attainment as the outcome of interest. Our measure of educational attainment is years of schooling. We explore four dimensions of family structure: family structure at age 14, years in a two-parent family, the type of family in which one spent the majority of childhood, and the number of disruptions during childhood. The first three are largely measures of the presence of parents, while the last is largely a measure of stress induced by changes in family structure.

Controlling for the effects of other aspects of family background can be done more carefully by using data from siblings. The issues involved are somewhat akin to the analysis of the effects of schooling on occupational achievement after controlling for common family influences (see, for example, Hauser and Mossel, 1985). Just as siblings may have different levels of education, they may differ in their family structure experiences. An older sibling may, for example, live with her two original parents at age 14 while her younger sibling may live with only one parent at age 14. Or, the number of disruptions experienced by an older sibling may be different from the number of disruptions experienced by a younger sibling. More important, sibling data permit us to control for both measured and unmeasured common family influences in assessing the effects of family structure. Hauser and Mossel (1985) found that education had significant effects on occupational attainment after adjusting for measured and unmeasured common family influences. We ask if the effects of family structure are also significant after applying similar controls.

## DATA AND METHODS

Our data come from NLSY, a large, nationally representative, longitudinal survey, first administered to 12,686 children aged 14–22 in 1979. The initial interviews have been followed up by interviews conducted annually since then. In 1992, 9,016 of the original respondents completed interviews. The NLSY addresses the conditions and environments facing adolescents and young adults and is well-suited for assessing the effects of family structure on the outcomes of young adults (Sandefur, McLanahan, and Wojtkiewicz, 1992; McLanahan and Sandefur, 1994; Wu, 1996).

The NLSY is also well-suited for sibling resemblance research, since a large proportion of households include several sibling respondents (Haurin and Mott, 1990; Hsueh, 1992). The original sample included 5,863 children who lived in the same household with a sibling who was also interviewed. In 1992, 4,806 of these respondents completed interviews. Of these respondents, we selected 4,312 who supplied valid responses for the family structure variables (survey years 1979 and 1988) and years of schooling completed (survey year 1992).<sup>1</sup>

A sibling pair simply consists of a younger and older sibling. Of course, some households have more than one pair of siblings. In our sample, we included every possible sibling pair in each household, but to avoid overrepresenting households with several pairs of siblings, we applied a weight to each sibling pair. This weight was the reciprocal of the number of sibling pairs found in the household.<sup>2</sup> In addition, we weighted the data by the individual sampling weights.

### Measures of Educational Attainment and Family Background

Table 1 contains weighted descriptive statistics for the variables other than family structure. These statistics are based on the 4,312 individuals used in the analysis. The dependent variable is the individual's years of schooling in 1992, when the respondents were aged 27–35. The last row in Table 1 shows that the mean for years of schooling is 13.4.

**TABLE 1**  
**Descriptive Statistics on Family Background Variables and Children's Educational Attainment**

	Mean (S.D.)
Father's education (years)	12.0 (3.52)
Mother's education (years)	11.7 (2.71)
Head's occupational status	3.67 (1.82)
Family income (log)	9.88 (.66)
Family income not reported	.22 (.42)
Family size	4.73 (2.26)
Race/ethnic group	
White	.79 (.41)
Black	.15 (.36)
Hispanic	.06 (.24)
Female	.47 (.50)
Educational attainment (years)	13.4 (2.46)

**Source:** Authors' computations with weighted data from the National Longitudinal Survey of Youth, 1979–1992.



Father's education and mother's education have been included, regardless of whom the children lived with or the type of family structure reported; the means for these variables are lower than the mean years of education of the respondents.

Head's occupational status is measured by Stevens and Featherman's (1981) 1970-basis occupational status index which we imputed and matched to the occupational codes supplied by the NLSY.<sup>3</sup> Head's occupational status refers to the occupational status of the adult head with whom the child lived at age 14. In two-parent families and one-parent families headed by an adult male, the occupational status of the adult male was assigned to the variable "head's occupational status." In single-parent families headed by an adult female, the occupational status of the adult female was assigned to "head's occupational status."

Our measure of family economic resources is net family income in 1978. We use the natural logarithm of this item in our analysis and have included a dummy variable for all cases in which a response to family income was not provided or was reported as zero.<sup>4</sup>

We also include number of siblings as well as dummy variables to control for race, Hispanic origin, and sex.

All of the family background variables were taken from the 1979 survey year. With the exception of head's occupational status, the family background variables are time-specific rather than age-specific. Head's occupational status may differ among siblings because changes may have taken place between the time that each child was 14, either in the adult head's occupational status or in the particular adult head with whom the children lived at age 14.<sup>5</sup> A discussion of the consistency of siblings' responses will be provided in more detail below.

### Measures of Family Structure

Several different measures of children's family structure experiences were considered in assessing the extent to which results are sensitive to different measures or conceptual dimensions of family structure.

The first measure is a snapshot of family structure experienced during early adolescence. In addition to this snapshot representation of family structure, we also considered the predominant family structure experienced by children while growing up—the one in which they spent the majority (10 years or more) of their childhood. This measure is different from the first in that it takes into account the family arrangement to which children have prolonged exposure, and it does not refer to a specific period in childhood (birth, early childhood, adolescence).

We also considered the number of years in a two-parent family. Given the disadvantages in well-being associated with not living in a two-parent family, we were interested in gauging the effect on educational attainment of every year spent in a two-parent family.

Our fourth measure pertains to a different component of family structure experience—number of changes in family structure. For this particular measure, we were interested in the effects that changes in family structure and living arrangements had on educational attainment; we did not differentiate between divorce, separation, and remarriage.

Responses to the first measure, family structure at age 14, were elicited in the 1979 survey. The second, third, and fourth measures pertain to the experiences of children between ages 0 and 18. These measures were constructed using the residential history data collected in the 1988 survey.

For the first and second measures of family structure, we distinguished four broad types of arrangements: (1) two-parent families, containing two biological or adoptive parents; (2) stepfamilies, containing one biological parent and one stepparent; (3) single-parent families, containing one biological parent; and (4) a residual category, containing all types of family structure not mentioned above.<sup>6</sup>

The third measure of family structure is a continuous variable which simply enumerates the number of years the child spent in a two-parent family. The fourth measure is adapted from Wu (1996), who considered 23 different possible living arrangements in which children might be located (see column 1 in Appendix). A change across any of these types of arrangements from one survey year to the next is considered a change in family structure. Of course, this procedure will not be able to detect short-term movements out of a category and then back into the same category that have taken place within the same year.

