FEDERAL RESERVE BANK *of* ATLANTA

Does Family Structure Affect Children's Educational Outcomes?

Donna K. Ginther and Robert A. Pollak

Working Paper 2000-13a
December 2000

Working Paper Series

Does Family Structure Affect Children's Educational Outcomes?

Donna K. Ginther and Robert A. Pollak

Federal Reserve Bank of Atlanta
Working Paper 2000-13a
December 2000

Abstract: In this paper we examine the effect of family structure on children's educational outcomes by exploiting the sibling structure in the NLSY and NLSY-Child to control for unobserved heterogeneity across families and individuals. We also compare outcomes for children within the same family—stepchildren with their half-siblings in the same blended family who are the biological children of both parents. Using panel data methods to control for unobserved heterogeneity across families, we find that family structure effects are statistically insignificant. Finally, comparing half-siblings in our data, we find no difference in educational outcomes as a function of family structure. Our empirical results are consistent with at least two interpretations. First, they can be interpreted as evidence that estimates of family structure effects reflect selection rather than causation. Second, they can be interpreted as evidence that the presence of stepchildren disrupts families.

JEL classification: J12, J13, J24

Key words: family structure, children, education

The authors thank Anne Case, Irwin Garfinkel, and James Heckman, who discussed the authors' paper at the AEA meetings in Boston in January, 2000, for their helpful suggestions. They also thank Daniel Black, Paula England, Nancy Folbre, Sara McLanahan, Gary Sandefur, and Robert Willis for helpful comments. The authors thank the Graduate School at Washington University for providing funding for this research, and David Lang for excellent research assistance. Pollak thanks the John Simon Guggenheim Memorial Foundation for financial support. Previous versions of this paper were presented at the American Economic Association Annual Meeting and the MacArthur Network on the Family and the Economy and the NICHD Family and Child Wellbeing Research Network conference "Conflict and Cooperation in Families." The views expressed here are the authors' and not necessarily those of the Federal Reserve Bank of Atlanta or the Federal Reserve System. Any remaining errors are the authors' responsibility.

Please address questions regarding content to Donna K. Ginther, Research Department, Federal Reserve Bank of Atlanta, 104 Marietta Street, N.W., Atlanta, Georgia 30303-2713, 404-614-7009, 404-521-8058 (fax), donna.ginther@atl.frb.org, or Robert A. Pollak, Department of Economics, Washington University, St. Louis, Missouri 63130-4899, 314-935-4918, 314-935-4156 (fax), pollak@olin.wustl.edu.

Does Family Structure Affect Children's Educational Outcomes?

A major premise of the welfare reform legislation of 1996 which replaced Aid to Families with Dependent Children (AFDC) with Temporary Assistance for Needy Families (TANF) is that two-parent families are good for children. The preamble to the legislation specifies that its purpose is providing "time-limited assistance" to needy families, and then declares two objectives regarding family structure: "preventing and reducing out-of-wedlock pregnancies, especially teenage ones; and … encouraging the formulation and maintenance of two-parent families." Researchers have weighed in on these issues. Cherlin [1999], in his presidential address to the Population Association of America, evaluates current research on the relationship between family structure and children's well-being. He argues extreme views often drown out sound social science research, criticizes psychologist Judith Wallerstein for overemphasizing the deleterious effects of divorce, criticizes psychologist Judith Rich Harris for dismissing them, and criticizes his fellow sociologists for disregarding the possibility that genetic factors may play a role in determining child outcomes.

Blended families are somewhat shrouded, if not completely invisible, in political debates which focus instead on single-parent families, two-parent families, and out-of-wedlock births. Yet blended families have received increasing attention from researchers. For example, in an important and influential recent book McLanahan and Sandefur [1994] found that stepchildren in blended families fare worse than children reared by both biological parents, and that outcomes for stepchildren are very similar to outcomes for children in single-parent families. Case, Lin, and McLanahan [1999, p. 237] analyze food expenditures in two-parent households, and find that "the presence of stepchildren is associated with lower food expenditure for home consumption, when those children are stepchildren of the mother." This pattern lends support to what they term the "theory of parental solicitude" and, as their title suggests, to the Cinderella stereotype of stepparents, or at least stepmothers. Evolutionary psychologists such as Daly and Wilson [1999] elaborate the rationale for results consistent with the Cinderella stereotype; in research beginning in the early 1980s, Daly and Wilson have found that the presence of a stepparent is a substantial risk factor for child abuse. Hrdy [1999], an anthropologist who has written extensively on infanticide among nonhuman primates and other mammals, finds that "stepfathers" often kill their "stepchildren."

Previous research on blended families has focused on stepchildren. The other children in blended families – those who are the biological children of both parents – have received relatively little attention. Aware of the findings of McLanahan and Sandefur that outcomes for stepchildren are similar to those of children in single parent families and less favorable than those of children reared by both biological parents, we set out to compare educational outcomes for the two types of children reared in blended families – the stepchildren and the biological children of both parents – expecting to find significant differences.

We did not. When we compared the stepchildren in blended families with the biological children in blended families, we found no significant differences: we found that both stepchildren and biological children in blended families had lower educational outcomes than children who grew up in intact families and had outcomes very similar to those of children in single parent families. Our results are interesting for two distinct reasons: first, just as we would like to know how children fare in single-parent families, we would like to know how children – the stepchildren and the biological children -- fare in blended families. Second, our unexpected results provide an opportunity to examine critically the meaning of estimated correlations between family structure and children's educational outcomes.

Our empirical results are consistent with at least two distinct interpretations. First, they can be interpreted as evidence that the correlations between family structure and outcomes for children reflect selection rather than causation. The selection interpretation is especially tempting in the light of the finding (see, for example, McLanahan and Sandefur [1994]) that educational outcomes for the children of widows are essentially identical to those of children from intact families. Tempting, but not conclusively so: as McLanahan and Sandefur suggest, more favorable educational outcomes for the children of widows may reflect more generous public and social support rather than selection. Second, they can be interpreted as evidence that the presence of stepchildren disrupts families – not only do stepchildren themselves have lower educational outcomes than children reared in intact families, but the disruption associated with their presence lowers educational outcomes for their half-siblings who are the biological children of both parents. In the conclusion we return to issues of interpretation. We argue there that estimating the "effect" of family structure on outcomes for children requires a comparison, that comparisons involve counterfactuals, and that counterfactuals should be explicit. Thus, we end the paper with a discussion of appropriate counterfactuals.

We conclude our introduction by discussing a definitional issue that marks our departure from previous research. Previous research has utilized child-oriented definitions of family structure, defining family structure in relation to each child, so that a blended family is classified as a stepfamily for one child and as a two-biological parent family for another. Although we begin our analysis with child-oriented definitions of family structure, we move quickly to family-oriented definitions, defining family structure in terms of the entire household. In our terminology a family that is a stepfamily from the perspective of one child and a two-biological parent family from the perspective of another is a "blended family." More specifically, we follow the census definition and say that a "blended" family is one "that must include at least one stepparent, stepsibling and/or half-sibling. A stepparent is the spouse of a child's biological parent but is not the child's biological parent. . . Half-siblings share only one biological parent." [Census Bureau P70-38, p.B-1] We say that a family is "intact" (our shorthand for what the census calls the "traditional nuclear family") if it consists of a married couple and their biological child(ren), with no others are present in the household.[1] [Census Bureau P70-38, p.B-1] Our family-oriented definitions facilitate comparing outcomes for children in intact families with those of the two types of children in blended families – stepchildren and those who are the biological children of both parents.

We begin in section 1 by discussing the literature on family structure and outcomes for children, with special reference to what is known about blended families. Section 2 discusses the two data sets we use in this study, the NLSY and the NLSY-Child. Section 3 discusses our empirical methodology, and section 4 our results. In

[1] The decennial census cannot be used to investigate family structure because it is not longitudinal and it only details the familial relationship between the householder (focal person) and other members of the household.

section 5, our final section, we return to the interpretation and implications of our results.

1. Background

Policy makers, from at least the time of Moynihan's 1965 report, The Negro Family, have regarded nonmarital fertility and single parent families as problems, both because of welfare costs to taxpayers and because of concerns for children – concerns that are clearly reflected in the preamble to the TANF legislation. Social scientists, sociologists more often than economists, have written extensively on the relationship between family structure and children's socio-economic outcomes.

Economists often ignore family structures other than intact families. For example, the theoretical and much of the empirical analysis in Becker [1981, 1991], Behrman, Pollak and Taubman [1995], and Mulligan [1997] assumes that children are born to parents who are married to each other and who remain married to each other. Recent work by Neal [1999] and Willis [1999] has modeled the decisions that determine family structure, but the theoretical literature on human capital generally assumes intact families. Several economists, including Haveman and Wolfe [1994, 1995] and Manski, McLanahan, Sandefur, and Powers [1992], Eckstein and Wolpin [1999], and Heckman, Hee, and Rubinstein [1999] include measures of family structure in estimates of children's educational outcomes. These estimates, however, are not linked to structural models of family structure and investments in children.

This lack of a structural model of family structure and investments in children has not stopped researchers from estimating correlations between family structure and children's schooling outcomes. McLanahan and Sandefur [1994] use four data sets to evaluate the effect of family structure on children's outcomes. They find that high school graduation rates, college enrollment, and college graduation rates for children from single-parent families are below those of children from two-parent families.[2] In addition, McLanahan and Sandefur [1994] find that stepchildren from blended families have socioeconomic outcomes similar to those of children from single-parent families, although the income of blended families does not differ significantly from that of intact families.

The literature on blended families has been growing rapidly from a small base. Wojtkiewicz [1993] uses the National Longitudinal Survey of Youth to estimate the effect of having a stepfather on children's schooling outcomes. He finds that duration of exposure to stepfather families reduces the probability of high school graduation. In more recent work, Wojtkiewicz [1999] examines the effect on college entry of family structure and changes in family structure. Using data from the National Educational Longitudinal Survey, Wojtkiewicz defines stable family structures as those that do not change between 1988 and 1992. He finds that children from stable single-parent families are more likely to attend college than those from unstable single-parent families or stepchildren from blended families. Boggess [1998] reports that stepchildren in stepfather families have lower rates of high school graduation than children growing up with both biological parents. Controlling for duration in a single-parent family and economic resources using the Panel Study of Income Dynamics, Boggess finds a negative and significant effect of living with a stepfather on high school graduation rates for white males and females, and black females.

[2] McLanahan and Sandefur [1994] also find that children from single-parent families tend to have higher rates of teen pregnancy, and higher rates of economic inactivity than children from families with both biological parents.

Biblarz and Raftery [1999] emphasize that empirical estimates of the influence of family structure on outcomes for children depend on the definitions of family structure groupings, which variables are treated as exogenous, and the time period considered. For example, they argue "rates of unemployment and lower-status occupational positions could account for the negative effect of single-mother families on children's attainment" (p. 322). They compare six single-factor explanations of how and why family structure affects outcomes for children – and conclude that evolutionary psychology is most consistent with their analysis. Finally, Gennetian [1999], uses the NLSY-Child data to examine the effect of family structure on children's test scores and home environment. Controlling for unobserved heterogeneity across families and individuals, she finds that living in a single mother family has a persistent negative effect on children's test scores. Other family structures such as living with a stepparent or with half-siblings in a blended family are no longer significant after controlling for mother and individual fixed effects. Some but not all of these results suggest that growing up in a single-parent family or as a stepchild in a blended family has a negative effect on children's schooling attainments.

