

**DIVERSE FAMILY LIVING SITUATIONS
AND CHILD DEVELOPMENT:
A MULTILEVEL ANALYSIS COMPARING
LONGITUDINAL EVIDENCE FROM
BRITAIN AND THE UNITED STATES¹**

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Abstract

This study uses national data from both Great Britain and the United States to examine the relationship between children's family history and their educational and behavioral development. We use a multivariate, multi-level modeling strategy to estimate heterogeneity both within and between families. Our results show that associations between family living situations and children's wellbeing appear to be mediated by levels of human, financial and social capital available to children. Contrary to expectations, we found no evidence that children with non-traditional family living experiences are any more likely to be negatively impacted in Britain than across the Atlantic where diverse living arrangements are more widespread.

Keywords: *Great Britain, United States, Family history, Child development, Living arrangements, Comparative analysis.*

Children growing up in most western industrialized countries today are experiencing much more diverse and fluid family living arrangements than have previous generations. As childbearing outside of marriage has become more common (Armitage and Babb, 1996; McLanahan and Sandefur, 1994; Smith *et al.*, 1996) and marital dissolution rates remain high (Bumpass *et al.*, 1995; Haskey, 1996), greater proportions of children are spending at least a part of their lives with a lone parent, usually the mother (Garasky and Meyer, 1996; Haskey, 1998a, 1998b). Children are also more likely to experience living with a stepparent (Cherlin and Furstenberg, 1994; Haskey, 1994).

Such changes in family arrangements have brought benefits of greater freedom to at least some adults, but how have they affected the children? McLanahan (1997) notes that the pendulum of opinion on the effect of non-traditional family living in determining children's wellbeing has swung from pessimism to optimism and back toward pessimism again over the past few decades. She writes that

“After a decade of research, a new consensus has emerged with regard to the effects of family structure on children: children who grow up with only one biological parent are less successful, on average, than children who grow up with both parents. These differences extend to a broad range of outcomes, and they persist into adulthood.” (McLanahan, 1997, p. 37)

The investment of material, emotional and social resources is likely to be more abundant and effective when two parents work together than in other family arrangements (McLanahan and Sandefur, 1994). Some therefore argue that the enterprise of child rearing is more likely to succeed if undertaken by two adults rather than one (Popenoe, 1993), and a less conventional upbringing may be detrimental to child development.

But are these suppositions always correct? Might new modes of family life offer new models of socialization in which children can also flourish? This may be especially true when "intact" partnerships are highly conflictual (Amato *et al.*, 1995; Jekielek, 1998). If children thrive on family stability, then although the arrival of a step-parent may increase economic resources and widen social networks relative to those available in single-parent families, the social capital available to children from their residential parent may be diminished when a new adult moves in (Cooksey, 1997). Single parents do not always lack resources, and children may well have more resilience than commonly assumed when viewed simply as vessels for parental investment. Further, the processes and dynamics of family life may be managed to minimize damage to children by both family members themselves and the wider society. An alternative viewpoint therefore sees unconventional family forms as neither necessary nor sufficient conditions for children to fail, particularly when they become sufficiently common to be tolerated rather than stigmatized.

In this paper we look at child outcomes in different family settings using national data from both Great Britain and the United States. We consider both the cognitive attainment and behavioral adjustment of children, and take a more dynamic view of family structure than has generally been modeled. To place our findings in context, we begin by presenting information pertaining to children's living situations in both countries.

1. The diversification of children's families: Great Britain and the United States

Great Britain and the United States are two industrial countries where recent demographic trends in marriage and fertility have resulted in the most diversification in family living. Around one third of

infants in both countries are born to unmarried mothers, although in the United States this figure varies considerably by race/ethnicity: 70 percent of non-Hispanic blacks and 41 percent of Hispanics are born out of wedlock, compared with only 22 percent of non-Hispanic whites (Ventura *et al.*, 1998). In Britain, 12 percent of all children lived with single parents in 1991 (Haskey, 1998a); in the United States in 1990 the corresponding figure was 28 percent (Garasky and Meyer, 1996). In both countries single parents are predominantly mothers (Cancian and Meyer, 1998; Clarke *et al.*, 1997). One reason for fewer lone-parent families in the UK is that about half of the British children born outside legal marriage are born within cohabiting unions (Office of National Statistics, 1997). Another is the different risk of partnership dissolution.