Frequency distributions for the four measures of family structure are presented in Table 2. In column 1 of panel A, we see that 78 percent of children lived with two parents at age 14, while 7 percent lived in a stepparent family, and 13 percent lived in a single-parent family. Column 1 of panel B shows that 86 percent of children spent at least 10 years of their childhood in a two-parent family, while 4 percent spent at least that amount of time in a stepparent family, and 7 percent of children spent 10 or more years in a single-parent family. Thus, we see that assessments of family structure are somewhat sensitive to how that variable is measured.

In column 1 of panel C, we see that the vast majority of children spent at least 15 years of their childhood in a two-parent family, while a significant percentage spent fewer than 5 years in a two-parent family. It is clear that the large majority of children spent the predominant part of their childhood in a two-parent family.

Finally, in column 1 of panel D, we see that 76 percent of children experienced zero changes in family structure between ages 0 and 18, 15 percent of children experienced one change, and 6 percent experienced two changes.<sup>7</sup> Changes in family structure and living arrangements are relatively rare: 91 percent of all children experienced no more than one change, and 97 percent of all children experienced no more than two changes. The rarity in changes of family structure is noteworthy given that we have considered 23 different arrangements across which a change could have been registered.

**TABLE 2**  
**Distribution of Family Structure Experiences by Relative Birth Order**

**Panel A: Type of Family at Age 14**

	All Children	1st Child	2nd Child	3rd Child	4th Child	5th Child	6th Child
Two-parent family	78.2	79.3	77.5	76.7	80.3	54.0	100.0
Stepparent family	7.0	6.8	7.3	6.9	5.1	0	0
Single-parent family	13.1	11.9	13.5	15.3	14.5	46.0	0
Other	1.7	1.9	1.7	1.2	0	0	0

**Panel B: Type of Family in Which 10+ Years Spent**

	All Children	1st Child	2nd Child	3rd Child	4th Child	5th Child	6th Child
Two-parent family	85.6	86.7	84.7	84.7	86.5	72.3	100.0
Stepparent family	3.9	3.9	4.1	3.5	3.2	0	0
Single-parent family	7.2	6.0	7.9	8.2	9.4	27.2	0
Other	3.4	3.4	3.4	3.6	.8	0	0

**Panel C: Number of Years in a Two-Parent Family**

	All Children	1st Child	2nd Child	3rd Child	4th Child	5th Child	6th Child
15–19	78.8	80.2	77.6	78.2	80.6	57.9	100.0
10–14	6.8	6.5	7.1	6.5	5.9	14.4	0
5–9	6.5	5.9	6.9	7.6	8.1	0	0
0–4	7.9	7.4	8.5	7.7	5.4	27.7	0

**Panel D: Number of Changes in Family Structure**

	All Children	1st Child	2nd Child	3rd Child	4th Child	5th Child	6th Child
0	76.4	77.6	75.4	75.8	74.2	63.7	100.0
1	14.5	13.1	15.1	16.5	20.0	21.9	0
2	6.2	5.9	6.6	5.8	4.0	14.4	0
3+	3.0	3.4	2.8	1.9	1.7	0	0
Unweighted n	4,312	1,821	1,821	541	113	14	2

**Source:** Authors' computations with weighted data from the National Longitudinal Survey of Youth, 1979–1992.

The remaining columns of Table 2 display frequency distributions of family structure experiences according to relative birth order.<sup>8</sup> As shown in the last row, the vast majority of children (90 percent) fall into the categories of first child, second child, or third child. In addition to having smaller relative representations, sample sizes become very small among children in the fourth, fifth, and sixth positions. Thus, our discussion of descriptive statistics will refer only to the first, second, and third child in a family.

As shown in Table 2, family disruption and instability appear to increase slightly with birth order. The results in the third row of Panel A show, for example, that 11.9 percent of first children were in a single-parent family at age 14 and 15.3 percent of third children were in this type of family at age 14. This trend is consistent across all four measures of family structure.

Table 3 presents a cross-tabulation of family structure experiences among the first child and second child in sibling pairs across the four measures of family structure. The top number in each cell is the cell frequency, and the number in parentheses is the row frequency. The row frequencies show some variation in the family structure experiences of siblings. The row frequencies in the first row of Panel A indicate, for example, that 95.5 percent of the younger siblings whose older siblings were in a two-parent family at age 14 were also in a two-parent family at age 14; 3.2 percent of the younger siblings whose older siblings were in a two-parent family at age 14 were in a single-parent family at age 14. Across these four measures (Panels A–D), 80 percent to 90 percent of the entries in the table lie on the diagonal, indicating that 80 percent to 90 percent of the sibling pairs have the same family structure experiences. More variation is seen in the number of changes in family structure (Panel D) across siblings than in the other measures of changes in family structure.

Table 4 presents a cross-classification of the number of changes in family structure with type of family at age 14 (Panel A) and type of family in which 10+ years spent (Panel B). It also gives the distribution of changes in family structure across the ages of the individuals when the change occurs.

**TABLE 3**  
**Cross-Tabulation of Family Structure Experiences**

**Panel A: Type of Family at Age 14**

1st Child	2nd Child				Total
	Two-Parent Family	Stepparent Family	Single-Parent Family	Other	
Two-parent family	75.7 (95.5)	.7 (.9)	2.6 (3.2)	.2 (.3)	79.0 (100.0)
Stepparent family	1.2 (17.8)	4.8 (68.9)	.7 (10.1)	.2 (3.1)	7.0 (100.0)
Single-parent family	.4 (3.7)	1.1 (9.4)	9.9 (82.1)	.6 (4.8)	12.0 (100.0)
Other	.6 (31.8)	.3 (16.7)	.3 (17.2)	.7 (34.4)	2.0 (100.0)