The interpretation of these findings raises difficult questions. Few researchers would claim that family structure is exogenous, and it is difficult to rule out the possibility that some unobserved variable or process determines both family structure and educational outcomes. For example, parental conflict or stress may lead to divorce and to lower educational outcomes; substance abuse or psychopathology (e.g., depression, or schizophrenia) by one or both parents could lead to similar results. The possible presence of selection effects complicates the interpretation of the estimated effect of family structure on children's schooling outcomes.

Researchers have attempted to assess the importance of selection in estimating the effect of family structure on children's outcomes. In an appendix to their book, McLanahan and Sandefur [1994] model selection using bivariate probit estimation. Bivariate probit models provide estimates of the correlation of unobserved characteristics between family structure and child outcomes. McLanahan and Sandefur interpret the bivariate probit results as supporting a causal interpretation of the effect of family structure on children's outcomes, but their bivariate probit results are mixed: for some (but not all) outcomes, the unobserved characteristics are statistically significant and correlated across child outcomes and family structure. In addition, the effect of family structure on child outcomes loses statistical significance and sometimes changes sign in the bivariate probit estimates. Their conclusion is further undermined by the functional form assumption and exclusion restrictions needed to identify their bivariate probit models. Hence, the bivariate probit analysis does not rule out the possibility that estimates of the effect of family structure are strongly influenced by selection.

In related work, Manski, Sandefur, McLanahan, and Powers [1992] construct nonparametric bounds on the effect of family structure on high school graduation. Their procedure does not provide point estimates of the effect of family structure on child outcomes. Their nonparametric bounds require no assumptions about the functional form of the underlying structural relationship, although some estimated bounds utilize exclusion restrictions. Noting that models that assume exogenous assignment of family structure lie within the nonparametric bounds, Manski, Sandefur, McLanahan, and Powers [1992] conclude that selection has little impact on estimates of the effect of family structure on high school graduation. This conclusion is unwarranted. The estimated bounds are wide—the price they pay for imposing few assumptions. All of the estimated bounds include zero and, hence, are also consistent with the hypothesis that family structure has no effect. Sandefur and Wells [1999] use a sample of siblings from the NLSY to estimate a multiple indicator, multiple cause model of educational attainment as a function of family structure. After controlling for common (unobserved) family characteristics, they find that living outside of a two-parent family has a small, negative effect on educational attainment. Finally, Painter and Levine [1999] investigate the extent to which the unfavorable outcomes for children associated with nonmarital birth, divorce, and remarriage are attributable to preexisting characteristics of the children or the parents rather than to family structure. Using the National Educational Longitudinal Survey of 1988 (NELS), they find that the preexisting characteristics reported in the NELS fail to explain the differences in outcomes, and conclude that the association between family structure and outcomes for children are causal.

2. The Data

In this paper we investigate the association between family structure and children's educational outcomes using two data sets and two distinct approaches. Using data on siblings from National Longitudinal Survey of Youth (NLSY), we examine the effect of family structure on schooling outcomes for young adults. Using the children of females from the National Longitudinal Survey of Youth (NLSY-Child), we examine the effect of family structure on children's cognitive and behavioral outcomes. In this section we provide brief descriptions of the two data sets. In the following sections we describe our empirical methodology and our results. Our strategy is first to replicate the findings of other researchers by estimating the correlations between family structure and the educational outcomes of children. Next, we exploit the sibling structure in the NLSY and NLSY-Child to control for unobserved heterogeneity across families and individuals. Finally, we compare outcomes for children within the same family. More specifically, we compare stepchildren with their half-siblings in the same blended family who are the biological children of both parents.

2.1 The National Longitudinal Survey of Youth

The NLSY began in 1979 with a nationally representative sample of 12,686 young adults between the ages of 14 and 21. Almost half of the observations in the NLSY (5,863) come from multiple sibling households. We work with an "NLSY sibling sample" which we define to include a subset of individuals who have siblings or stepsiblings in the NLSY. To be included in our sibling sample, individuals must have completed the 1988 Childhood Residence Calendar, have complete measures of schooling in the 1994 survey wave, and have at least one sibling meeting these criteria. We eliminate individuals who are adopted, or report zero years of schooling, or report more than one change in family structure in a given year of childhood. We investigate years of schooling, which we treat as a continuous variable, and three dichotomous measures of schooling attainment: high school graduation, college attendance, college graduation.

In order to account for the effect of changes in family structure on children's outcomes, researchers should measure family structure over the entire childhood. However, most studies of the effect of family structure on child outcomes, including McLanahan and Sandefur [1994] and Manski, McLanahan, Sandefur and Powers [1992], use one-year 'window' measurements taken at a given age as a proxy for family structure throughout childhood.[3] Wolfe, Haveman, Ginther, and An [1996] examine the reliability of these 'window' variable estimates, conclude that one-year window variables serve as weak proxies for childhood circumstances and events, and can result in unreliable estimates.

Although the family structure variables in the NLSY are subject to the window problem, they can be supplemented with retrospective data collected in the 1988 NLSY Childhood Residence Calendar Supplement. We used these data to reconstruct age-specific changes in living arrangements over an individual's entire childhood, from ages zero to 16. We begin our analysis using child-oriented measures of family structure. Family structure is characterized as the number of years that a child lives with both biological parents (intact), with a single biological parent (single-parent), with a biological parent who is married to a stepparent (stepparent), and alternative (other) family structures.[4]

Although the NLSY contains information on multiple sibling households, the data do not explicitly report whether a pair of siblings are half or full. To identify half-siblings in the data, we compare measures of family structure in a household. We restrict our analysis to "stable" blended families, which we define as those in which at least one sibling reports living with both biological parents until age 18 while at least one other sibling reports living with a stepparent. We impose this restriction to obtain a blended family sample in which at least one child in each family spends his or her entire childhood living with both biological parents; this allows us to evaluate whether

---

[3] Wolfe, Haveman, Ginther, and An [1996] enumerate papers with the window problem.
[4] We treat cohabiting parents as if they were married.

outcomes for these biological children in stable blended families are similar to outcomes for children in intact families. Our definition excludes "unstable" blended families that end in divorce. It also excludes families in which none of the children are the biological children of both parents (e.g., the "Brady Bunch") because we want to compare schooling outcomes of step-children in blended families with the outcomes of their half-siblings who are the biological children of both parents.

Table 1 reports the means and standard deviations of the variables used in the NLSY siblings sample and stable blended family subsample. Average years of schooling in the sibling sample is 13.15. Only 27 percent of the siblings report ever living in a nonintact family. 3.5 percent of the siblings (135 individuals) lived in stable blended families.[5] Mean educational outcomes are lower in the stable blended family subsample than for all siblings. In addition to means and standard deviations, Table 1 reports the standard deviation within families and the percent of the variance of the educational outcome and family structure variables accounted for by within family variation. In the sibling sample, over half of the variation in family structure and educational outcomes is accounted for between families. This holds true for years of schooling, high school graduation, and college attendance in the stable blended family sample as well.

2.2 The National Longitudinal Survey of Youth – Children Sample

Beginning in 1986, the NLSY-Child collected data on all of the children born to the female NLSY respondents. The 1994 wave of the NLSY-Child sample contains information from 3,464 women with children. Because children under the age of 15

[5] Because our blended families are defined as families that remain together for the entire childhood of at least one child, this 3.5 percent is not an estimate of the percentage of children in the population who spend some portion of their childhood in a family that includes a husband, a wife, at least one stepchild, and at least one biological child of the couple.

comprise the majority of this sample, we focus on cognitive and behavioral outcomes rather than schooling attainment. The NLSY-Child contains several cognitive and behavioral assessments that can be used to estimate the effects of changes and differences in family structure.

The NLSY-Child sample biennially interviews both mother and child. Two child supplements record information on children's demographic characteristics and on cognitive and behavioral assessments. The assessment instruments used in this study are three Peabody Individual Achievement Tests (PIAT)--reading recognition, reading comprehension, and math--and the Behavior Problems index which measures a child's anti-social behavior. For all four assessments, we use the normalized percentile scores in our analysis.[6] Our sample from the NLSY-Child data is limited to children with siblings in the sample, ages 5-15 for whom we have data on age, the three PIAT assessments, and the Behavioral Problems index. Family structure is defined in each year of the survey data as living with a single mother, living with both biological parents, or living with a mother who is married to a stepfather.[7] These definitions do not measure family structure over the entire childhood and are potentially subject to the 'window problem.' Because we observe individuals over multiple survey years, however, we can measure changes in family structure over time.

As with the NLSY, we create from the NLSY-Child a subsample of stable blended families. We identify half-siblings within a household using the following criteria: A) one sibling reports living with a father and the other reports not living with a

---

[6] Normalized percentile scores are derived on an age-specific basis. For the PIAT assessments, raw scores are normalized to a national distribution. For the Behavioral Problems Index, raw scores are normalized based on the survey distribution.
[7] We treat cohabiting parents as if they were married.

father; or B) both siblings report not living with a father but report fathers living at different distances from the child; or C) one child reports the father is dead while the other does not. To make our NLSY-Child stable blended-family sample more nearly comparable to the NLSY stable blended-family sample, we impose the additional restriction that at least one child in the household reports having lived with both biological parents from birth until the time of the survey.

Table 2 reports the descriptive statistics for the NLSY-Child sample and our stable blended family subsample. There are 4,320 siblings in the sample, of whom 418 individuals live in stable blended families. Children in the NLSY-Child sample are repeatedly assessed, so we have over 10,000 child-year observations in this data set. Mean reading and math assessment scores are lower in stable blended families than for all of the siblings in the NLSY-Child sample; mean behavioral problem scores are higher. We also report the within family standard deviation of the family structure and outcome variables, and the percentage of variation explained within families. As with the NLSY data, we find that over half of the variation in family structure and outcomes occurs between families, but there is more variation in outcomes in stable blended families than for all siblings in the NLSY-Child sample.

3. Empirical Methodology

We take three approaches to estimating the effect of family structure on children's educational outcomes. We begin by estimating the usual cross section relationship between family structure and educational outcomes using the entire sample of siblings. If family structure were randomly assigned to children and there were no omitted variables, then we could interpret the estimated coefficients as the causal effect of family structure on educational outcomes. Because we are concerned about both selectivity and omitted variables, we do not think these estimates warrant a causal interpretation, but we report them to provide a baseline for comparison with the findings of other researchers and with the other specifications that we estimate. Next, we use sibling models (family fixed effects) to control for unobserved heterogeneity. Unfortunately, fixed effects methods tend to throw the estimated baby out with the bath water. When the fixed effects estimates are statistically significant, the variables can safely be interpreted as determinants of the estimated outcome, but when fixed effects estimates are not statistically significant, then one cannot safely conclude that these variables are irrelevant. Finally, we compare outcomes for half-siblings within the same blended family. We reason that if growing up with both biological parents leads to better educational outcomes we would see this in stable blended families—that is, we would expect to find that children who grow up with both biological parents have better outcomes than their half-siblings who are stepchildren. Taken together, these three approaches provide us with a more complete understanding of the relationship between family structure and educational outcomes for children than any single method used in isolation.

3.1 Sibling Models

Researchers use sibling models to control for unobserved heterogeneity in estimating the determinants of children's outcomes. Sibling models are based on the assumption that siblings, because they share genetic and environmental background, are more alike in unobserved characteristics than randomly selected pairs of children. Estimates of the within family variation in family structure and outcomes in Tables 1 and

2 are consistent with this assumption: variation in educational outcomes within families is substantially less than variation between families. Economists have used sibling models, often twins models, to estimate the effect of schooling on earnings (see Taubman, 1977, Griliches 1979, and Bound and Solon 1999) and the effect of teen pregnancy on women's outcomes (see Geronimus and Korenman 1992). We use the panel and sibling structure of the data sets to control for unobserved heterogeneity across individuals and families.