In Britain where approximately 41 percent of marriages are projected to end in divorce (Haskey, 1994) Haskey estimates that children born to married parents face a 28 percent risk of divorce before the age of sixteen (Haskey, 1997). American children born to married parents face a 45 percent risk that their parents will divorce in the next eighteen years (Bumpass, 1984), as over one half of all marriages end in divorce (Bumpass *et al.*, 1995). Family fission has also been accompanied by an increase in stepfamilies (Cherlin and Furstenberg, 1994; Haskey 1994). Although the rates of divorce and lone parenting are higher in the United States, Britain appears closer to the United States than to its European neighbors in terms of these demographic trends.

Outcomes for children

Studies that attempt to identify family factors affecting children's attainments can be found in the economic, sociological, demographic and psychological literature (for example, Amato *et al.*, 1995; Burghes, 1994; Cherlin *et al.*, 1991; Cherlin and Furstenberg, 1994; Cockett and Tripp, 1994; Corak, 1998; Ermisch and Francesconi, 1996; Ferri, 1976; Gregg and Machin, 1999; Kiernan, 1992, 1996; Kiernan and Hobcraft, 1997; McLanahan and Sandefur, 1994; Marmer, 1997; Mott, 1993; Mott *et al.*, 1997; Rodgers and Pryor, 1998; Thomson *et al.*, 1994; Wadsworth and Maclean, 1986). Each places a somewhat different framework around the issue. Economists, for example, emphasize the quantity and quality of family resources allocated to children and note how changing family circumstances might alter them (Haveman and

Wolfe, 1995). They therefore see divorce as potentially reducing economic resources available to children, whereas marriage/remarriage can alleviate economic hardships (Beller and Chung, 1992).

Sociologists have incorporated Coleman's (1988) concept of social capital into their models. Since social capital includes time that parents spend engaged with their children, it is diminished if parents are either absent or uninvolved (Cooksey and Fondell, 1996). Although children living in stable single-parent households are more likely to be economically poor (Bianchi, 1993), they may have more social capital available to them than children living in situations where the resident parent takes a (new) partner, if this new adult competes for the parents' time and attention.

Sociologists and developmental psychologists stress the importance of parents as role models for a child's cognitive, emotional and personality development (McLanahan and Bumpass, 1988). Their use of a life-course perspective also focuses attention on the timing of events within an individual's life. The effect of a change in family structure may differ depending on the age of the child when it occurs, the degree of antagonism between the adults involved, and the subsequent marital choices of one or both parents (Seltzer, 1994). Finally, psychologists also emphasize the role that stressful events can play in undermining child development. The arrival of a stepparent, for example, may be accompanied by further disruptions such as the move to a new neighborhood and/or school. These may well offset the benefits of additional economic resources and have adverse effects on child well-being (Amato, 1993; Coleman and Ganong, 1990).

Although many studies across these disciplines find a negative association between various types of non-traditional family living on the one hand, and child outcomes on the other, there are also a number of exceptions to this overall pattern. Smith *et al.* (1997), for example, found very little evidence relating parental absence with young children's test scores, and in fact found that children of divorced lone mothers sometimes fared better on academic test scores. Cooksey (1997) found that differences in children's cognitive ability scores by family background did not persist when further measures of social, human and financial capital available to the children were included in the models. Smith *et al.* (1997) also found their family structure estimates disappeared when income was controlled and suggest that poverty may be especially important for preschool-aged children. In

contrast, McLanahan and Sandefur (1994) found the effects of household structure relatively unchanged when income was added to their models. It may be that the social stressors accompanying a change in family structure increase with age (Smith *et al.*, 1997) and take precedence over changes in family economic situations.

The association between a parent's absence and child behavior problems is more consistently positive than with children's cognitive attainment (see for example, Cooksey *et al.*, 1997; Hanson *et al.*, 1997; Pagani *et al.*, 1997). However, the recency of the absence also matters as many children successfully adapt to their changed family circumstances after a crisis period, typically lasting for about two years (Chase-Lansdale and Hetherington, 1990).

Much of the research reported on above has been based on samples of children in the United States and Canada. We can draw similar conclusions, however, from analyses of British children. For example, evidence on British adolescents found no adverse effects of family structure on their life satisfaction, but did find children living with two parents had higher levels of self-confidence (Brynin and Scott, 1996). Using data from the second generation of National Child Development Study (NCDS), Wiggins and Wale (1996) also found no significant difference in numeracy and literacy between the children of lone mothers and two-parent families when other characteristics of the parents and child were controlled.