**Panel B: Type of Family in Which 10+ Years Spent**

1st Child	2nd Child				Total
	Two-Parent Family	Stepparent Family	Single-Parent Family	Other	
Two-parent family	81.1 (93.8)	1.2 (1.4)	2.5 (2.8)	1.7 (2.0)	86.5 (100.0)
Stepparent family	1.1 (27.5)	2.0 (49.2)	.7 (16.4)	.3 (6.9)	4.0 (100.0)
Single-parent family	1.5 (25.2)	.3 (5.3)	3.8 (62.5)	.4 (7.0)	6.0 (100.0)
Other	1.1 (32.1)	.5 (15.1)	.9 (27.1)	.9 (25.7)	3.5 (100.0)

**Panel C: Number of Years in a Two-Parent Family**

1st Child	2nd Child				Total
	15–19	10–14	5–9	0–4	
15–19	75.1 (93.9)	2.8 (3.5)	.5 (.6)	1.5 (1.9)	79.9 (100.0)
10–14	.5 (7.4)	2.8 (41.9)	3.0 (45.4)	.3 (5.2)	6.6 (100.0)
5–9	.9 (15.5)	.7 (11.8)	2.0 (33.8)	2.3 (39.0)	6.0 (100.0)
0–4	1.4 (18.4)	.7 (9.5)	1.2 (16.3)	4.2 (55.7)	7.5 (100.0)

(table continues)

TABLE 3, continued

**Panel D: Number of Changes in Family Structure**

1st Child	2nd Child				Total
	0	1	2	3+	
0	70.7 (91.5)	5.3 (6.9)	.8 (1.0)	.5 (.6)	77.3 (100.0)
1	3.3 (25.5)	6.8 (51.9)	2.1 (15.8)	.9 (6.7)	13.1 (100.0)
2	1.0 (17.2)	1.9 (30.9)	2.3 (38.1)	.8 (13.8)	6.1 (100.0)
3+	.5 (15.1)	1.0 (29.1)	1.3 (37.5)	.6 (18.3)	3.5 (100.0)

**Source:** Authors' computations with weighted data from the National Longitudinal Survey of Youth, 1979–1992.

**Note:** Cell percentages are presented on top. Row percentages are presented in parentheses. Entries in rows do not always sum to 100 due to rounding. Marginal frequencies do not reflect frequencies presented in column 1 of Table 2 because entries in Table 3 are weighted by the mean of the two respondents' sampling weights.

**TABLE 4**  
**Distribution of Changes in Family Structure Arrangements by Family Structure and Age**

**Panel A: Type of Family at Age 14**

	Total	Ages at Which Change Occurred			
		0-4	5-9	10-14	15-18
Two-parent family	.1	.0	.0	.0	.1
Stepparent family	1.8	.3	.6	.5	.3
Single-parent family	1.1	.1	.3	.4	.2
Other	1.2	.2	.4	.5	.2

**Panel B: Type of Family in Which 10+ Years Spent**

	Total	0-4	5-9	10-14	15-18
Two-parent family	.2	.0	.0	.1	.1
Stepparent family	1.8	.6	.8	.1	.2
Single-parent family	1.0	.3	.5	.1	.2
Other	2.1	.2	.9	.7	.3
Total	.4	.1	.1	.1	.1

**Source:** Authors' computations with weighted data from the National Longitudinal Survey of Youth, 1979-1992.



Column 1 shows that the mean number of changes in family structure corresponds with what we might expect for certain family types: close to zero changes for those in two-parent families, one change for single-parent families, and two changes for stepparent families. The “Other” category in Panel A has a mean of 1.2 changes while the “Other” category in Panel B has a mean of 2.1 changes. This reflects the construction of the “Other” category in the two measures. The “Other” category in Panel A includes individuals who were living with no biological parent at age 14, and the “Other” category in Panel B includes these individuals as well as individuals who were not in any type of family for 10+ years, a group that has experienced a relatively high amount of change in family structure. Examining the ages at which these changes occur, we find that the changes in family structure for those who are in a two-parent family at age 14 occur after age 14 and that the changes in family structure for those who spent 10+ years in a two-parent family occur after age 10.

The descriptive results show that different measures characterize different aspects of family structure experiences, and the family structure experiences of siblings bear a high degree of resemblance, regardless of which measure is used.<sup>9</sup>