Formally, let y_{jit} measure a child's outcome, where j indexes families, i indexes individuals in the same family, and t indexes time. Let w_{ji} be family characteristics, x_{jit} characteristics that vary across siblings and time, and z_{jit} be family structure. Consider the linear sibling model:

$$y_{jit} = aw_{ji} + bx_{jit} + gz_{jit} + e_{jit} \ . \qquad (1)$$

We can decompose the error term into three components: $e_{jit} = j_j + h_i + u_{jit}$, where j_j is the family-specific component, h_i is the individual-specific component, and u_{jit} is random error. If j_j is correlated with family structure and both h_i and u_{jit} are uncorrelated with family structure, then first differencing across siblings will eliminate selection bias. If we ignore time-varying data and assume that family structure only operates through a family fixed effect, j_j, and that all family effects are sibling-invariant, $w_{ji} = w_j$, then we can first difference (1) with respect to siblings and estimate the following equation:

$$\Delta y_{ji} = b\Delta x_{ji} + g\Delta z_{ji} + \Delta e_{ji} \ . \qquad (2)$$

Under our assumptions, this procedure eliminates any observed or unobserved variables that do not vary within a family.

Using the NLSY-Child sample we can relax the assumption of sibling-invariant family effects and use an individual fixed effects estimator to control for unobserved heterogeneity across individuals. If we assume that h_i is correlated with family structure and j_j and u_{jit} are not, then we can first difference (1) across time for each individual and eliminate selection bias. We have the following individual fixed-effects equation:

$$\Delta y_{jit} = b\Delta x_{jit} + g\Delta z_{jit} + \Delta e_{jit} \ . \tag{3}$$

Under our assumptions, differencing across time eliminates all observed or unobserved variables that do not vary across time by child or within the family.

Griliches [1979] and others have noted the limitations of fixed effects estimators. First, measurement error in the determinants of children's outcomes will be exacerbated by using the fixed effects methodology. We alleviate this problem to some extent by using measurements of family structure from the entire childhood instead of the more commonly used one year window variables that are subject to greater measurement error. Second, there might be unobserved heterogeneity across siblings that is correlated with family structure. For example, because divorce is more likely to occur in families with daughters than sons, first differencing across siblings will not correct for selection bias.

Third, three of our four schooling outcomes are dichotomous. For these we use discrete choice fixed-effects methods proposed by Chamberlain [1980].[8]

3.2 Blended Family Comparisons

In addition to the panel data methods described above, we compare outcomes for half-siblings within the same stable blended family. We have defined both of our stable blended-family samples to ensure that each family includes at least one child who grew up with both biological parents. If growing up with both biological parents has a substantial impact on children's educational outcomes, we would expect to find evidence of this in our stable blended family samples. That is, we would expect to find that children who grow up with both biological parents have better outcomes than their half-siblings who spent time first in single parent families and then as stepchildren in stable blended families. Like any approach based on nonexperimental data, selection is a potential problem. We assume that the characteristics of children from previous relationships do not affect the probability of blended family formation or having additional children. We also assume that the quality of the spouses' relationship in the stepfamily does not affect the probability of having additional children.

Despite their limitations, taken together these estimation methods offer insights into the relationship between family structure and children's educational outcomes.

4. Estimation Results

4.1 NLSY Estimates for All Siblings

To provide a baseline for comparisons with other specifications, we begin by estimating two cross-section models of the effect of family structure on schooling outcomes. Model (A) regresses schooling outcomes on variables for gender, race, year of

---

[8] Years of schooling usually is reported in integer values but treated as continuous; we follow this tradition.

birth, and family structure, and Model (B) adds measures for number of siblings, religion, and parental schooling to Model (A). All models have measures for years in a single parent, stepparent, or other family structure with years in an intact family being the omitted category. We can interpret the coefficient on years in a given family structure as the effect on the educational outcome of spending one additional year in that family structure on the educational outcome. These estimates might represent a causal relationship between family structure and schooling if family structure and the other right hand side variables were exogenously assigned. One can make a strong case that gender and race are exogenous, but sibship size (number of siblings), religion, and parental schooling can be considered endogenous to the family. Results for these models are presented in Table 3. Like previous research, our OLS and probit cross-section Models (A) and (B) show that years with a single parent or stepparent have negative and significant effects on schooling outcomes. As variables for parental schooling, number of siblings, and religion are added to Model (B), estimates of the effect of family structure attenuate, and in the case of single parent's effect on college attendance and graduation, become statistically insignificant at the five percent level. Years with a stepparent have negative and significant effects on college attendance and graduation.[9]

The fixed effects estimates in Table 3 tell a different story. For all four schooling outcomes, the family structure variables are not statistically significant. In these fixed effects models, years with a single parent have a positive and insignificant effect on all

---

[9] We have experimented with alternative specifications in Table 3 and found our results to be robust. We used dummy variables for family structure instead of years living in a particular family structure. The estimates presented in Table 3 fit the data better than those using family structure dummies but tell the same story. In Model (B) we substituted dummy variables for number of siblings to account for nonlinearities in the effect of family size on outcomes. We found no qualitative differences in the effect of family structure variables on outcomes. These estimates are reported in Appendix A.

schooling outcomes. The fixed effects estimates indicate that unobserved heterogeneity across families "explains" schooling outcomes better than observed family structure.[10] The fixed effects results must be interpreted cautiously, however, because the fixed effects estimation procedures only make use of data from sibling pairs whose schooling outcomes differ. As reported in Tables 1 and 2, more of the variation in schooling outcomes occurs between than within households.

4.2 NLSY Estimates for Stable Blended Families

We next consider the relationship between family structure and schooling in our stable blended family sample from the NLSY. Because our stable blended-family sample is small (135 individual observations), we begin with simple tests of differences in mean schooling outcomes. The top panel of Table 4 tests the null hypothesis of no difference in mean schooling outcomes between siblings in stable blended families and siblings from intact families in the NLSY sample. For all four schooling outcomes we reject the null hypothesis of no difference in schooling outcomes. Mean schooling outcomes in the stable blended-family sample are significantly lower than those for children from intact families.

Next, we evaluate whether schooling outcomes within the stable blended-family sample differ with family structure. These results are presented in the bottom panel of Table 4. For all four schooling outcomes the children growing up with both biological

[10] We tested the fixed effects specifications against random effects specifications. For all outcomes, we rejected random effects in favor of the fixed effects specifications reported here.

parents in stable blended families do better than the step-children, but the differences are not statistically significant –mean schooling outcomes are not significantly different in the stable blended-family sample as a function of family structure. However, when we compare the mean outcomes for biological children in stable blended families with those for intact families, we find substantially larger differences--children from intact families do better than the biological children in stable blended families. Appendix Table B.1 contains more comparisons between children from intact families, stepparent families, single-parent families, and biological children and stepchildren in stable blended families. For all schooling outcomes, children living in intact families have substantially and significantly higher mean outcomes than any other family structure.

In Table 5, we estimate two models of family structure using the stable blended-family sample.[11] Model (A) is a parsimonious model where family structure is measured as years outside of an intact family (nonintact); the specification is appealing in part because we only have 135 observations. In Model (A), years in a nonintact family have a negative and significant effect on years of schooling at the ten percent level. For the remaining outcomes, family structure is not statistically significant. In Model (B), years spent with a single-parent or stepparent have a negative but not statistically significant effect on schooling outcomes.

Taken together, these results indicate that once we control for unobserved heterogeneity across families, we cannot reject the null hypothesis that family structure has no effect on children's outcomes. The tests of mean differences indicate that growing

[11] Only three of the four schooling outcomes are presented in Table 5 because only 4 individuals in the blended-family sample graduate from college.

up in a stable blended family has a negative impact on schooling outcomes for both the stepchildren and the biological children of both parents. The regression models show no additional significant impact of family structure on schooling outcomes. We next turn to the effect of family structure on the four child assessment outcomes.

4.3 NLSY-Child Estimates for All Siblings

Table 6 presents four sets of estimates for each of four child assessment outcomes (reading recognition, reading comprehension, math, and behavior problems). For each outcome, the first two columns are OLS specifications and the next two columns are fixed effects specifications. In the first OLS specification, Model (A), the normalized percentile assessment scores for each outcome is regressed on variables for age, gender, race, and family structure. Model (B) adds number of siblings, mother's schooling, and an indicator for low birth weight to Model (A). Family structure is measured as an indicator variable for each year an individual is in the data set. The results for Model (A) indicate that living with a single mother or stepfather significantly decreases the reading recognition score, and significantly increases behavior problems. Living with a single mother significantly decreases the reading comprehension and math scores. The estimated effect of family structure decreases in Model (B) when variables for number of siblings and mother's schooling are added. The results in Table 6 indicate that living with a single mother has a larger negative impact on child assessments than living with a stepfather. In the reading comprehension and math regressions, living with a stepfather is not statistically significant.

In the two fixed effect specifications which control for heterogeneity across families or individuals, none of the family structure effects are statistically significant.

4.4 NLSY-Child Stable Blended Family Estimates

Table 7 reports results of tests of mean differences in the four assessment outcomes for children in the NLSY-Child sample. The first panel in Table 7 shows statistically significant differences in mean outcomes between the children in the stable blended family sample and children from intact families in the NLSY-Child sample. For all four outcomes, we reject the null hypothesis of no difference in mean scores across the two groups. The second panel of Table 7 compares mean outcomes within the stable blended family sample, comparing the stepchildren (in this case, "her children") with the biological children of both parents ("their children"). We test the null hypothesis that there is no mean differences in outcomes between "her children" and "their children." Again, we fail to reject the null hypothesis—we find no significant difference in mean outcomes as a function of family structure in the stable blended-family sample. We do find, however, that stepchildren have lower mean scores on reading and math assessments and higher mean scores on behavioral problems. When we compare the mean outcomes for biological children in stable blended families with the children from intact families, we again see large differences--children in intact families have substantially better outcomes. Appendix Table B.1 contains more comparisons between children from intact families, stepparent families, single-parent families, and biological children and stepchildren in stable blended families. For all schooling outcomes, children living in intact families have substantially higher mean outcomes than any other family structure, and these differences are statistically significant.

Finally, we consider regression estimates of the effect of family structure on children's assessments using the NLSY-Child stable blended-family sample in Table 8.

Results for Models (A) and (B), and mother fixed effects estimates are presented in the table for the four assessments. First, living with a single mother or stepfather has a *positive* and sometimes significant effect on the PIAT reading assessments. In the reading comprehension model, living with a single mother has a positive and statistically significant effect even after controlling for mother fixed effects. For the math scores and behavior problems, family structure variables are not significant in any of the models.

Tables 7 and 8 indicate that stable blended family outcomes differ from the sample of all remaining siblings. Comparing the effect of family structure using the stable blended-family sample, we find that the estimated coefficients on the family structure variables often change signs and generally become statistically insignificant. These results are quite similar to those reported for the NLSY.

5. Conclusion

We have examined the relationship between family structure and educational outcomes using two data sets. We began by estimating models in which family structure is assumed to be exogenous to outcomes. Like previous researchers we found that, under this assumption, living with a single-parent or stepparent has a negative and significant effect on adult schooling outcomes and child assessment outcomes. When we control for unobserved heterogeneity across families or individuals, however, we found that the coefficients on family structure were not statistically significant. Our results are consistent with the hypothesis that the correlations between family structure and educational outcomes reflect selection, and that unobserved variables or processes determine both family structure and children's educational outcomes.