There is also a growing body of evidence suggestive of longer-term outcomes associated with family breakup (Corak, 1998; Gregg and Machin, 1999; Kiernan and Hobcraft, 1997; Lefebvre and Merrihan, 1998; McLanahan and Sandefur, 1994; Richards, 1996; Rodgers and Pryor, 1998). Kiernan (1992) looked at early school leaving and early parenthood at ages 16 and 23 for original cohort members of the NCDS who either had or had not experienced various sorts of family disruption in childhood. Consistent with the results of others, she found the estimated coefficients of being in a step-family or a one-parent family at age 16, although moderated by the inclusion of additional controls, remained consistently significant. She has also since looked at the legacy of divorce for educational attainment, economic situation, partnership formation and dissolution and parenthood behavior when cohort members were aged 33 (Kiernan, 1997), and found that in most domains, children whose parents divorced had more negative experiences than those reared by two parents. These

relationships were attenuated for non-demographic adult outcomes by childhood financial hardship, however.

Both British and American studies using longitudinal data have shown that long before parents separate there are observable differences in their children's behavior when compared with children in marriages that remain intact (Cherlin *et al.*, 1991; Elliott and Richards, 1991). This suggests that divorce should be viewed as a process. It may involve conflict, poor parenting and other family dysfunctions that are significant in themselves for children's behavior problems (Rutter, 1981; Rodgers and Pryor, 1998). We also need to remember that children living in intact two-parent families are not immune to parental conflict either (Hess, 1995), and that marital conflict can be at least as harmful as parental separation for children's well-being (Amato *et al.*, 1995; Jekielek, 1998).

Previous research has tended to be country specific, though Cherlin *et al.* (1991) pioneered a cross-national comparative approach that is pursued in the present study. We compare British children of NCDS members with American children of a similarly aged subset of mothers from the National Longitudinal Survey of Youth (NLSY) to address two principal questions. First, how do children currently living with both natural parents differ from those who have experience of alternative family situations and family change, in terms of their cognitive skill levels and emotional maturity? Second, do any such differences persist once we allow for other known determinants of these measured outcomes? We make parallel analyses in two countries where the nuclear family is in different degrees of eclipse. This permits us to look for signs that the children living in a society where standard family forms are more prevalent are less well adjusted than in a society in which non-intact family forms are more commonplace.

2. Methods

2.1. Samples

We analyze children in two prospective longitudinal studies using the NCDS of the 1958 birth cohort from Great Britain and the NLSY linked mother-child files from the United States. These data sets have sufficient similarities to provide a strong resource for international

comparison. The NCDS is a study of over 17,000 people in Britain, born in one week in 1958 (see Ferri, 1993). Follow-up sweeps took place in 1965, 1969, 1974, 1981 and 1991. When respondents were age 33, information was additionally obtained on the children of 1 in 3 cohort members. The original nationally representative sample of the NLSY included 12,686 young men and women who were first interviewed in 1979 at ages between 14 and 22. This sample has been re-interviewed annually through 1996. Beginning in 1986, and biannually since then, the NLSY also collected data on children of the women in this cohort (Baker and Mott, 1989). We use data from the 1992 mother and child supplements. In order to facilitate comparisons between the two countries, the mother-and-child questionnaires of the NCDS include instruments imported from the NLSY.

The children in our sample have to be of an age to produce test scores: 5-17. To foster comparability between the two countries, we restrict our NLSY sample to children whose mothers were between 30 and 34 years old in 1992. From the NCDS we limit our sample to those children whose cohort member parent was the mother and resident with her child in 1991. These sample restrictions leave us with a total of 1546 children of 1039 mothers from the NCDS, and 2647 children of 1465 mothers from the NLSY.

Our sample definition clearly omits some children who have experienced family disruption: those living with single fathers or in non-parental care, for example. We are therefore unable to say anything about the development of this small number of children (approximately 7 percent of children age 5-17 in the NLSY and under 2 percent in the NCDS). The sample also omits families who have lost contact with either survey, who may perhaps have experienced more than a random share of family disruption. On the whole, however, retention rates for both datasets are very good. For example, 92 percent of eligible women of the NLSY were re-interviewed in 1992 (CHRR, 1995). Finally, the children in our samples do not constitute random samples as they are selected on mother's age – no child born to a mother over 28 (NCDS) or 29 (NLSY) is covered in this study. These data are instead more representative of children of younger mothers whose experience of family living arrangements may differ from that of children born to older parents.