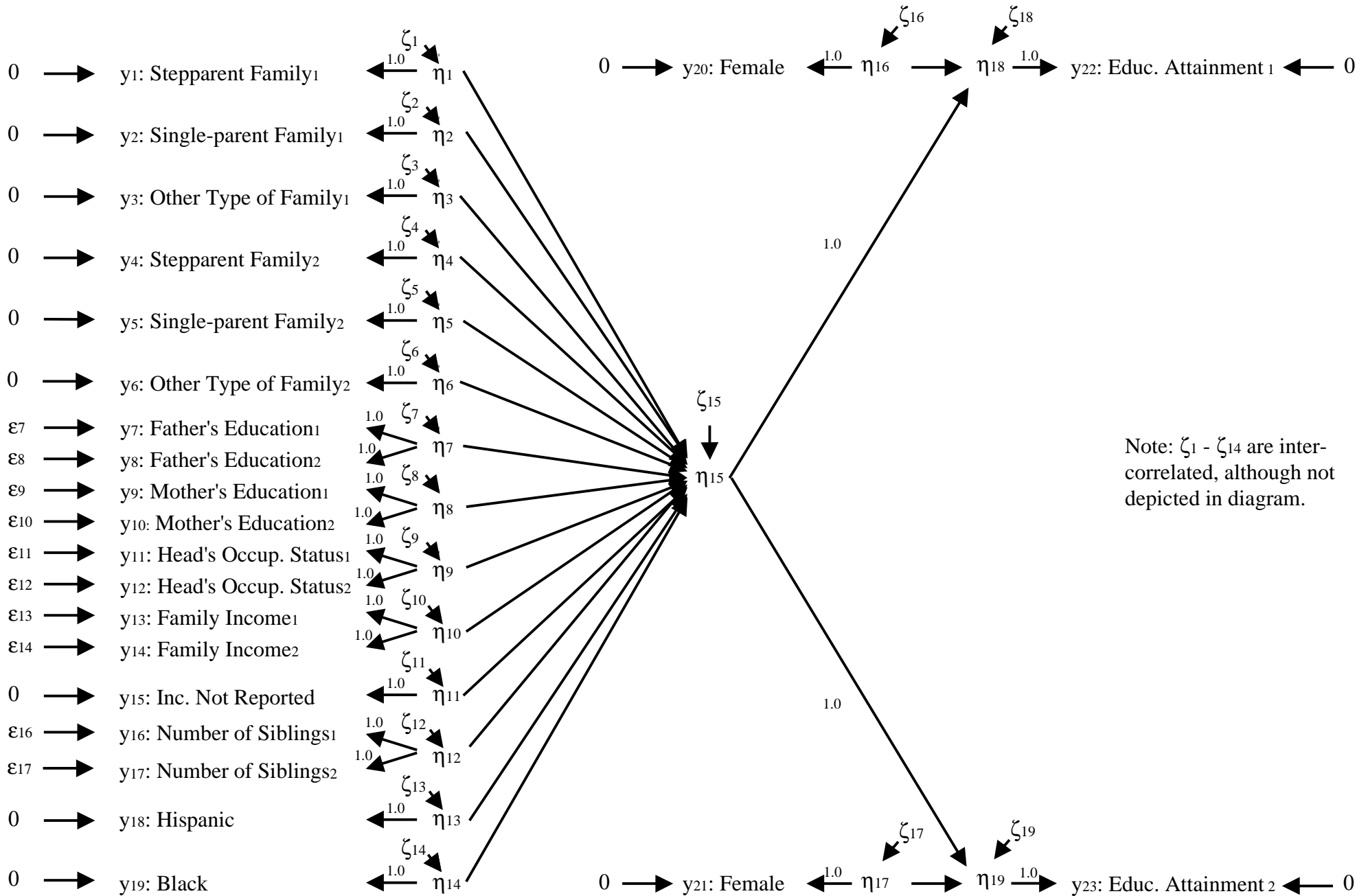
## MODEL

To answer our central research question, we propose a model which allows us to control for measured and unmeasured factors that may be correlated with family structure (see Figure 1). The model, which appears in the analysis as Model 3, is a MIMIC (multiple indicator, multiple cause) model and is expressed in LISREL notation (see Joreskog and Sorbom, 1989) by the following equations:

$$\eta = \mathbf{B}\eta + \zeta \quad (1)$$

$$\mathbf{y} = \Lambda_y\eta + \varepsilon \quad (2)$$

Figure 1. MIMIC Model (Model 3)



Equation 1 represents the structural model in which  $\eta$  is a vector of latent exogenous variables,  $B$  is a matrix of the effects of  $\eta$  on  $\eta$ , and  $\zeta$  is a vector of structural disturbances, with variance-covariance matrix  $\Psi$ . The structural disturbances in the endogenous latent variables are specified to be uncorrelated with one another and uncorrelated with the disturbances in the exogenous variables. However, the structural disturbances in the exogenous latent variables are allowed to be correlated with one another (although this is not depicted in Figure 1).

Equation 2 represents the measurement model in which  $y$  is a vector containing measured variables for family structure, family background, race/ethnicity, sex, and educational outcomes.  $\Lambda_y$  is a vector of factor loadings of  $\eta$  on  $y$ . Finally,  $\varepsilon$  is a vector of errors in  $y$ , with variance-covariance matrix  $\Theta_\varepsilon$ . For each sibling, errors in the family background variables are not initially specified to be intercorrelated, but such a specification is tested in a later model (Model 3b).

As shown in Figure 1, the two dependent variables, older sibling's educational attainment and younger sibling's educational attainment, are represented by latent variables, but are specified to be perfectly measured by each child's response (in these cases,  $\lambda = 1$  and  $\varepsilon = 0$ ).

The same is true of the exogenous variables for sex, which serve as control variables, but are specified to have direct effects on children's education. The effects of sex are not mediated by the common factor since the effects are not necessarily common to pairs of siblings.

The common family factor, specified by the latent variable  $\eta_{15}$ , refers to a common educational environment shared by siblings. The common factor is indicated by two measures of siblings' education and mediates the effects of family background on educational attainment. The common factor is useful in that it captures all sources of variation in the educational environment that are common to both siblings, whether these sources are measured or unmeasured. Using the common family factor, we are able to test whether family structure affects children's educational attainment after controlling for the influences that are shared by siblings. The loadings of the common factor on children's educational attainment are each

initially set equal to one (we relax this constraint in Model 3a). This normalization is done for purposes of identification and to provide a scale for the common factor. As a result of this normalization, all of the effects of family background and, thus, all of the structural effects in the model can be expressed in terms of years of schooling completed. In addition, this specification states that family background affects each sibling's educational attainment equally, regardless of relative birth order.

As displayed in Figure 1, five of the family background variables are represented by a latent variable (which can be thought of as a "true score") and are indicated by two measures (one response from each sibling). Thus, each of these components of family background is specified to apply to both children, subject to error. The factor loadings that apply to these background variables are all set equal to one, which simply states that each child's response is assigned equal weight.

It is not appropriate to represent the categorical family background variables (race, Hispanic origin, and missing income) in the same manner as the continuous variables. For these measures, both siblings are represented by a single latent variable. For the missing income variable, if either sibling in a pair reported income as missing, both responses were coded as missing and the mean was imputed for both responses.

The family structure variables are child-specific and, although they are represented by latent variables, are indicated by one response from each child and are assumed to be perfectly measured. The first two measures of family structure that we consider are represented in the model as a series of dummy variables, with the first category (two-parent families) serving as the omitted category. Thus, the effects of living in a stepparent family, single-parent family, or "other" type of family will be assessed relative to living in a two-parent family. The third and fourth measures of family structure are continuous and need no reference category. Each child's measure of family structure is specified to have an effect on the common family factor. However, the effects of family structure on the common factor are not initially specified to be equal among siblings, as are the effects of the family background variables.

## RESULTS

### Goodness-of-Fit Testing and Model Selection

The main goal of our regression analysis was to assess the effects of family structure on educational attainment after controlling for common family influences, both measured and unmeasured. We considered several models in which we successively controlled for more sources of variation. In addition, we were interested in determining whether our results are sensitive to the measure of family structure employed. Therefore, we estimated similar models across several measures of family structure. We also considered additional specifications discussed below. Table 5 contains the goodness-of-fit statistics for alternative models, and Table 6 contains the estimated effects of family structure for selected models.