We next analyzed two samples of half-siblings from stable blended families, where at least one of the siblings lived with both biological parents. If the observed correlations between family structure and educational outcomes reflected causation, then we would expect to find better adult schooling outcomes and better child assessment outcomes for the half-siblings who grew up with both biological parents than for their half-siblings who grew up with a stepparent. We did not. Using the stable blended family samples, we found that the half-sibling who grew up with both biological parents experienced educational outcomes that were not significantly different from those of their half-siblings who were stepchildren. On average, children in intact families do better than children in stable blended families, but within stable blended families there is no significant difference between the stepchildren and the biological children.

How can we understand these findings? Two explanations, alone or in combination, could account for them. The first is selection: unobserved variables or processes may jointly determine family structure and educational outcomes. If mothers are heterogeneous and their characteristics affect all of their children, then "mother fixed effects" will affect child outcomes. Our data do not permit us to follow fathers, but if there is positive assortative mating on characteristics that are associated with favorable or unfavorable child outcomes, then our mother fixed effects analysis will attribute to the mother the correlated portion of the unmeasured father effects. Hence, "mother fixed effects" should be understood as a shorthand for this broader family effect.

The second explanation that could account for our findings relates to the stresses and strains that some have argued are likely to be present in blended families. Although the Brady Bunch was preternaturally happy, the presence of step-children is often described as a source of stress. The discussion of blended families has focused on outcomes for the stepchildren and, less often, on divorce, rather than on outcomes for the biological children in the family.[12] Perhaps the stresses and strains of the blended family -- the presence of a stepchild, not necessarily the behavior of the stepchild-- affect not only outcomes for the stepchildren but outcomes for all children in the family. We call this the "disruption" hypothesis.

Our results may be more difficult to reconcile with evolutionary psychology. Biblarz and Raftery [1999], investigating educational outcomes, conclude that the evidence supports what Case, Lin, and McLanahan [1999] term the "theory of parental solicitude." The Biblarz and Raftery analysis, together with the violence results of Daly and Wilson [1999] led us to expect that stepchildren in blended families would do worse than the biological children of both parents.[13] Our results do not support these expectations. When we compare educational outcomes of stepchildren with those of their half-siblings who are the biological children of both parents, we find no significant differences; both types of children in blended families do worse than those from intact families.

Our results imply cautions for policy. Policies intended to improve outcomes for children often focus on family structure, which is relatively easy to observe and, some believe, relatively easy to influence (e.g., through tax and welfare policy or through legal rules). If the observed correlations between family structure and outcomes for children

---

[12] See, for example, Daly and Wilson [1999] and Popenoe [1994], both of which draw on evolutionary psychology. The Booth and Dunn [1994], the edited volume in which the Popenoe [1994] appears, contains several papers critical of Popenoe.

[13] The food expenditure results of Case, Lin, and McLanahan [1999] suggest that stepchildren do worse compared to biological children when they live with stepmothers than with stepfathers.

reflect the influences of unobserved variables and processes, then policies that affect family structure may have little or no effect on outcomes for children. To design effective interventions, we need to know more about the determinants of outcomes for children, and to learn more about these determinants, we must look critically at how questions about the effects of family structure are posed.

What is the effect of family structure on outcomes for children? The question is odd for two reasons, even after we agree on the meaning of family structure and outcomes. First, family structure is endogenous. Thus, asking how family structure affects outcomes for children is asking how one endogenous variable affects other endogenous variables. To draw a parallel from consumer demand analysis, the family structure question is analogous to asking: "How would a specified increase bread consumption affect the consumption of jam?" instead of asking: "How would a specified increase in the price of bread affect consumption of jam?" or "How would a specified increase in the tax on bread affect consumption of jam?"

Although demand analysis usually treats prices as exogenous, it is sometimes useful to conduct thought experiments in which some quantities are assigned exogenously (i.e., "preallocated" or "rationed") before the consumer enters the market. Under these assumptions, we can follow Pollak [1969] and define "conditional demand functions" and use them to ask how a specified increase in the exogenously assigned quantity of one good would affect consumption of other goods.

Conditional demand functions correspond to a thought experiment in which family structure is exogenous. The closest empirical counterpart of an exogenous change in family structure is the death of a parent. There are two problems with focusing on single parent families created by the death of a parent rather than by divorce or nonmartial fertility. One problem is selectivity -- the risk of premature death is not exogenous, so further refinement is required. To avoid this selection problem, we might restrict our attention to deaths that appear exogenous (e.g., outcomes for children whose fathers or mothers died in commercial airline accidents) although such a restriction would yield a sample that is unrepresentative in other dimensions. The other problem with focusing on single parent families created by the death of a parent is that even after using this event to make family structure fully exogenous, its relevance to the experience of single parent families created by divorce or nonmartial fertility depends on the assumption that the effect of a change in family structure is independent of how it occurred. We find this assumption implausible, but it is consistent with the hypothesis that family structure is itself a determinant of outcomes for children rather than a proxy for other variables with which it is correlated. Policy interventions intended to affect outcomes for children by affecting family structure implicitly rely on the assumption that family structure is a cause, not merely a correlate, of outcomes for children.

Second, the family structure question is odd because the counterfactual is unspecified. Researchers investigating the effect of family structure seldom specify explicit counterfactuals, and there is no generally accepted or understood implicit default counterfactual. Yet without a counterfactual, a researcher's decision about whether to control for other variables such as sibship size or parents' schooling in estimating the effect of family structure is arbitrary. (Because educational outcomes are negatively correlated with sibship size, and because single-parent families have fewer children than two-parent families, controlling for sibship size reduces the estimated negative effect of single-parent families on children's educational outcomes.) Without an explicit counterfactual, however, we cannot do better than by follow Biblarz and Raftery [1999] and present empirical results both ways: one set of estimates that control for sibship size and another set that do not. If sibship size were the only troublesome variables, presenting the results in all possible ways would be a tempting solution, but the problem arises with respect to virtually all variables other than race and sex.

The popular interest in the relationship between family structure and outcomes for children reflects highly personal concerns. For example: what would you tell your cousin if she said she was thinking of divorcing her husband, but was concerned about how divorce would affect their children. The personal counterfactual here is not fully specified; we might want to know whether she intends to remarry and whether she intends to have additional children. But even with a fully specified individual-specific counterfactual, social science could not determine the probability that her children would suffer (in terms of education or other outcomes) if she were to divorce her husband. The difficulty is that individuals have more information than econometricians and individuals use this information in making their decisions.

An alternative to a personal, individual-specific counterfactual is a policy-based counterfactual. For example: how would a specific change in the tax treatment of marriage (e.g., reducing the so-called 'marriage penalty') affect outcomes for children.[14] Policy counterfactuals are more interesting to researchers and policy-makers than to popular audiences. Policy counterfactuals resolve the researcher's sibship size dilemma by avoiding the dichotomy of controlling or not controlling for sibship size, and instead reformulate the question, asking how a specified policy change would affect individuals' decisions to marry,

[14] Alm, Dickert-Conlin, and Whittington [1999] discuss marriage penalties in the income tax and in transfer programs such as TANF.

divorce, and have additional children and how these decisions would affect educational and other outcomes for children. Policy counterfactuals, by focusing on the effect of changes that are exogenous from the standpoint of individuals, are analogous to demand analysis questions about the effect of a tax on bread on the consumption of jam.

We distinguish between two versions of the policy counterfactual, an "experimental" version that envisions a policy change applied to a small fraction of the population, and an "implementation" version that envisions a policy change applied to everyone. Policies that apply to everyone have equilibrium effects that cannot be inferred directly from the effects of experimental versions of the same policy. This distinction between experimental and implementation effects – in effect, between partial and general equilibrium effects – is emphasized by Heckman, Lochner, and Taber [1998a, 1998b] who analyze the equilibrium effects of tuition subsidies on educational attainment and wages. To the extent that tuition subsidies induce individuals to attend college, they will affect the equilibrium wage rates of those who attend college and those who do not; Heckman, Lochner, and Taber argue that the experimental and the implementation effects of tuition subsidies differ by an order or magnitude. To the extent that reducing the marriage penalty would affect individuals' decisions to marry, such a reduction will have equilibrium effects that operate through the marriage market.

The policy question (e.g., "How much would a specified reduction in the marriage penalty affect outcomes for children?") implies a particular counterfactual. Instead of attempting to answer an ill-formed question about the effect of family structure on outcomes for children, the policy counterfactual reformulates and sharpens the question. Instead of controlling or not controlling for sibship size, the policy counterfactual takes seriously the distinction between exogenous and endogenous variables and treats endogenous variables as endogenous.

References

Alm, James, Stacy Dickert-Conlin, and Leslie A. Whittington, "The Marriage Penalty," Journal of Economic Perspectives, Vol. 13, No. 3 (summer 1999), 193-204.

Biblarz, Timothy J., and Adrian E. Raftery, "Family Structure, Educational Attainment, and Socioeconomic Success: Rethinking the 'Pathology of Matriarchy'" American Journal of Sociology, Vol. 105, No. 2 (September 1999), 321-65.

Boggess, Scott, "Family Structure, Economic Status, and Educational Attainment," The Journal of Population Economics, Vol. 11, No. 2, (May 1998), 205-222.

Booth, Alan and Judith Dunn, editors, Stepfamilies: Who benefits? Who does not? Hillsdale, N.J.: L. Erlbaum Associates, 1994.

Bound, John and Gary Solon, "Double Trouble: On the Value of Twins-Based Estimation of the Return to Schooling," Economics of Education Review, Vol. 18, No. 2, (April 1999), 169-182.

Case, Anne, I-Fen Lin, and Sara McLanahan, "Household Resource Allocation in Stepfamilies: Darwin Reflects on the Plight of Cinderella," American Economic Review, Vol. 89, No. 2, (May 1999), 234-238.

Chamberlain, Gary, "Analysis of Covariance with Qualitative Data," Review of Economic Studies, Vol. 47, No.1, (January 1980), 225-238.

Cherlin, Andrew J., "Going to Extremes: Family Structure, Children's Well-Being, and Social Science," Demography, Vol. 36, No. 4, (November 1999), 421-428.

Current Population Reports P23-181, Households, Families, and Children: A 30-Year Perspective, Washington, D.C: U.S. Government Printing Office (November 1992).

Daly, Martin and Margo Wilson, The Truth about Cinderella: A Darwinian View of Parental Love, New Haven: Yale University Press, 1999.

Department of Health and Human Services, Trends in the Well-Being of America's Children and Youth: 1996, Washington, D.C: U.S. Government Printing Office, 1996.

Eckstein, Zvi and Kenneth I. Wolpin, "Why Youths Drop Out of High School: The Impact of Preferences, Opportunities, and Abilities," Econometrica, Vol. 67, No. 6 (November 1999), 1295-1339.

Gennetian, Lisa, "One or Two Parents? Half or Step Siblings? The Effect of Family Composition on Young Children." MDRC, April 1999.

Geronimus, Arline T., and Sanders Korenman, "The Socioeconomic Consequences of Teen Childbearing Reconsidered," The Quarterly Journal of Economics, Vol. 107, No. 4, (November 1992), 1187-1214.

Griliches, Zvi, "Sibling Models and Data in Economics: Beginning of a Survey," Journal of Political Economy, Vol. 87, No. 5 pt. 2. (October 1979), S37-S64.

Haveman, Robert and Barbara Wolfe, Succeeding Generations: On the Effects of Investments in Children, New York: Russell Sage Foundation, 1994.

Haveman, Robert, and Barbara Wolfe. "The Determinants of Children's Attainments: A Review of Methods and Findings," *Journal of Economic Literature*, Vol. XXXIII, No. 4, (December 1995) 1829-1878.