2.2. Dependent variables

We use three measures of children's cognitive and behavioral development in our analyses. Children's cognitive development is measured by two sub-scales of the Peabody Individual Achievement Test (PIAT), available in both samples. The reading recognition sub-scale measures ability in oral reading, the mathematics score assesses ability in mathematics as taught in mainstream education. Instead of standardizing our test scores for the influence of age (Dunn and Markwardt 1970), we include linear and quadratic age terms as covariates in all our models. We therefore avoid concerns about the suitability of the available norms (Wiggins and Wale, 1996) but may have 'over-corrected' for some of the circumstances associated with early parenthood. When these scores are expressed relative to their maximum value, but with no adjustment for age, we find average scores close to 50 percent on each, marginally higher in the NCDS than the NLSY and marginally higher for reading than for maths.

We also use data on child behavior that may be more sensitive than academic measurements to family living situations. To assess children's emotional adjustment, we include data from both the Behavior Problems Index - BPI (Peterson and Zill, 1986), and the Rutter A Scale (Rutter *et al.*, 1970) in our analysis. The 28-item BPI was asked about all children in the NLSY, and of children under 7 years in the NCDS. The 18-item Rutter Scale was asked of older NCDS children. For each scale, the mother was asked if her child exhibited various elements of antisocial, anxious, headstrong, hyperactive or dependent behaviors. It has been suggested that the mother's own well-being may influence these reports. However, in the NCDS, for example, a measure of mother's mental well being (malaise) correlated only very weakly (0.03) with reports of child adjustment. Further, results from a meta-analysis of research on emotional and behavioral problems (Achenbach *et al.*, 1987) showed that parental responses were consistent with those of other informants such as teachers and mental health professionals. To compute our overall behavioral adjustment scores, we sum the individual responses, divide by the maximum possible, and subtract this number from 1. Our score thus rises as behavior improves, in line with the literacy and numeracy scores. On the whole the samples were relatively free of behavioral problems, with a mean score of 0.71 for NLSY and 0.75 for NCDS. Within each country, scores were slightly above average for children in

slightly above average for children in intact families (0.74 in the NLSY and 0.75 in the NCDS). Descriptives for these and all other variables included in our analyses are presented in Table 1.

Table 1
Variable distributions: Children aged 5-17 in regression samples
from the United States and the United Kingdom

Dependent variables	NCDS UK, 1991		NLSY US, 1992	
	Mean	Std Dev	Mean	Std Dev
PIAT Reading Recognition	0.51	0.24	0.49	0.22
PIAT Math Score	0.48	0.20	0.45	0.19
Behavioral adjustment ^a	0.75	0.17	0.71	0.20
<i>Child level predictors</i>				
<i>Child's family history ^b</i>				
Intact: child still lives with both natural parents*	0.74	0.44	0.52	0.50
Lone-Lone: mother alone - at birth and now	0.02	0.15	0.15	0.36
Joint-Lone: mother now alone, natural parents split	0.10	0.30	0.18	0.38
Lone-Step: step family now, mother alone at birth	0.02	0.14	0.05	0.22
Joint-Step: step family now, two natural parents at birth	0.11	0.32	0.11	0.31
<i>Other child level predictors</i>				
Child's age in months ^c	112.8	35.8	121.4	37.3
(Child's age - mean age) squared	1283.0	1424.5	1392.9	1445.2
Child's sex: Male*	0.51		0.50	0.50
Female	0.49		0.50	0.50
Child's race/ethnicity				
Hispanic*	n.a.		0.23	0.42
White	n.a.		0.42	0.49
Black	n.a.		0.34	0.48
Child's birth order	1.61	0.87	1.73	0.94
<i>Family level predictors</i>				
Mother's educational attainment ^d	1.89	1.34	2.17	0.86
Income (per head, £ per week (UK), \$ per year (US)) ^e	71.99	40.45	7206.7	5009.6
Maximum no. of cases ^f	1526		2637	

* Represents omitted reference category in multivariate analyses.

Notes a to f. see next page.

a. Mother's report on child behaviour as a %, good behaviour scores high: Behaviour Problems Index for UK and US children 5-7, otherwise a subset of the Rutter Scale.

b. Mothers' partnership includes cohabitation and marriage.

c. Age enters as linear term and age-squared as deviation from mean squared/100.

d. Mother's highest educational qualification. UK: 0 = none to 5 = degree, US: 0 = less than high school to 4 = more than BA.

e. Family income for reported cases. For 470 and 430 cases where it was missing in UK and US respectively, income was imputed. Income enters models as log of per capita income.

f. Data present on at least one dependent variable, missing for the following number of cases: Reading, 70, 207; Maths, 87, 177; Behaviour, 144, 81, NCDS and NLSY.