We considered a series of hierarchically ordered models, which we tested for goodness-of-fit. We tested the fit of nested models relative to one another. Although the likelihood ratio test statistic is presented in Table 5, our criterion for model selection was the bic statistic (see Raftery, 1986), which is shown to approximate the  $\chi^2$  distribution in large samples. Negative values of bic demonstrate satisfactory fit; among nested models, a smaller or more negative bic statistic indicates that a particular model fits relatively better than an alternative model.

We began the analysis by introducing a naive model. Model 1 includes family structure as a determinant of educational attainment (and introduces sex as a control variable), but does not include any other exogenous variables, and thus does not control for any of the factors which may be correlated with family structure and which may affect years of schooling. Family structure, sex, and educational attainment are measured separately for each sibling, and separate regression equations are estimated for each sibling.

**TABLE 5**  
**Goodness-of-Fit Testing and Model Selection**

	L <sup>2</sup>	df	Contrast		bic
			L <sup>2</sup>	df	
<b>A. Type of Family at Age 14</b>					
<i>Model</i>					
1. Effects of family structure	36.36	8	—	—	-23.70
2. Effects of family structure, family background	88.39	18	52.03	10	-46.74
3. MIMIC model	343.63	140	255.24	122	-707.37
3a. $\beta_{17,15} = 1$ constraint relaxed	343.53	139	.10	1	-699.96
3b. Correlated errors in independent variables	221.05	120	122.58	20	-679.81
3c. Effects of family structure equal among siblings	347.92	144	4.29	4	-733.11
3d. Number of changes in family structure	360.49	161	12.57	17	-848.16
<b>B. Type of Family in Which 10+ Years Spent</b>					
<i>Model</i>					
1. Effects of family structure	36.86	8	—	—	-23.20
2. Effects of family structure, family background	91.11	18	54.25	10	-44.02
3. MIMIC model	277.93	140	186.82	122	-773.07
3a. $\beta_{17,15} = 1$ constraint relaxed	277.72	139	.21	1	-765.77
3b. Correlated errors in independent variables	156.39	120	121.54	20	-744.47
3c. Effects of family structure equal among siblings	279.52	144	1.59	4	-801.51
3d. Number of changes in family structure	296.49	161	16.97	17	-912.16

(table continues)

TABLE 5, continued

	L <sup>2</sup>	df	Contrast		bic
			L <sup>2</sup>	df	
<b>C. Number of Years Spent in a Two-Parent Family</b>					
<i>Model</i>					
1. Effects of family structure	25.43	4	—	—	-4.60
2. Effects of family structure, family background	84.35	14	58.92	10	-20.75
3. MIMIC model	225.06	108	140.71	94	-585.71
3a. $\beta_{13,11} = 1$ constraint relaxed	224.85	107	.21	1	-578.41
3b. Correlated errors in independent variables	103.69	88	121.37	20	-556.94
3c. Effects of family structure equal among siblings	226.88	110	1.82	2	-598.91
3d. Number of changes in family structure	245.34	127	18.46	17	-708.07
<b>D. Number of Changes in Family Structure</b>					
<i>Model</i>					
1. Effects of family structure	27.84	4	—	—	-2.19
2. Effects of family structure, family background	87.01	14	59.17	10	-18.09
3. MIMIC model	231.90	108	144.89	94	-578.87
3a. $\beta_{13,11} = 1$ constraint relaxed	231.71	107	.19	1	-571.55
3b. Correlated errors in independent variables	110.48	88	121.42	20	-550.15
3c. Effects of family structure equal among siblings	232.08	110	.18	2	-593.71

**TABLE 6**  
**Parameter Estimates for Effects of Family Structure**

	Model 1	Model 2	Model 3	Model 3c	Model 3d
<u>Older Sibling</u>					
Type of family at age 14					
Stepparent family	-1.21*	-.91*	-.49*	-.46*	-.28*
Single-parent family	-.55*	-.18	-.44*	-.14	-.02
Other	-.99*	-.52	-.38	-.49*	-.37
Number of changes in family structure					-.09
Type of family in which 10+ years spent					
Stepparent family	-1.16*	-.92*	-.53*	-.49*	-.38*
Single-parent family	-.77*	-.35	-.50*	-.29*	-.22*
Other	-1.11*	-.72*	-.63*	-.56*	-.42*
Number of changes in family structure					-.06
Number of years lived in a two-parent family	.08*	.05*	.04*	.03*	.02*
Number of changes in family structure					-.04
Number of changes in family structure	-.33*	-.23*	-.15*	-.16*	
<u>Younger Sibling</u>					
Type of family at age 14					
Stepparent family	-.93*	-.68*	-.41	-.46*	-.28*
Single-parent family	-.37*	.07	.16	-.14	-.02
Other	-1.06*	-.58	-.57	-.49*	-.37
Number of changes in family structure					-.09*
Type of family in which 10+ years spent					
Stepparent family	-.68*	-.48*	-.45	-.49*	-.38*
Single-parent family	-.91*	-.52*	-.11	-.29*	-.22*
Other	-.72*	-.53*	-.51*	-.56*	-.42*
Number of changes in family structure					-.06
Number of years lived in a two-parent family	.07*	.04*	.02	.03*	.02*
Number of changes in family structure					-.04
Number of changes in family structure	-.27*	-.17*	-.17*	-.16*	

\*p&lt;.05



According to Model 1, living in a stepparent family, single-parent family, or “other” type of family arrangement rather than in a two-parent family at age 14 or for 10+ years entails significant educational disadvantages. This is true of both older and younger siblings. As displayed in Table 6, living outside a two-parent family is associated with disadvantages as large as a reduction of one year of completed schooling.

Consistent with this finding, each year spent in a two-parent family confers significant, but small, educational advantages on children. Each change in family structure is associated with significant disadvantages comparable to missing about 0.3 year of completed schooling. According to the bic statistic, the fit of Model 1 is shown to be satisfactory, at least for the first three measures of family structure, as shown in Table 5. However, family structure alone explains very little of the variation in years of schooling. As seen in Table 7, the proportion of variance in years of schooling explained by family structure is close to zero, regardless of which measure is considered.