Heckman, James J., Lance Lochner, and Christopher Taber, "Evaluation of Education and Training Programs in a General Equilibrium Setting," March 1998.

Heckman, James J., Lance Lochner, and Christopher Taber, "General Equilibrium Effects: A Study of Tuition Policy," American Economic Review, Vol. 88, No. 2 (May 1998), 293-297.

Heckman, James J.,Jingjing Hee, and Yona Rubinstein, "The GED is a Mixed Signal," December 1999.

Hrdy, Sarah Blaffer, Mother Nature: A History of Mothers, Infants, and Natural Selection: New York, Pantheon Books, 1999.

McLanahan, Sara and Gary Sandefur, Growing Up with a Single Parent: What Hurts, What Helps, Cambridge: Harvard University Press, 1994.

Manski, Charles F., Identification Problems in the Social Sciences, Cambridge: Harvard University Press, 1995.

Manski, Charles, Gary Sandefur, Sara McLanahan, and Daniel Powers, "Alternative Estimates of the Effect of Family Structure During Adolescence on High School Graduation," Journal of the American Statistical Association, Vol. 87 No. 417, (March 1992), 25-37.

Neal, Derek "The Economics of Family Structure," mimeo, University of Wisconsin-Madison (July 1999).

NLSY79 User's Guide Handbook, Columbus, Ohio: Center for Human Resource Research, The Ohio State University, August 1997.

Painter, Gary and David I. Levine, "Family Structure and Youths' Outcomes: Which Correlations Are Causal?" September 1999.
Pollak, Robert A., "Conditional Demand Functions and Consumption Theory," Quarterly Journal of Economics, Vol. 83, No. l, (February 1969), 60-78.

Popenoe, David, "The Evolution of Marriage and the Problem of Stepfamilies: A Biosocial Perspective," in Booth and Dunn [1994], pp. 3-27.

Sandefur, Gary D., and Thomas Wells, "Does Family Structure Really Influence Educational Attainment?" Social Science Research, Vol. 28, No. 4, (December 1999), 331-357.

Taubman, Paul, editor, Kinometrics: Determinants of Socioeconomic Success within and between Families, Amsterdam: North-Holland Publishing Company, 1977.

Willis, Robert J., "A Theory of Out-of-Wedlock Childbearing," Journal of Political Economy, Vol. 107, No. 6, Part 2 (December 1999), S33-S64.

Wojtkiewicz, Roger A., "Simplicity and Complexity in the Effects of Parental Structure on High School Graduation," Demography, Vol. 30, No. 4 (November 1993), 701-717.

Wojtkiewicz, Roger A., "The Effects of Single and Stepparent Families on College Entry: Who Gets Hurt the Most?," mimeo, Louisiana State University (1998).

Wolfe, Barbara, Robert Haveman, Donna Ginther, and Chong Bum An, "The 'Window Problem' in Studies of Children's Attainments: A Methodological Exploration," Journal of the American Statistical Association, Vol. 91, No. 435 (September 1996), 970-982.

Table 1
Descriptive Statistics 1994 NLSY Siblings

	All Siblings		Stable Blended Families	
Variable	**Mean**	**Within Standard Deviation**	**Mean**	**Within Standard Deviation***
Years of Schooling in 1994	13.153	1.199	12.459	1.327
	(2.379)	25.39%	(1.958)	45.95%
High School Graduate = 1	0.874	0.210	0.800	0.270
	(0.332)	40.11%	(0.401)	45.22%
College Attendance = 1	0.440	0.288	0.311	0.286
	(0.496)	33.66%	(0.465)	37.88%
College Graduate = 1	0.133	0.224	0.030	0.140
	(0.340)	43.52%	(0.170)	67.66%
Years Lived with Both Biological Parents	14.286	2.070	10.748	6.462
	(5.245)	15.57%	(7.051)	84.00%
Years Lived with Single Parent	1.908	1.828	2.185	3.056
	(4.300)	18.07%	(4.049)	56.98%
Years Lived with Stepparent	0.701	1.336	3.874	4.734
	(2.550)	27.46%	(5.365)	77.86%
Years Lived in Other Family Structure	0.106	0.577	0.193	0.816
	(0.876)	43.39%	(1.136)	51.58%
Lived in Intact Family until Age 16 = 1	0.729		0.467	
	(0.445)		(0.501)	
Lived in Single Parent Family = 1	0.158		0.081	
	(0.365)		(0.275)	
Lived in Stepparent Family = 1	0.086		0.415	
	(0.281)		(0.495)	
Lived in Other Family Structure = 1	0.026		0.037	
	(0.160)		(0.190)	
Female = 1	0.486		0.481	
	(0.500)		(0.502)	
African American = 1	0.326		0.585	
	(0.469)		(0.495)	
Hispanic = 1	0.178		0.119	
	(0.382)		(0.324)	
Year of Birth	61.020		60.874	
	(2.039)		(2.042)	
Number of Siblings	4.357		5.015	
	(2.657)		(2.168)	
Practiced Religion = 1	0.958		0.919	
	(0.200)		(0.275)	

Table 1
Descriptive Statistics 1994 NLSY Siblings (continued)

	All Siblings		Stable Blended Families	
Variable	**Mean**	**Within Standard Deviation**	**Mean**	**Within Standard Deviation***
Mother High School Graduate = 1	0.366		0.267	
	(0.482)		(0.444)	
Mother Some College = 1	0.164		0.059	
	(0.370)		(0.237)	
Mother's Schooling Missing = 1	0.056		0.074	
	(0.230)		(0.263)	
Father High School Graduate = 1	0.284		0.185	
	(0.451)		(0.390)	
Father Some College = 1	0.217		0.111	
	(0.412)		(0.315)	
Father's Schooling Missing = 1	0.132		0.259	
	(0.339)		(0.440)	
Sample Size	3897		135	

Note: Standard Deviations in Parentheses. * Percentages give the amount of variation explained within families.

Table 2
Descriptive Statistics 1986-1994 NLSY Children

	All Siblings			Stable Blended Families		
Variable	**Number Of Obs.**	**Mean**	**Within Standard Deviation**	**Number of Obs.**	**Mean**	**Within Standard Deviation***
PIAT- Reading Recognition Percentile Score	10803	52.990	18.781	1031	49.890	18.769
		(27.931)	45.21%		(27.522)	46.51%
PIAT-Reading Comprehension Percentile Score	8799	50.839	18.760	822	47.658	19.114
		(27.745)	45.72%		(27.506)	48.29%
PIAT-Math Percentile Score	10803	45.141	18.423	1031	42.172	18.918
		(26.335)	48.94%		(25.967)	53.08%
Behavioral Problems Index Percentile Score	10803	64.347	17.476	1031	68.117	18.13
		(26.564)	43.28%		(24.805)	53.42%
Lived with Both Biological Parents	10803	0.514	0.232	1031	0.409	0.438
		(0.500)	21.54%		(0.492)	2.67%
Lived with Single Mother	10803	0.377	0.237	1031	0.228	0.294
		(0.485)	23.90%		(0.420)	35.72%
Lived with Stepfather	10803	0.108	0.204	1031	0.363	0.383
		(0.311)	43.02%		(0.481)	83.27%
Age	10803	9.064		1031	9.129	
		(2.626)			(2.681)	
Female = 1	4320	0.482		418	0.502	
		(0.500)			(0.501)	
African American = 1	4320	0.344		418	0.397	
		(0.475)			(0.490)	
Hispanic = 1	4320	0.215		418	0.208	

Table 2
Descriptive Statistics 1986-1994 NLSY Children (continued)

Variable	All Siblings: Number Of Obs.	All Siblings: Mean	All Siblings: Within Standard Deviation	Stable Blended Families: Number of Obs.	Stable Blended Families: Mean	Stable Blended Families: Within Standard Deviation*
		(0.411)			(0.406)	
Number of Siblings	4320	2.139		418	2.656	
		(1.169)			(1.396)	
Practiced Religion = 1	4320	0.406		418	0.385	
		(0.491)			(0.487)	
Mother High School Graduate = 1	4320	0.488		418	0.495	
		(0.500)			(0.501)	
Mother Some College = 1	4320	0.272		418	0.251	
		(0.445)			(0.434)	
Low Birth Weight	4320	0.089		418	0.105	
		(0.285)			(0.307)	

Note: Standard Deviations in Parentheses. * Percentages give the amount of variation explained within families.

Table 3
NLSY Siblings Estimates of the Effect of Family Structure on Schooling Outcomes

	Years of Schooling			High School Graduate		
Variable	**OLS (A)**	**OLS (B)**	**Fixed Effects**	**Probit (A)**	**Probit (B)**	**Cond. Logit**
Female	**0.332**	**0.350**	**0.327**	**0.224**	**0.239**	*0.293*
	(0.073)	(0.065)	(0.068)	(0.053)	(0.056)	(0.156)
African-American	**-0.952**	0.054		**-0.339**	0.098	
	(0.085)	(0.083)		(0.064)	(0.075)	
Hispanic	**-1.216**	-0.123		**-0.600**	*-0.156*	
	(0.101)	(0.099)		(0.069)	(0.082)	
Year of Birth	**-0.064**	**-0.054**	-0.006	-0.007	-0.009	0.017
	(0.018)	(0.016)	(0.016)	(0.013)	(0.014)	(0.039)
Number of Siblings		**-0.097**			**-0.052**	
		(0.013)			(0.010)	
Religion		**0.484**	0.120		**0.458**	0.043
		(0.164)	(0.215)		(0.112)	(0.378)
Mother High School Graduate		**0.604**			**0.312**	
		(0.080)			(0.075)	
Mother Some College		**1.535**			**0.473**	
		(0.126)			(0.126)	
Mother's Schooling Missing		*-0.261*			**-0.274**	
		(0.148)			(0.106)	
Father High School Graduate		**0.400**			**0.418**	
		(0.086)			(0.079)	
Father Some College		**1.687**			**0.830**	
		(0.118)			(0.127)	
Father's Schooling Missing		-0.033			0.036	
		(0.110)			(0.084)	
Years with Single Parent	**-0.032**	**-0.021**	0.017	**-0.023**	**-0.023**	0.017
	(0.009)	(0.008)	(0.014)	(0.006)	(0.006)	(0.026)
Years with Stepparent	**-0.069**	**-0.049**	-0.004	***-0.019***	*-0.019*	0.046
	(0.013)	(0.012)	(0.019)	(0.010)	(0.010)	(0.038)
Years without parents	***-0.072***	-0.029	-0.062	-0.036	-0.028	-0.257
	(0.029)	(0.026)	(0.044)	(0.024)	(0.025)	(0.167)
Constant	**17.555**	**15.392**	**13.210**	***1.793***	1.158	
	(1.124)	(1.027)	(1.032)	(0.798)	(0.847)	
Sample Size	3897	3897	3897	3897	3897	741

Numbers in **Bold** indicate statistically significant at the one percent level. Numbers in ***Italics*** indicate statistically significant at the five percent level. Numbers in *Italics* indicate statistical significance at 10 percent level.