2.3. Child level independent variables

The focus of the analysis is the child's experience of family change. Our measure reflects the child's family status at the time of birth and at the date of interview. There are relatively few children who have experienced multiple changes between these time points. We distinguish children

- (1) whose parents were living together (married or cohabiting) at the birth of the child and are still living together as 'intact';
- (2) born to a lone mother and currently living only with her;
- (3) living with a lone mother after parental separation or divorce;
- (4) living in a step-parent family, having been born to a lone mother, and
- (5) living in a step family 'reconstituted' after natural parents parted company.

Where it is known whether the child's biological father joined the household after the child's birth, the child is assigned to the 'intact' category. Although this variable describes a child's family, it is still a child-level measure as children with the same mother may have different fathers.

Just over half the NLSY children and just under three quarters of the NCDS children are assigned to 'intact' families. This reflects the greater prevalence of family breakup in the United States than in Britain, but the comparison is exaggerated by an over-sampling of ethnic minority groups in the NLSY. The group of lone mothers who were also alone at the child's birth is much larger (15% compared with 2% of the NCDS) in the NLSY sample, where they are predominantly black. In both countries, but particularly Britain, most non-intact fami-

lies have involved a parental split, with re-partnering being relatively more common in the British sample.

We allow for the age of child by including in both a linear and quadratic term, as noted above. It must be remembered that the age of the child will also contain information about the age of the mother at the time of the child's birth. This is inevitable with samples of children based on a birth cohort (the NCDS especially). The child's sex is included to allow for differences in biological nature or gendered nurture affecting the scores. In the analyses using the NLSY we make a rough allowance for cultural differences in minority groups, as well as the fact that minorities were oversampled, by including indicators for non-Hispanic black and non-Hispanic white children. There are too few ethnic minority children in the NCDS sample to do the same. The child's birth order is included in both samples as first born children appear to be at a slight advantage, perhaps due to more parental attention and higher parental aspirations (Rutter, 1985).

2.4. Family level predictors

We include two indicators of parental resources in the models presented here: the mother's educational attainment and family income. The former is likely to have been determined before the child's birth, whereas the latter may have been affected by family change. In both countries mothers in non-intact families, particularly those who had entered motherhood without a partner, had lower levels of educational attainment than mothers in intact two-parent families.

The financial standing of the family, represented by the log of income per person, is included to see if children in poor families are in general at a disadvantage. It is also used to see whether the effects of family disruption on children operate through effects on the economic resources available to the child. Data on actual income was missing for a significant portion of cases: nearly one third of the British sample and about one sixth of the U.S. sample. We therefore decided to use ancillary information about the family's circumstances to impute income where it was missing, adopting a multiple imputation technique following Schafer (1997).²

2. The instruments used to impute missing income data in both samples include the presence of a partner in the household, the partner's school leaving age, the cohort member's education, and whether there were one or two earners in the fam-

In the British sample, estimates of mean imputed income exceed the mean for those 1069 cases where income is known. This implies that the average measured attributes of those with unmeasured income were characteristic of above-average income. This is consistent with a lower response rate to income questions from the wealthier respondents. In the NLSY sample, by contrast, imputed income is below average suggesting a different pattern of non-response, and also an important source of bias, had we proceeded to analyze only cases with non-missing income. We divided our estimates of family income by the number of family members and then logged it to provide a comparable estimate of the impact of a given proportional change. In both countries, intact families have higher income than families currently headed by a lone mother. Stepfamily income is quite close to that of two-parent intact families, particularly where the child was born to a couple.

In preliminary analyses we included additional possible regressors (Joshi *et al.*, 1998) but have chosen to discard items which were insignificant (e.g., duration since last family change), too highly correlated with variables already included (e.g., mother's age at first birth) or only available for one country (social housing). The resulting list is approximately comparable across the two countries, but not identical. In recognition of findings in the literature, we also included interactions of the family history terms with sex, and for the NLSY sample, with race. Only in the case of race was any estimate significant: white children in reconstituted families had better reading scores than either black or Hispanic children in comparable family living situations. For ease of comparison we present the additive results only.

The limited information about each child contained in the regressors also requires a technique that acknowledges that not all relevant factors are measured. The multi-level approach we use (described below) allows for such unobserved heterogeneity to have common elements between the different scores within a child, and between children, where more than one child is observed within the same fam-

ily. For the NLSY sample we additionally include race, rural residence, mother's age, a measure of her self esteem (indexed by the 10-item Rosenberg scale, completed in 1980), and her score on the Armed Forces Qualifying Test (AFQT) as a measure of her cognitive skills. In the NCDS, car access and whether the family lives in social housing are additional predictors. The imputation was made on five draws of the random element in income, and the multi-level model estimated five times. Reported parameters are the average of these multiple estimates.

ily. In the NLSY, 835 mothers report at least two children, and 257 have at least three. For the NCDS sample, 396 mothers have at least two children, and 97 have at least three. This means that a little over 600 children in each sample were either only children or the sole members of their sibship of an age to be included in the study.