In Model 2, we introduce the set of family background variables in order to control for parents’ financial and human capital endowments as well as for family size, race, and Hispanic origin. Once again, all of the variables are measured separately for each child, and separate regression equations are estimated for each child. This model is similar to models used in most research on the effects of family structure. The major difference is that our sample is split into younger and older siblings. In effect, these models estimate the effects of family structure on educational attainment controlling for the effects of *measured* family background characteristics.

As seen in Table 5, Model 2 provides a better fit to the data than does Model 1, according to the bic statistic. The addition of the family background variables greatly increases the explained proportion of variance in years of schooling (Table 7). As we might expect, the magnitudes of the family structure coefficients are reduced once the background variables are introduced. Indeed, the educational

**TABLE 7**  
**Proportions of Variance Explained by Selected Models**

	Endogenous Variable		
	Common Family Factor	Older Sibling's Educational Attainment	Younger Sibling's Educational Attainment
<b>A. Type of Family at Age 14</b>			
<i>Model</i>			
1. Effects of family structure		.02	.01
2. Effects of family structure, family background		.27	.29
3. MIMIC model	.54	.55	.60
3c. Effects of family structure equal among siblings	.53	.55	.60
3d. Number of changes in family structure	.54	.55	.60
<b>B. Type of Family in Which 10+ Years Spent</b>			
<i>Model</i>			
1. Effects of family structure		.02	.02
2. Effects of family structure, family background		.27	.29
3. MIMIC model	.54	.55	.60
3c. Effects of family structure equal among siblings	.54	.55	.60
3d. Number of changes in family structure	.54	.55	.60
<b>C. Number of Years Spent in a Two-Parent Family</b>			
<i>Model</i>			
1. Effects of family structure		.03	.03
2. Effects of family structure, family background		.27	.29
3. MIMIC model	.54	.55	.60
3c. Effects of family structure equal among siblings	.54	.55	.60
3d. Number of changes in family structure	.54	.55	.60
<b>D. Number of Changes in Family Structure</b>			
<i>Model</i>			
1. Effects of family structure		.01	.01
2. Effects of family structure, family background		.26	.28
3. MIMIC model	.53	.55	.60
3c. Effects of family structure equal among siblings	.53	.55	.60

disadvantages of living in a single-parent family or “other” type of family at age 14 are no longer statistically significant once family background characteristics are controlled for.

With Model 3, we introduce the sibling resemblance model, which permits us to estimate the effects of family structure on educational attainment after adjusting for both measured and unmeasured sources of variation that may be correlated with family structure. As shown in Table 5, the bic statistics suggest that Model 3 improves over Model 2 across all four measures of family structure.

As seen in Table 7, Model 3 provides improved explanatory power. The common family factor explains 55 percent to 60 percent of the variation in educational attainment. The family structure and family background variables are shown to account for about half of the variance in the common family factor. The family structure effects are once again reduced in magnitude after controlling for shared sources of variation, both measured and unmeasured. Most of the family structure coefficients are about half the size of the magnitudes estimated in Model 1.

As shown in Table 6, most of the family structure coefficients, for both older and younger siblings, are statistically significant under Model 2. When Model 3 is introduced, most of the family structure coefficients for older siblings are statistically significant, while most of those pertaining to younger siblings are not statistically significant. This finding can, in part, be explained by the introduction of unmeasured sources of influence which are shared by siblings. However, this is also partly due to the fact that family structure measures for both children are concurrently included in a single model, which was not the case in Model 2. Given the high degree of similarity in siblings’ family structure experience, younger siblings’ reports of family structure are quite redundant, thus accounting for the reduced magnitude in the effects pertaining to the younger sibling. Although the results are not provided, we tested models in which one set of siblings’ measures of family structure was dropped. None of these revised models was shown to fit the data as well as Model 3.

Model 3 became our preferred model at this point. However, we were interested in performing three other tests. First, we relaxed the constraint that the effect of the common factor on younger siblings education is equal to 1. Accepting Model 3a would imply that although the educational attainment of each sibling is affected by a common family factor, these effects might not necessarily be equal in magnitude. Model 3a does not provide a statistically significant improvement in fit, so we did not accept it in favor of the immediately preceding model.

Second, we tested for the existence of correlated errors in responses. More specifically, we tested for the existence of within-occasion, between-variable response error (Bielby, Hauser, and Featherman, 1977) among responses to the five measured background variables that were reported in 1979 and are not specified to be perfect indicators of a latent variable. Correlated response error is confined to individuals; we did not allow for errors between siblings. According to  $L^2$ , Model 3b provides a statistically significant improvement in fit over Model 3, but it does so at the expense of a much less parsimonious model. Using bic as the criterion for model selection, we were led to prefer Model 3 in favor of Model 3b.

Next, we tested the hypothesis that each sibling's family structure experience equally affected the common family factor. It is possible that siblings may have had different family structure experiences; however, we were interested in considering whether, in the aggregate, the effects of family structure on the common factor were the same among older and younger siblings. Comparing Model 3c with Model 3, we see that among sibling pairs, the corresponding family structure effects can be constrained to be equal to one another without a statistically significant deterioration of fit to the data. This specification does not increase the explanatory power of the model, but it is interesting in its own right. The family structure experiences of older siblings and younger siblings are shown to affect the common factor and years of schooling equally, regardless of birth order, differences in ages, and differences in exposure to particular family arrangements.

As seen in Table 6, after the equality constraint is imposed, several of the family structure variables for younger siblings are once again found to be statistically significant. By applying one coefficient to two paths, this constraint effectively averages the coefficients between siblings and serves to address the issue of redundancy discussed above.

Table 6 shows that for both older and younger siblings, living outside a two-parent family is associated with fewer years of schooling completed. Independent of the other background variables, living in a stepparent family or “other” type of family rather than in a two-parent family at age 14 or for 10+ years entails a one-half year disadvantage in years of schooling completed. This finding applies to both siblings and is consistent with previous findings that control for socioeconomic status, family income, and demographic variables (Astone and McLanahan, 1991; McLanahan and Sandefur, 1994). Living in a single-parent family rather than in a two-parent family demonstrates smaller negative effects than those discussed above, and living with a single parent at age 14 does not demonstrate a significant negative effect on years of schooling.