Table 3
NLSY Siblings Estimates of the Effect of Family Structure on Schooling Outcomes (continued)

Variable	College Attendance Probit (A)	College Attendance Probit (B)	College Attendance Cond. Logit	College Graduation Probit (A)	College Graduation Probit (B)	College Graduation Cond. Logit
Female	**0.227**	**0.277**	**0.658**	**0.139**	**0.157**	**0.420**
	(0.041)	(0.044)	(0.119)	(0.052)	(0.054)	(0.152)
African-American	**-0.366**	***0.122***		**-0.370**	0.006	
	(0.049)	(0.057)		(0.062)	(0.070)	
Hispanic	**-0.441**	0.099		**-0.539**	-0.135	
	(0.057)	(0.067)		(0.080)	(0.089)	
Year of Birth	**-0.042**	**-0.043**	-0.030	-0.015	-0.013	-0.018
	(0.010)	(0.011)	(0.028)	(0.013)	(0.013)	(0.036)
Number of Siblings		**-0.044**			***-0.027***	
		(0.009)			(0.012)	
Religion		***0.234***	-0.100		0.227	0.397
		(0.108)	(0.392)		(0.155)	(0.579)
Mother High School Graduate		**0.360**			**0.229**	
		(0.055)			(0.075)	
Mother Some College		**0.922**			**0.482**	
		(0.078)			(0.090)	
Mother's Schooling Missing		0.006			-0.124	
		(0.105)			(0.168)	
Father High School Graduate		**0.181**			**0.191**	
		(0.058)			(0.077)	
Father Some College		**0.859**			**0.640**	
		(0.072)			(0.083)	
Father's Schooling Missing		-0.084			-0.179	
		(0.078)			(0.123)	
Years with Single Parent	***-0.012***	-0.006	0.032	**-0.022**	*-0.013*	0.033
	(0.005)	(0.006)	(0.026)	(0.007)	(0.008)	(0.051)
Years with Stepparent	**-0.037**	**-0.028**	-0.015	**-0.062**	**-0.052**	-0.084
	(0.008)	(0.009)	(0.034)	(0.016)	(0.016)	(0.128)
Years without parents	***-0.050***	-0.028	-0.136	-0.005	0.017	-0.042
	(0.025)	(0.024)	(0.118)	(0.028)	(0.028)	(0.185)
Constant	**2.565**	**1.750**		0.009	-0.895	
	(0.615)	(0.667)		(0.781)	(0.843)	
Sample Size	3897	3897	1388	3897	3897	833

Numbers in **Bold** indicate statistically significant at the one percent level. Numbers in ***Italics*** indicate statistically significant at the five percent level. Numbers in *Italics* indicate statistical significance at 10 percent level.

Table 4
Tests of Mean Differences in NLSY Sibling Sample

Test: Mean Outcome Half-Siblings in Stable Blended Families v. Siblings in Intact Families

Outcome	**Mean Half-Siblings**	**Mean Intact Families**	**Test Statistic**	**P-value**
Years of Schooling	12.459	13.361	4.257	0.000
High School Graduate	0.800	0.897	3.581	0.000
College Attendance	0.311	0.473	3.690	0.000
College Graduation	0.030	0.154	3.990	0.000
Sample Size	135	2778		

Test: Mean Outcome Biological v. Stepchild in Stable Blended Family Sample

Outcome	**Mean Biological**	**Mean Stepchild**	**Test Statistic**	**P-value**
Years of Schooling	12.619	12.319	0.886	0.377
High School Graduate	0.841	0.764	1.118	0.266
College Attendance	0.333	0.292	0.518	0.605
College Graduation	0.048	0.014	1.150	0.252
Sample Size	63	72		

Notes: Intact defined as observed in the survey as always living with an intact family. Stepchild defined as ever living with a stepparent.

Table 5
NLSY Half-Sibling Sample Estimates of the Effect of Family Structure on Educational Outcomes

	Years of Schooling		High School Graduate		College Attendance	
Variable	**(A)**	**(B)**	**(A)**	**(B)**	**(A)**	**(B)**
Female	0.126	-0.003	-0.038	-0.149	0.332	0.398
	(0.336)	(0.335)	(0.247)	(0.289)	(0.232)	(0.255)
African-American	0.539	0.617	0.005	0.339	0.287	0.367
	(0.380)	(0.396)	(0.287)	(0.400)	(0.273)	(0.327)
Hispanic	0.440	0.412	-0.594	-0.566	0.214	0.285
	(0.693)	(0.767)	(0.400)	(0.471)	(0.407)	(0.444)
Year of Birth	-0.022	-0.036	0.025	0.027	-0.083	***-0.114***
	(0.065)	(0.067)	(0.058)	(0.069)	(0.055)	(0.058)
Number of Siblings		0.037		0.026		0.022
		(0.075)		(0.062)		(0.063)
Religion		***1.265***		0.671		
		(0.511)		(0.477)		
Mother High School Graduate		-0.116		-0.235		0.172
		(0.417)		(0.340)		(0.327)
Mother Some College		1.290				**1.622**
		(0.919)				(0.626)
Mother's Schooling Missing		-0.001		-0.183		*0.833*
		(0.701)		(0.495)		(0.505)
Father High School Graduate		0.446		0.121		0.122
		(0.467)		(0.416)		(0.331)
Father Some College		1.040				0.593
		(0.700)				(0.483)
Father's Schooling Missing		-0.202		-0.604		-0.214
		(0.507)		(0.379)		(0.386)
Years with Single Parent		-0.019		-0.015		-0.010
		(0.044)		(0.035)		(0.040)
Years with Stepparent		-0.046		-0.028		*-0.036*
		(0.030)		(0.026)		(0.024)
Years without parents		0.072		0.109		0.006
		(0.090)		(0.100)		(0.165)
Years in Nonintact Family	*-0.040*		-0.024		-0.023	
	(0.023)		(0.018)		(0.017)	
Constant	**13.592**	**12.920**	-0.395	-1.314	4.302	*5.860*
	(3.922)	(4.030)	(3.579)	(4.237)	(3.342)	(3.559)
Sample Size	135	135	115*	135	124*	135

* Note: Observations dropped because parent's having college degree perfectly predicts outcome. Numbers in **Bold** indicate statistically significant at the one percent level. Numbers in ***Italics*** indicate statistically significant at the five percent level. Numbers in *Italics* indicate statistical significance at 10 percent level.

Table 6
NLSY-Child Sibling Estimates of the Effect of Family Structure on Assessment Outcomes

Variable	**Reading Recognition Test Scores**				**Reading Comprehension Test Scores**			
	OLS (A)	**OLS (B)**	**Mother Fixed Effects**	**Individual Fixed Effects**	**OLS (A)**	**OLS (B)**	**Mother Fixed Effects**	**Individual Fixed Effects**
Age	**-0.808**	**-0.736**	**-0.595**	**-0.931**	**-3.453**	**-3.228**	**-2.762**	**-2.880**
	(0.103)	(0.104)	(0.090)	(0.079)	(0.110)	(0.113)	(0.107)	(0.103)
Female	**6.328**	**6.138**	**5.312**		**3.680**	**3.648**	**3.218**	
	(0.519)	(0.500)	(0.521)		(0.545)	(0.526)	(0.590)	
African-American	**-8.322**	**-7.645**			**-9.319**	**-8.596**		
	(0.628)	(0.614)			(0.658)	(0.647)		
Hispanic	**-9.145**	**-6.322**			**-7.871**	**-5.270**		
	(0.698)	(0.679)			(0.746)	(0.727)		
Number of Siblings		**-2.377**				**-2.151**		
		(0.231)				(0.243)		
Religion		**2.366**	**3.738**			**1.754**	**2.551**	
		(0.530)	(0.606)			(0.562)	(0.691)	
Mother High School		**8.895**				**9.114**		
Graduate		(0.679)				(0.712)		
Mother Some College		**17.079**				**16.136**		
		(0.753)				(0.800)		
Low Birth Weight		**-4.399**	*-1.715*			**-4.346**	***-2.293***	
		(0.894)	(1.024)			(0.966)	(1.172)	
Lives with Stepfather	**-2.546**	***-1.856***	-0.132	1.439	-1.107	-0.571	0.595	0.284
	(0.893)	(0.862)	(1.100)	(1.196)	(0.918)	(0.887)	(1.262)	(1.500)
Lives with Single Mother	**-7.084**	**-4.733**	-0.732	0.642	**-6.456**	**-4.317**	-0.009	0.839
	(0.599)	(0.584)	(0.934)	(0.901)	(0.636)	(0.618)	(1.086)	(1.145)
Constant	**65.139**	**57.868**	**54.215**	**61.297**	**90.260**	**81.330**	**74.724**	**78.437**
	(1.003)	(1.258)	(0.894)	(0.807)	(1.119)	(1.414)	(1.139)	(1.106)
Sample Size	10803	10803	10803	9748	8799	8799	8799	8202

Table 6
NLSY-Child Sibling Estimates of the Effect of Family Structure on Assessment Outcomes (continued)

	Math Test Scores				Behavioral Problems Index			
Variable	**OLS (A)**	**OLS (B)**	**Mother Fixed Effects**	**Individual Fixed Effects**	**OLS (A)**	**OLS (B)**	**Mother Fixed Effects**	**Individual Fixed Effects**
Age	**-0.252**	-0.123	0.096	0.038	**0.699**	**0.589**	**0.562**	**0.349**
	(0.095)	(0.097)	(0.089)	(0.087)	(0.099)	(0.103)	(0.083)	(0.084)
Female	*0.784*	0.644	0.176		**-5.089**	**-5.061**	**-4.547**	
	(0.486)	(0.473)	(0.516)		(0.505)	(0.503)	(0.485)	
African-American	**-12.932**	**-12.374**			*1.047*	0.695		
	(0.590)	(0.584)			(0.609)	(0.620)		
Hispanic	**-11.973**	**-9.697**			-0.218	*-1.266*		
	(0.649)	(0.642)			(0.672)	(0.685)		
Number of Siblings		**-1.413**				***0.468***		
		(0.209)				(0.224)		
Religion		0.788	0.201			0.607	**2.304**	
		(0.498)	(0.600)			(0.527)	(0.564)	
Mother High School Graduate		**8.107**				**-4.296**		
		(0.608)				(0.655)		
Mother Some College		**14.358**				**-5.861**		
		(0.706)				(0.744)		
Low Birth Weight		**-4.144**	-1.427			***1.803***	1.005	
		(0.818)	(1.014)			(0.871)	(0.953)	
Lives with Stepfather	-1.337	-0.833	0.294	1.631	**4.200**	**4.066**	0.638	1.087
	(0.837)	(0.820)	(1.090)	(1.321)	(0.831)	(0.828)	(1.024)	(1.278)
Lives with Single Mother	**-5.486**	**-3.603**	-0.223	1.367	**5.819**	**5.087**	0.224	0.602
	(0.558)	(0.548)	(0.925)	(0.996)	(0.581)	(0.589)	(0.869)	(0.963)
Constant	**56.487**	**48.941**	**44.257**	**44.106**	**57.519**	**61.388**	**59.990**	**61.232**
	(0.944)	(1.181)	(0.885)	(0.891)	(0.989)	(1.246)	(0.832)	(0.862)
Sample Size	10803	10803	10803	9748	10803	10803	10803	9748

Table 7
Tests of Mean Differences NLSY-Child Sibling Sample

Test: Mean Outcome Half-Siblings in Stable Blended Families v. Siblings in Intact Families

Outcome	Mean Half-Siblings	Mean Intact Families	Test Statistic	P-value
PIAT-Reading Recognition	49.369	57.896	6.364	0.000
PIAT-Reading Comprehension	46.838	56.696	6.945	0.000
PIAT-Math	41.627	50.333	6.830	0.000
Behavioral Problems Index	67.232	58.959	6.167	0.000
Sample Size	418	1861		

Test: Mean Outcome Biological v. Stepchildren in Stable Blended Families

Outcome	Mean Biological	Mean Stepchildren	Test Statistic	P-value
PIAT-Reading Recognition	49.615	49.145	0.191	0.848
PIAT-Reading Comprehension	49.645	44.994	1.715	0.087
PIAT-Math	42.025	41.264	0.334	0.738
Behavioral Problems Index	65.559	68.753	1.413	0.159
Sample Size	199	219		

Notes: Tests performed on average assessment scores. Intact defined as observed in the survey as always living with an intact family. Stepchild defined as ever living with a stepparent.