2.5. Statistical models

We model the cognitive and behavioral development of children within families using hierarchical linear modeling. This is a variant of the multiple linear regression model for data with a hierarchical nesting structure (Goldstein, 1995). Algebraically, consider the simplest multivariate multilevel model specification where y_{ijk} is the outcome score, i , for an individual child, j , in family k . No explanatory variables are included, but a set of dummy variables (Z_{ijk} 's) indicates which response measure is present at level 1. We have an equation

$$y_{ijk} = \mathbf{b}_{01}Z_{1jk} + \mathbf{b}_{02}Z_{2jk} + \mathbf{b}_{03}Z_{3jk} + \mathbf{n}_{1k} + \mathbf{n}_{2k} + \mathbf{n}_{3k} + u_{1jk} + u_{2jk} + u_{3jk} \quad (1)$$

which is equivalent to specifying three simple variance component models, one for each outcome, in a single formulation. The added appeal of the specification is that we are able to model the relationships between the outcomes as well as contrast the effect of controlling for the characteristics of the child and family. Associated with each intercept term (the \mathbf{b}_0 's) are two random terms, one capturing between family residuals (the \mathbf{n}_k 's) and another measuring residuals within families for each child (the u_{jk} 's). These define the covariance matrices at the child and family level. At the family level we have

$$\text{var}(\mathbf{n}_{1k}) = \mathbf{S}_{n1}^2; \quad \text{var}(\mathbf{n}_{2k}) = \mathbf{S}_{n2}^2; \quad \text{var}(\mathbf{n}_{3k}) = \mathbf{S}_{n3}^2$$

and

$$\text{cov}(\mathbf{n}_{1k}, \mathbf{n}_{2k}) = \mathbf{S}_{n12}; \quad \text{cov}(\mathbf{n}_{1k}, \mathbf{n}_{3k}) = \mathbf{S}_{n13}; \quad \text{cov}(\mathbf{n}_{2k}, \mathbf{n}_{3k}) = \mathbf{S}_{n23}.$$

Similarly, at the child level, $\text{var}(u_{ijk}) = \mathbf{S}_{u1}^2$ and so on. The covariances at the family level record whether families whose children have poor math scores are also those in which children have poor reading scores and poor emotional adjustment. Similarly, the covariances at the individual level, estimate whether individual children who do poorly in reading also do poorly in math and are judged to be poorly adjusted behaviourally by their mothers. Another important feature of these models is that the estimates are statistically efficient even when

some of the children's outcomes are missing. We therefore reduce losses to our sample from incomplete data by adopting a method that allows cases to be included if up to two dependent variables are missing.

The inclusion of any additional child or family level characteristics as explanatory variables is straightforward. Algebraically, this is a natural extension of equation (1) where each new regression coefficient is multiplied by a dummy variable. Extending the model to include a child's age, x , we have:

$$y_{ijk} = \mathbf{b}_{01} Z_{1ijk} + \mathbf{b}_{02} Z_{2ijk} + \mathbf{b}_{03} Z_{3ijk} + \mathbf{b}_{11} Z_{1ijk} X_{jk} + \mathbf{b}_{12} Z_{2ijk} X_{jk} + \mathbf{b}_{13} Z_{3ijk} X_{jk} + \mathbf{n}_{1k} + \mathbf{n}_{2k} + \mathbf{n}_{3k} + \mathbf{u}_{ijk} + \mathbf{u}_{2jk} + \mathbf{u}_{3jk} \quad (2)$$

By systematically introducing explanatory variables we are able to assess not only the association of child and family characteristics with the three outcomes, but also their impact on the covariance structure. Both of the models described in equation (1) and (2) assume constant variance at levels 2 and 3.