Finally, for the first three measures of family structure, we introduce Model 3d. Along with the particular measure of family structure previously considered, we also consider the effects of changes in family structure. Therefore, we are considering the effects of family arrangements on educational attainment, including disruptions in family structure. As shown in Table 5, this addition does not lead to a statistically significant deterioration in fit, so Model 3d is our preferred model. Once again, the family structure effects decline in magnitude.

Model 3d does not improve the level of explained variance in the common factor nor in the two dependent variables. In fact, Model 3c and Model 3d demonstrate the same amount of explanatory power that Model 3 does. As will be discussed in more detail shortly, this is due to the fact that most of the explanatory power of the model arises from the effects of family background variables and unmeasured sources of shared influence.

### Parameter Estimates

Parameter estimates for all of the variables in the preferred models are presented in Table 8. All of the substantive socioeconomic and demographic variables have significant effects on children's schooling. Parent's education is shown to positively affect children's years of schooling, as expected, although the effect of mother's education is shown to be twice as large as the effect of father's education. Every 10-point increase in head's occupational status is associated with an increase of about a third of a year of completed schooling, while every additional child in the family is shown to decrease educational attainment by about 0.1 year. Family income is shown to have large effects: every 1 percent increase in family income is shown to increase years of schooling by roughly 0.3 year. Consistent with past findings (Hauser and Phang, 1993; Bauman, 1995), we see that once family structure, socioeconomic status, and demographic characteristics are controlled for, blacks and Hispanics demonstrate higher levels of educational attainment than do whites. Additionally, women are shown to complete more years of schooling than men after controlling for all other sources of common variation.

Although children in stepparent families experience more disruptions, this is not the sole source of their disadvantage. For the first two measures of family structure, living in a stepparent family has statistically significant and negative effects on years of schooling completed.

The evidence is mixed concerning the consequences of living in a single-parent family or "other" type of family. In both instances, educational disadvantages are not found to exist when family structure at age 14 is considered, including disruptions. On the other hand, living in a single-parent family or "other" type of family for 10+ years does entail educational disadvantages that cannot be explained by the number of disruptions experienced.

TABLE 8

## Parameter Estimates for Preferred Models

	Model 3d (A <sup>a</sup> )	Model 3d (B <sup>a</sup> )	Model 3d (C <sup>a</sup> )	Model 3c
<u>Effect of Common Family Factor on:</u>				
Older sibling	1.0	1.0	1.0	1.0
Younger sibling	1.0	1.0	1.0	1.0
<u>Effect of Sex on:</u>				
Older sibling	.19* (.06)	.20* (.06)	.19* (.06)	.19* (.06)
Younger sibling	.19* (.06)	.20* (.06)	.19* (.06)	.19* (.06)
<u>Effects of Family Background</u>				
Father's education	.10* (.02)	.10* (.02)	.10* (.02)	.10* (.02)
Mother's education	.21* (.03)	.21* (.03)	.21* (.03)	.21* (.03)
Head's occupational status	.33* (.04)	.33* (.04)	.32* (.04)	.33* (.04)
Family income (log)	.35* (.09)	.32* (.08)	.28* (.08)	.33* (.08)
Family income not reported (log)?	-.07 (.09)	-.07 (.09)	-.07 (.09)	-.08 (.09)
Family size	-.10* (.02)	-.10* (.02)	-.11* (.02)	-.11* (.02)
Black	.19 (.13)	.26* (.13)	.31* (.13)	.18 (.13)
Hispanic	.56* (.19)	.58* (.19)	.59* (.19)	.57* (.19)
<u>Effects of Family Structure</u>				
Type of family at age 14				
Stepparent family	-.28* (.13)			
Single-parent family	.02 (.10)			
Other	-.37 (.22)			

(table continues)

**TABLE 8, continued**

	Model 3d (A <sup>a</sup> )	Model 3d (B <sup>a</sup> )	Model 3d (C <sup>a</sup> )	Model 3c
Type of family in which 10+ years spent				
Stepparent family		-.38* (.14)		
Single-parent family		-.22* (.11)		
Other		-.42* (.17)		
Number of years lived in a two-parent family			.02* (.01)	
Number of changes in family structure	-.09* (.05)	-.06 (.04)	-.04 (.04)	-.16* (.03)
Unmeasured between-family variance	1.63* (.11)	1.62* (.11)	1.62* (.11)	1.64* (.11)
Within-family variances				
Older sibling	2.84* (.13)	2.84* (.13)	2.84* (.13)	2.84* (.13)
Younger sibling	2.34* (.12)	2.34* (.12)	2.34* (.12)	2.34* (.12)

<sup>a</sup>Letter designation of corresponding panel from Tables 5 and 7.

\*p<.05

Estimates of standard errors are presented in parentheses.



We see that every year spent in a two-parent family is associated with educational advantages (albeit very small) which occur independently of the number of changes in family arrangements experienced.

The number of changes in family structure is shown to be consistently associated with negative consequences for children's schooling. However, in Model 3d, the effect for number of changes is attenuated and does not have a statistically significant effect independent of the type of family arrangement, except when type of family at age 14 is considered.

Comparing the magnitudes of the family structure effects with the effects of family background variables, we see, for example, that living in a stepparent family or "other" type of family rather than a two-parent family for 10+ years entails the same disadvantage for educational attainment as would growing up with a mother who had completed 2 fewer years of schooling, holding everything else constant. Alternatively, living in a single-parent family rather than a two-parent family for 10+ years has an effect roughly equivalent to growing up with a mother who had completed one less year of schooling. Each change in family structure (ignoring family arrangement for the moment) has a negative effect on educational attainment roughly equivalent in size to a 5-point drop in the occupational status of the head of the household.

Altogether, family background and family structure variables explain about half of the variance in the common family background. That is, half of the common educational environment shared by siblings can be explained by our vector of measured variables. As shown in Table 7, shared influences and sex seem to explain slightly more variance in years of schooling among younger siblings. Corresponding to this, within-family variance is slightly smaller among younger siblings (see Table 8). However, the differences are quite small, and in separate analyses, no statistically significant difference exists between siblings.