Table 8
NLSY-Child Half-Sibling Sample Estimates of the Effect of Family Structure on Assessment Outcomes

Variable	Reading Recognition Test Scores: OLS (A)	OLS (B)	Mother Fixed Effects	Reading Comprehension Test Scores: OLS (A)	OLS (B)	Mother Fixed Effects
Age	**-1.380**	**-1.424**	**-0.959**	**-3.957**	**-3.922**	**-3.347**
	(0.344)	(0.341)	(0.287)	(0.352)	(0.354)	(0.334)
Female	**5.300**	**5.797**	**5.183**	*3.385*	***3.890***	**4.990**
	(1.702)	(1.645)	(1.589)	(1.806)	(1.729)	(1.826)
African-American	**-6.574**	**-6.547**		**-7.827**	**-7.649**	
	(1.983)	(2.178)		(2.045)	(2.235)	
Hispanic	**-9.375**	**-6.182**		**-8.939**	***-5.172***	
	(2.216)	(2.214)		(2.436)	(2.388)	
Number of Siblings		**-2.865**			**-2.382**	
		(0.699)			(0.753)	
Religion		***3.845***	-1.467		2.476	***-5.594***
		(1.865)	(2.102)		(2.002)	(2.480)
Mother High School Graduate		***4.331***			*3.931*	
		(2.131)			(2.257)	
Mother Some College		**13.425**			**15.053**	
		(2.687)			(2.912)	
Low Birth Weight		-4.499	-3.463		**-8.633**	-4.354
		(2.945)	(2.810)		(3.194)	(3.232)
Lives with Stepfather	***4.406***	2.451	2.073	***4.533***	3.347	*4.059*
	(2.082)	(2.130)	(1.967)	(2.167)	(2.214)	(2.193)
Lives with Single Mother	1.581	*3.756*	3.417	1.277	*3.889*	***5.854***
	(2.229)	(2.173)	(2.339)	(2.354)	(2.270)	(2.790)
Constant	**62.531**	**62.332**	**55.548**	**87.854**	**85.851**	**78.515**
	(3.202)	(4.089)	(2.509)	(3.606)	(4.563)	(3.262)
Sample Size	1031	1031	1031	822	822	822

Numbers in **Bold** indicate statistically significant at the one percent level. Numbers in ***Italics*** indicate statistically significant at the five percent level. Numbers in *Italics* indicate statistical significance at 10 percent level.

Table 8
NLSY-Child Half-Sibling Sample Estimates of the Effect of Family Structure on Assessment Outcomes (continued)

	Math Test Scores			Behavioral Problems Index		
Variable	**OLS (A)**	**OLS (B)**	**Mother Fixed Effects**	**OLS (A)**	**OLS (B)**	**Mother Fixed Effects**
Age	-0.417	-0.427	-0.345	**0.985**	**0.793**	0.375
	(0.307)	(0.312)	(0.293)	(0.295)	(0.303)	(0.279)
Female	0.171	0.384	-0.831	**-6.395**	**-6.340**	*-2.744*
	(1.606)	(1.567)	(1.618)	(1.558)	(1.556)	(1.542)
African-American	**-12.757**	**-14.241**		**-4.441**	***-5.452***	
	(1.815)	(2.033)		(1.741)	(2.221)	
Hispanic	**-11.253**	**-8.789**		***-4.992***	**-5.702**	
	(2.136)	(2.164)		(2.082)	(2.156)	
Number of Siblings		***-1.090***			0.170	
		(0.602)			(0.704)	
Religion		1.980	-1.511		***3.760***	*3.896*
		(1.722)	(2.142)		(1.658)	(2.041)
Mother High School Graduate		**6.068**			-2.275	
		(1.955)			(2.012)	
Mother Some College		**14.547**			-1.464	
		(2.537)			(2.554)	
Low Birth Weight		***-5.433***	***-5.066***		1.744	2.469
		(2.486)	(2.862)		(2.494)	(2.728)
Lives with Stepfather	1.438	0.273	2.534	-1.914	-2.674	-0.350
	(1.898)	(1.925)	(2.004)	(1.822)	(1.877)	(1.910)
Lives with Single Mother	-1.736	0.363	-0.319	2.718	2.034	3.107
	(2.043)	(2.027)	(2.383)	(2.034)	(2.047)	(2.271)
Constant	**53.486**	**48.869**	**46.189**	**65.419**	**67.086**	**63.238**
	(3.023)	(3.777)	(2.556)	(2.929)	(3.671)	(2.436)
Sample Size	1031	1031	1031	1031	1031	1031

Numbers in **Bold** indicate statistically significant at the one percent level. Numbers in ***Italics*** indicate statistically significant at the five percent level. Numbers in *Italics* indicate statistical significance at 10 percent level.

APPENDIX A
SUPPLEMENTARY TABLES

Table A.1
NLSY Siblings Estimates of the Effect of Family Structure on Schooling Outcomes
Alternative Specification Using Dummy Variables for Family Structure

	Years of Schooling			High School Graduate		
Variable	OLS (A)	OLS (B)	Fixed Effects	Probit (A)	Probit (B)	Cond. Logit
Female	**0.329**	**0.349**	**0.325**	**0.224**	**0.242**	***0.328***
	(0.073)	(0.065)	(0.068)	(0.053)	(0.057)	(0.157)
African-American	**-0.994**	0.029		**-0.355**	0.082	
	(0.084)	(0.082)		(0.063)	(0.074)	
Hispanic	**-1.223**	-0.126		**-0.601**	*-0.157*	
	(0.101)	(0.099)		(0.069)	(0.082)	
Year of Birth	**-0.064**	**-0.054**	-0.007	-0.006	-0.008	0.014
	(0.018)	(0.016)	(0.017)	(0.013)	(0.014)	(0.040)
Number of Siblings		**-0.094**			**-0.050**	
		(0.013)			(0.010)	
Religion		**0.486**	0.128		**0.461**	0.027
		(0.163)	(0.215)		(0.111)	(0.378)
Mother High School		**0.612**			**0.322**	
Graduate		(0.081)			(0.075)	
Mother Some College		**1.552**			**0.495**	
		(0.126)			(0.126)	
Mother's Schooling		-0.227			***-0.244***	
Missing		(0.148)			(0.107)	
Father High School		**0.398**			**0.422**	
Graduate		(0.086)			(0.079)	
Father Some College		**1.680**			**0.826**	
		(0.118)			(0.127)	
Father's Schooling		-0.064			0.030	
Missing		(0.108)			(0.083)	
Lived with Single	**-0.266**	***-0.172***	0.245	**-0.279**	**-0.279**	0.206
Parent = 1	(0.103)	(0.097)	(0.163)	(0.071)	(0.078)	(0.305)
Lived with	**-0.648**	**-0.445**	0.217	**-0.239**	**-0.247**	0.498
Stepparent = 1	(0.124)	(0.118)	(0.203)	(0.091)	(0.095)	(0.396)
Lived in Other	**-0.804**	***-0.476***	-0.392	**-0.599**	**-0.563**	**-1.477**
Family Structure = 1	(0.231)	(0.204)	(0.270)	(0.142)	(0.148)	(0.603)
Constant	**17.588**	**15.388**	**13.242**	***1.771***	1.119	
	(1.128)	(1.030)	(1.032)	(0.801)	(0.852)	
Sample Size	3897	3897	3897	3897	3897	741

Numbers in **Bold** indicate statistically significant at the one percent level. Numbers in ***Italics*** indicate statistically significant at the five percent level. Numbers in *Italics* indicate statistical significance at 10 percent level.

Table A.1
NLSY Siblings Estimates of the Effect of Family Structure on Schooling Outcomes
Alternative Specification Using Dummy Variables for Family Structure (continued)

	College Attendance			College Graduation		
Variable	**Probit (A)**	**Probit (B)**	**Cond. Logit**	**Probit (A)**	**Probit (B)**	**Cond. Logit**
Female	**0.225**	**0.276**	**0.658**	**0.140**	**0.159**	**0.428**
	(0.041)	(0.044)	(0.119)	(0.052)	(0.054)	(0.152)
African-American	**-0.387**	***0.110***		**-0.398**	-0.012	
	(0.048)	(0.057)		(0.061)	(0.070)	
Hispanic	**-0.445**	0.097		**-0.548**	*-0.143*	
	(0.057)	(0.067)		(0.080)	(0.088)	
Year of Birth	**-0.043**	**-0.043**	-0.030	-0.015	-0.012	-0.022
	(0.010)	(0.011)	(0.028)	(0.013)	(0.014)	(0.036)
Number of Siblings		**-0.043**			***-0.026***	
		(0.009)			(0.012)	
Religion		***0.235***	-0.073		0.224	0.463
		(0.108)	(0.390)		(0.154)	(0.571)
Mother High School Graduate		**0.363**			**0.228**	
		(0.055)			(0.074)	
Mother Some College		**0.929**			**0.491**	
		(0.078)			(0.090)	
Mother's Schooling Missing		0.021			-0.115	
		(0.105)			(0.169)	
Father High School Graduate		**0.178**			***0.188***	
		(0.058)			(0.077)	
Father Some College		**0.856**			**0.638**	
		(0.072)			(0.083)	
Father's Schooling Missing		-0.101			*-0.204*	
		(0.077)			(0.122)	
Years with Single Parent	-0.078	-0.030	0.420	***-0.173***	-0.099	0.401
	(0.059)	(0.065)	(0.287)	(0.079)	(0.085)	(0.534)
Years with Stepparent	**-0.316**	**-0.225**	0.373	**-0.580**	**-0.471**	0.308
	(0.076)	(0.082)	(0.349)	(0.123)	(0.129)	(0.755)
Years without parents	**-0.367**	*-0.226*	-0.271	0.014	0.180	0.853
	(0.136)	(0.138)	(0.507)	(0.167)	(0.168)	(0.847)
Constant	**2.595**	**1.772**		-0.006	-0.908	
	(0.616)	(0.667)		(0.784)	(0.846)	
Sample Size	3897	3897	1388	3897	3897	833

Numbers in **Bold** indicate statistically significant at the one percent level. Numbers in ***Italics*** indicate statistically significant at the five percent level. Numbers in *Italics* indicate statistical significance at 10 percent level.