To the extent that the modeling detects associations between the explanatory variables and the dependent variables it is tempting to interpret them as 'effects' upon outcomes. In fact this interpretation is only valid to the extent that the regressors are truly independent, not themselves determined by the dependent variable or other unmeasured factors. This paper does not explore what may have led to family disruption but proceeds on an assumption of exogeneity. It seems plausible that child development does not itself determine variables which have been previously established. This certainly applies to the child's age, sex, and birth order, and most probably to the history of family disruption and level of mother's education. Current financial circumstances may not have been generated by the child's development, but may also be the outcome of the adults' past history, including family disruption and their level of education. We therefore present models with and without the terms through which family structure may indirectly influence child development. We also note that we have no direct evidence that any association reveals a causal relationship, only the argument that the assumption of the independence of regressors is reasonably plausible.

3. Results

We present two sets of results. In the first model, presented in Table 2, we control for the child's age, sex, and our summary of their history of family living situations. Then in Table 3 we control for the full set of predictor variables. We report the 't' statistics as a general guide to the margin of error around each estimate. Where 't' is 2.0 or more, there is a 95% confidence limit which does not include zero. Estimates on the borderline may be indicative of a relationship that is not so well determined, and where 't' is close to zero there is no clear evidence for an association in either direction.

From Table 2 we can see that scores for reading, math, and in Britain behavioral adjustment, increase with age but at a diminishing rate. There is less of a systematic age pattern for behavior than for the cognitive scores. Girls also do better on reading and have fewer behavior problems reported than boys, but in Britain only they score lower in math. Regarding family history, most of the individual coefficients are at, or close to, significance, but the magnitude of the associations are modest. Put another way, children from non-traditional family backgrounds tend to fare worse, both educationally and behaviorally, than those in intact families, but the differences are not great. The largest differences with the omitted reference category of intact families are for the children whose mother was unpartnered at both birth and interview (lone-lone). The small British sample of such children scores nearly 7 percentage points worse for behavior. In both countries, their reading score averages around 6 and a half percentage points below that of children in intact families, but only in the United States is their math score significantly worse. Children of current lone mothers who had broken up with the child's father, also have lower behavior scores of approximately 5 and 6 percentage points in the NCDS and NLSY respectively than children from intact families. The estimated differences between reconstituted and intact two-parent families are small and generally statistically insignificant. However, children born to single mothers but currently living with a stepfather appear to do worse than children in intact families, particularly in terms of their behavior (-5.9 points in the NCDS and -6.0 in the NLSY).

As we had expected from previous findings, to the extent children in non-intact families appear to be at a disadvantage, it is more in terms

Table 2
Multivariate multi-level models for child scores controlling for age, sex of child and family situation

Component	NCDS (Britain)						NLSY (USA)					
	Reading		Math		Behavior		Reading		Math		Behavior	
Fixed	b*100	t	b*100	t	b*100	t	b*100	t	b*100	t	b*100	t
Constant	-13.43	10.7	-6.40	6.6	39.69	26.4	-8.73	-9.6	-3.28	-4.4	72.77	57.7
Child's age	0.61	55.3	0.53	61.1	0.15	11.4	0.52	73.7	0.45	77.9	-0.01	-1.6
(age-mean) ² /100	-0.01	-13.0	-0.01	-15.9	-0.01	-5.6	-0.32	-19.0	-0.36	-25.6	0.05	2.3
Girl	1.56	2.3	-1.29	-2.4	2.21	2.9	3.18	6.5	0.16	0.4	3.46	5.2
Lone-lone	-6.40	-2.4	-1.98	-1.0	-6.85	-2.2	-6.45	-7.4	-4.89	-7.0	-4.37	-3.4
Split-lone	-3.53	-2.9	-3.72	-2.2	-5.89	-2.8	-4.32	-5.3	-2.61	-4.0	-6.06	-4.8
Lone-step	-3.77	-1.5	-2.24	-2.0	-4.83	-2.0	-2.87	-2.4	-2.07	-2.1	-5.97	-3.4
Split-step	-1.19	-1.0	-0.83	-0.9	-1.21	-0.8	-2.01	-2.1	-0.23	-0.3	-2.93	-2.1
Random	$\hat{\sigma}^2*100$	t	$\hat{\sigma}^2*100$	t	$\hat{\sigma}^2*100$	t	$\hat{\sigma}^2*100$	t	$\hat{\sigma}^2*100$	t	$\hat{\sigma}^2*100$	t
Family level	0.62	7.5	0.32	6.5	1.16	9.3	0.56	10.7	0.34	9.9	2.02	16.1
Child level	1.23	16.3	0.78	16.3	1.53	15.3	1.10	23.9	0.78	24.4	1.78	24.0
-2*LogL'hd	-5908.9						-9874.85					

of their reported behavior than in reading and math. We also find that children who show the greatest negative contrasts with children in intact families are those currently living in families which are, or have been fatherless, rather than in stepfamilies formed after the break-up of a two-parent family. The estimates from the two countries are remarkably similar with the main difference being that the U.S. estimates are better determined, due in part to their larger sample sizes of non-intact families.