Finally, reliabilities provided by the measurement model are presented in Table 9. The reliability of each measured variable is the proportion of variation that is attributable to the true score. High reliabilities indicate a high degree of consistency among sibling responses and are evident in each of the five family background measures. The reliabilities for logged income are artificially high due to the way that reports of missing income were treated among siblings. The reliability for the measures of head's occupational status is a little smaller than the others, but still highly reliable. It is possible that the older child is better informed of his or her parent's position. Alternatively, it is possible that real change has taken place or that siblings are referring to different individuals with whom they lived when they were 14 years old (recall that the occupational status variable refers to the occupation of the adult head the child lived with at age 14).

## CONCLUSIONS

We employed a sibling resemblance model in an attempt to assess the effects of family structure on children's educational attainment after statistically controlling for other potential sources of common influence on educational attainment. Our central research question was: Does family structure affect children's well-being, after controlling for common family influences? Our findings indicate that it does. Independent of other factors, living outside a two-parent family is associated with educational disadvantages, as are changes in family structure and living arrangements.

Although previous research on family structure and children's well-being has often investigated the effects of nontraditional family arrangements and changes in family structure, these factors have not often been considered together. Our results show that educational disadvantages can be attributed to the type of family arrangement lived in or to the number of disruptions associated with particular arrangements, or in one case, to a combination of both. Thus, there seems to be some support for the

**TABLE 9****Reliabilities of Measured Variables**

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	Measure Provided by:	
	Older Sibling	Younger Sibling
Father's education	.86	.88
Mother's education	.88	.88
Head's occupational status	.79	.79
Family income (log)	.91	.94
Family size	.91	.96

---

stress hypothesis. That is, the detrimental consequences for children's well-being that are associated with living outside a two-parent family can, in part, be attributed to the stress that accompanies transitions to different family structure arrangements. Another possible explanation lies with the changes in household resources that are also associated with changes in family structure (Jonsson and Gahler, 1997). Since family background measures are only available in the 1979 survey year of the NLSY, we cannot pursue this further.

On the other hand, we also find that living outside a two-parent family entails educational disadvantages for children. These findings provide some support for the social capital and social control explanations.

Finally, it should be kept in mind that although the effects of family structure are shown to persist even after measured and unmeasured sources of variation have been controlled, family structure alone demonstrates limited explanatory power for educational attainment. The disadvantages reported above are expressed in terms of fractions of years of schooling and are relatively small when compared with the whole array of family background variables. Recall that in terms of explained variation in years of schooling, the vast majority is attributed to the introduction of family background variables and unmeasured sources of common influence. Thus, family background is shown to play a much larger role in predicting educational attainment, but at the same time, the independent role of family structure cannot be discounted.

**APPENDIX**


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 Categorization of Family Structure
 

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Both biological parents	Two-parent
Biological father and adoptive mother	Two-parent
Adoptive father and biological mother	Two-parent
Two adoptive parents	Two-parent
Biological father and stepmother	Stepparent
Stepfather and biological mother	Stepparent
Adoptive father and stepmother	Stepparent
Biological father only	Single-parent
Biological mother only	Single-parent
Stepfather only	Single-parent
Stepmother only	Single-parent
Adoptive father only	Single-parent
Adoptive mother only	Single-parent
Two stepparents	Other
Grandparents	Other
Other relative	Other
Foster parents	Other
Friends	Other
Children's home	Other
Group home	Other
Detention center	Other
Other institution	Other
Other nonparent	Other

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Entries in column 1 are taken from Wu (1996, p. 391). We used them to enumerate the number of changes in family structure and living arrangements. Column 2 demonstrates how these detailed arrangements correspond to the three other family structure variables we used: family structure at age 14, family structure in which 10+ years spent, and number of years spent in a two-parent family.



### Endnotes

<sup>1</sup>Respondents were asked in 1979 to record with whom they lived at age 14. In 1988, respondents were asked to provide a residential history that indicated with whom they were living from birth through age 18.

<sup>2</sup>The number of households with two or more siblings are as follows:

Number of Siblings in a Household	Number of Households
2	1,280
3	428
4	99
5	12
6	2

Summing column 2 yields 1,821 households. Multiplying across rows and then summing the products yields 4,312 siblings.

<sup>3</sup>We rescaled the index for head's occupational status by dividing it by 10.

<sup>4</sup>In cases with a missing value on family income (or on any other background variable), we have imputed the mean among those with valid responses.

<sup>5</sup>The difference in sibling ages ranges from 0–8 since all respondents were aged 14–22 in 1979.

<sup>6</sup>In the case of the second measure, the residual category also pertains to children who did not spend 10+ years in any of the other three categories.

<sup>7</sup>For children who left home before age 18 and were living independently, we looked at the number of changes in family arrangements prior to leaving home, consistent with Wu's (1996) approach.

<sup>8</sup>Although children are labeled 1st child, 2nd child, etc., these designations do not refer to absolute birth orders within a family, but rather, to relative birth orders within a family among those in the sample. Since the sample consists of those who were 14–22 years old in 1979 (and who completed an interview and supplied information on certain variables), it is possible that the first eligible child in a

family has an older sibling who was more than 22 years old in 1979 (or was age-eligible but did not complete an interview) and thus is not included in the sample. Similarly, it is possible that a child of a later birth order is not the youngest in a family, since those younger than 14 in 1979 were not included in the sample.

<sup>9</sup>Our sample of children with siblings obviously does not include only children. The NLSY has data on 251 only children who supplied valid responses for the family structure variables and years of schooling completed. Descriptive statistics on measures of family structure for only children are provided below. Across all four measures of family structure, only children are more likely to experience instability and disruption and are less likely than children with siblings to live in a two-parent family. Despite this, only children are shown to exhibit slightly higher average years of schooling completed (13.6 years versus 13.4 years).

Type of Family at Age 14		Type of Family in Which 10+ Years Spent	
Two-parent family	66.4	Two-parent family	69.2
Stepparent family	7.3	Stepparent family	5.4
Single-parent family	19.9	Single-parent family	14.0
Other	6.5	Other	11.4

Number of Years in a Two-Parent Family		Number of Changes in Family Structure	
15–19	66.5	0	65.8
10–14	2.8	1	16.3
5–9	8.5	2	12.0
0–4	22.2	3+	5.9



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