Table A.2
NLSY79 Siblings Estimates of the Effect of Family Structure on Schooling Outcomes-Alternative Specification Using Dummy Variables for Family Size

Variable	Years of Schooling	High School Graduation	College Attendance	College Graduation
Female	**0.354**	**0.231**	**0.278**	**0.159**
	(0.065)	(0.057)	(0.044)	(0.054)
African-American	0.046	0.116	***0.119***	0.001
	(0.083)	(0.076)	(0.058)	(0.071)
Hispanic	-0.126	*-0.142*	0.099	-0.133
	(0.099)	(0.082)	(0.068)	(0.088)
Year of Birth	**-0.056**	-0.010	**-0.043**	-0.013
	(0.016)	(0.014)	(0.011)	(0.014)
Two Siblings = 1	*-0.254*	-0.253	-0.125	-0.110
	(0.153)	(0.158)	(0.093)	(0.105)
Three Siblings = 1	**-0.592**	***-0.315***	**-0.250**	-0.047
	(0.148)	(0.152)	(0.092)	(0.105)
Four Siblings = 1	**-0.637**	*-0.297*	**-0.290**	-0.084
	(0.152)	(0.155)	(0.096)	(0.110)
Five Siblings = 1	**-0.812**	**-0.501**	**-0.309**	*-0.225*
	(0.166)	(0.161)	(0.106)	(0.128)
Six Siblings = 1	**-0.787**	**-0.481**	-0.410	-0.193
	(0.169)	(0.161)	(0.108)	(0.133)
Seven Siblings = 1	**-0.859**	**-0.592**	**-0.417**	-0.081
	(0.161)	(0.156)	(0.104)	(0.127)
Eight or More Siblings = 1	**-1.156**	**-0.665**	**-0.437**	***-0.439***
	(0.200)	(0.176)	(0.131)	(0.196)
Religion	**0.494**	**0.455**	***0.240***	0.233
	(0.165)	(0.112)	(0.109)	(0.155)
Mother High School Graduate	**0.584**	**0.306**	**0.353**	**0.237**
	(0.081)	(0.075)	(0.056)	(0.075)
Mother Some College	**1.514**	**0.461**	**0.916**	**0.490**
	(0.126)	(0.126)	(0.079)	(0.090)
Mother's Schooling Missing	***-0.287***	**-0.277**	-0.002	-0.134
	(0.148)	(0.107)	(0.106)	(0.168)
Father High School Graduate	**0.413**	**0.423**	**0.188**	**0.197**
	(0.086)	(0.080)	(0.058)	(0.077)
Father Some College	**1.687**	**0.835**	**0.858**	**0.649**
	(0.118)	(0.127)	(0.072)	(0.083)
Father's Schooling Missing	-0.017	0.037	-0.077	-0.182
	(0.110)	(0.084)	(0.078)	(0.123)
Years with Single Parent	***-0.019***	**-0.022**	-0.006	*-0.013*
	(0.008)	(0.006)	(0.006)	(0.008)
Years with Stepparent	**-0.046**	*-0.018*	**-0.027**	**-0.052**
	(0.012)	(0.010)	(0.009)	(0.016)
Years without parents	-0.031	-0.031	-0.028	0.017
	(0.026)	(0.025)	(0.024)	(0.028)
Constant	**15.663**	1.355	**1.871**	-0.916
	(1.035)	(0.858)	(0.670)	(0.847)
Sample Size	3897	3897	3897	3897

Table A.3
NLSY-Child Estimates of the Effect of Family Structure on Assessment Outcomes
Alternative Specification Using Dummy Variables for Family Size

Variable	Reading Recognition	Reading Comprehension	Math	Behavioral Problems
Age	**-0.723**	**-3.210**	-0.114	**0.581**
	(0.104)	(0.113)	(0.097)	(0.103)
Female	**6.085**	**3.564**	0.630	**-5.020**
	(0.500)	(0.526)	(0.473)	(0.504)
African-American	**-7.916**	**-8.857**	**-12.681**	0.828
	(0.618)	(0.650)	(0.586)	(0.623)
Hispanic	**-6.510**	**-5.418**	**-9.880**	*-1.182*
	(0.677)	(0.725)	(0.640)	(0.687)
Two Siblings = 1	**-2.053**	**-2.273**	**-1.740**	0.169
	(0.586)	(0.615)	(0.567)	(0.592)
Three Siblings = 1	**-3.769**	**-3.343**	*-1.132*	0.310
	(0.762)	(0.800)	(0.707)	(0.772)
Four Siblings = 1	**-8.652**	**-8.921**	**-5.226**	**2.858**
	(1.157)	(1.213)	(1.065)	(1.132)
Five Siblings = 1	**-4.513**	***-3.739***	-1.993	-0.965
	(1.583)	(1.703)	(1.384)	(1.586)
Six Siblings = 1	**-20.271**	**-18.909**	**-17.605**	**5.524**
	(2.198)	(2.232)	(1.729)	(1.760)
Seven Siblings = 1	**-12.189**	***-7.605***	***-6.083***	2.002
	(3.443)	(3.526)	(2.790)	(3.628)
Religion	**2.410**	**1.801**	*0.875*	0.578
	(0.531)	(0.563)	(0.498)	(0.529)
Mother High School	**8.780**	**9.092**	**7.885**	**-4.294**
Graduate	(0.683)	(0.717)	(0.612)	(0.662)
Mother Some College	**16.943**	**16.076**	**14.129**	**-5.836**
	(0.754)	(0.800)	(0.707)	(0.749)
Low Birth Weight	**-4.311**	-4.275	**-4.058**	***1.760***
	(0.896)	(0.968)	(0.819)	(0.870)
Lives with Stepfather	***-1.912***	-0.618	-0.922	**4.103**
	(0.863)	(0.886)	(0.820)	(0.830)
Lives with Single Mother	**-4.623**	**-4.195**	**-3.423**	**5.059**
	(0.586)	(0.620)	(0.549)	(0.591)
Constant	**55.321**	**79.102**	**47.583**	**62.036**
	(1.201)	(1.359)	(1.133)	(1.201)
Sample Size	10803	8799	10803	10803

Numbers in **Bold** indicate statistically significant at the one percent level. Numbers in ***Italics*** indicate statistically significant at the five percent level. Numbers in *Italics* indicate statistical significance at 10 percent level.

APPENDIX B
TESTS OF MEAN DIFFERENCES IN EDUCATIONAL OUTCOMES BY FAMILY STRUCTURE

Table B.1
Descriptive Statistics and Tests of Mean Differences in NLSY by Family Structure

NLSY Education

	Intact	Stepfamily	Single-Parent	Blended Biological	Blended Stepchild
Intact	**13.36**				
	(0.046)				
Step Family	**5.920**	**12.505**			
	{0.000}	(0.118)			
Single Parent	**5.788**	*1.656*	**12.759**		
	{0.000}	{0.098}	(0.089)		
Blended Biological	***2.415***	0.409	0.475	**12.619**	
	{0.016}	{0.683}	{0.635}	(0.224)	
Blended Step Child	**3.612**	0.684	1.570	0.886	**12.319**
	{0.000}	{0.494}	{0.117}	{0.377}	(0.248)

NLSY High School Graduation

	Intact	Stepfamily	Single-Parent	Blended Biological	Blended Stepchild
Intact	**0.897**				
	(0.006)				
Stepfamily	**3.319**	**0.835**			
	{0.001}	(0.021)			
Single-Parent	**5.675**	0.629	**0.818**		
	{0.000}	{0.530}	(0.015)		
Blended Biological	1.444	0.122	0.453	**0.841**	
	{0.149}	{0.903}	{0.651}	(0.046)	
Blended Stepchild	**3.641**	1.416	1.124	1.118	**0.764**
	{0.000}	{0.158}	{0.262}	{0.266}	(0.050)

NLSY College Attendance

	Intact	Stepfamily	Single-Parent	Blended Biological	Blended Stepchild
Intact	**0.473**				
	(0.009)				
Stepfamily	**4.980**	**0.323**			
	{0.000}	(0.027)			
Single-Parent	**4.018**	*1.878*	**0.386**		
	{0.000}	{0.061}	(0.019)		
Blended Biological	***2.198***	0.152	0.825	**0.333**	
	{0.028}	{0.879}	{0.410}	(0.060)	
Blended Stepchild	**3.048**	0.519	1.573	0.518	**0.292**
	{0.002}	{0.604}	{0.116}	{0.605}	(0.054)

Table B.1
Tests of Mean Differences in NLSY by Family Structure (continued)

NLSY College Graduation

	Intact	Stepfamily	Single-Parent	Blended Biological	Blended Stepchild
Intact	**0.154**				
	(0.007)				
Stepfamily	**4.473**	**0.059**			
	{0.000}	(0.014)			
Single-Parent	**3.730**	***1.973***	**0.098**		
	{0.000}	{0.048}	(0.012)		
Blended	***2.336***	0.365	1.305	**0.048**	
Biological	{0.020}	{0.715}	{0.192}	(0.028)	
Blended	**3.294**	1.584	***2.372***	1.150	**0.014**
Stepchild	{0.001}	{0.114}	{0.018}	{0.252}	(0.014)

NLSY-Child PIAT Reading Recognition

	Intact	Stepfamily	Single-Parent	Blended Biological	Blended Stepchild
Intact	**57.896**				
	(0.572)				
Stepfamily	**4.702**	**52.013**			
	{0.000}	(1.145)			
Single-Parent	**12.265**	**3.559**	**47.430**		
	{0.000}	{0.000}	(0.634)		
Blended	**4.485**	1.117	1.163	**49.615**	
Biological	{0.000}	{0.264}	{0.245}	(1.810)	
Blended	**4.962**	1.394	0.955	0.191	**49.145**
Stepchild	{0.000}	{0.164}	{0.340}	{0.849}	(1.674)

NLSY-Child PIAT Reading Comprehension

	Intact	Stepfamily	Single-Parent	Blended Biological	Blended Stepchild
Intact	**56.700**				
	(0.597)				
Stepfamily	**5.340**	**49.976**			
	{0.000}	(1.135)			
Single-Parent	**13.752**	**4.194**	**44.542**		
	{0.000}	{0.000}	(0.653)		
Blended	**3.333**	0.139	1.506	**49.645**	
Biological	{0.001}	{0.890}	{0.132}	(2.096)	
Blended	**6.669**	***2.432***	0.252	*1.715*	**44.994**
Stepchild	{0.000}	{0.015}	{0.801}	{0.087}	(1.713)

Table B.1
Tests of Mean Differences in NLSY by Family Structure (continued)

NLSY-Child PIAT Math

	Intact	Stepfamily	Single-Parent	Blended Biological	Blended Stepchild
Intact	50.333				
	(0.548)				
Stepfamily	**4.126**	45.482			
	{0.000}	(1.005)			
Single-Parent	**13.766**	**5.289**	39.528		
	{0.000}	{0.000}	(0.554)		
Blended	**4.702**	*1.790*	1.506	42.025	
Biological	{0.000}	{0.074}	{0.132}	(1.724)	
Blended	**5.406**	***2.321***	1.104	0.334	41.264
Stepchild	{0.000}	{0.021}	{0.270}	{0.738}	(1.503)

NLSY-Child Behavioral Problems Index

	Intact	Stepfamily	Single-Parent	Blended Biological	Blended Stepchild
Intact	58.958				
	(0.583)				
Stepfamily	**5.486**	65.753			
	{0.000}	(1.012)			
Single-Parent	**9.877**	1.241	67.224		
	{0.000}	{0.215}	(0.592)		
Blended	**3.519**	0.099	0.943	65.559	
Biological	{0.000}	{0.921}	{0.346}	(1.785)	
Blended	**5.541**	*1.670*	0.923	1.413	68.753
Stepchild	{0.000}	{0.096}	{0.356}	{0.159}	(1.421)

Notes: **Underlined** numbers are Means. (Underlined) numbers are standard deviations. Absolute value of test statistics appear below the diagonal. P-values appear in {}. Numbers in **Bold** are statistically significant at the one percent level. Numbers in ***Italics*** are statistically significant at the five percent level. Numbers in *Italics* are statistical significance at 10 percent level.

Family Structure definitions: Intact defined as families where children observed to always live with both biological parents. Stepfamily defined as child lives with one biological parent and one stepparent. No half-siblings are present in the household. Single-parent defined as ever live with a single parent and never living with a stepparent. Blended biological defined as living in a blended family as the child of both biological parents. A half-sibling who is the stepchild of one parent is present in the household. Blended Stepchild defined as living in a blended family with one biological parent and one stepparent. A half-sibling who is the biological child of both parents is present in the household.