The random part of the model shows that a large part of the variance remains unexplained, particularly for behavior, and particularly at the level of the child, rather than the family. The residual variances, for each score, as with the fixed coefficients, are remarkably similar in the two countries, especially for reading and math. The covariances (not shown) are strongly positive between reading and math scores at both the child and the family level. This means that children who are better than expected (for their age and family type) at math also tend to do better at reading, and that families in which children are good at math are also likely to have children good at reading. The association between the behavioral and cognitive scores is not as strong.

Are these associations really attributable to family structure itself, or do they reflect other differences in the resources families offer, which may be a better explanation of the disadvantage children in disrupted families appear to suffer? In the final model that we present in Table 3, we additionally control for race (in the United States), birth order, mother's educational qualifications and family income. The coefficients are averages of the imputation estimates based on Schafer's procedures to handle missing data.

The inclusion of race terms in the United States does not make a great contribution to the explanation of variation in child scores. White children score higher academically than both Hispanic and black children, but show no significant difference in terms of their behavior. In both countries and on most scores, having an older sibling is associated with mildly poorer results. The level of maternal education, however, makes a much larger difference in terms of these child outcomes. In the United States, the predicted difference between a child of a college graduate and one whose mother has less than a high school education is 9.6 percentage points for reading, 6.8 for math, and 10.0 on the behavior score. For the British sample the gap associated with minimal and maximum maternal qualifications in the mother is 12.5 percentage

Table 3
Multivariate multi-level models for child scores with further child- and family-level controls

Component	NCDS (Britain)						NLSY (USA)					
	Reading		Math		Behavior		Reading		Math		Behavior	
Fixed	b*100	t	b*100	t	b*100	t	b*100	t	b*100	t	b*100	t
Constant	-20.55	5.91	-15.07	5.56	49.92	11.1	-35.11	-9.13	-23.94	-7.67	-55.01	9.01
Child's age	0.61	50.6	0.53	56.6	0.15	10.0	0.53	64.7	0.46	69.8	0.01	-0.4
(age-mean) ² /100	-0.01	-13.5	-0.01	16.3	-0.01	-5.6	-0.33	-19.7	-0.36	-26.3	0.05	-2.1
Girl	1.48	2.2	-1.38	-2.6	2.08	2.5	3.05	6.4	0.005	0.01	3.46	-5.2
Lone-lone	-4.57	-1.8	-0.67	-0.3	-5.36	-1.7	-2.19	-2.4	-1.22	-1.6	-2.37	1.6
Split-lone	-3.42	-1.7	-3.52	-1.0	-5.48	-1.9	-1.30	-1.6	-0.10	-0.1	-4.25	3.3
Lone-step	-2.18	-1.5	-0.99	-2.0	-3.28	-1.8	-1.54	-1.3	-0.67	-0.7	-5.35	3.1
Split-step	-0.54	-0.4	-0.47	-0.5	-0.95	-0.6	-1.41	-1.6	0.11	0.2	-2.59	1.9
White							1.83	2.5	4.26	7.1	-0.37	0.3
Black							-1.41	-1.7	-0.27	-0.4	-0.40	0.3
Birth order	-1.80	-4.3	0.78	-2.3	-0.88	-1.6	-1.08	-3.5	-0.41	-1.6	0.64	-1.41
Mother's qual.	2.48	8.3	1.74	7.6	1.40	3.7	2.41	6.6	1.72	5.9	2.55	-4.33
Income	0.12	1.7	0.13	2.4	0.17	1.5	2.52	25.8	1.75	14.8	2.64	-8.1
Random	$\hat{\sigma}^2*100$	t	$\hat{\sigma}^2*100$	t	$\hat{\sigma}^2*100$	t	$\hat{\sigma}^2*100$	t	$\hat{\sigma}^2*100$	t	$\hat{\sigma}^2*100$	t
Family level	0.51	6.7	0.26	5.6	1.07	8.7	0.38	8.3	0.23	7.5	1.93	15.8
Child level	1.19	16.4	0.77	16.4	1.55	15.4	1.11	24.2	0.77	24.6	1.78	24.1
-2*Log L'hd	-6057.58						-10169.6					

points for reading, 9.0 points for math and 7.0 points for behavior. We also note that in models excluding income (not presented), the NCDS coefficients for maternal education were very similar to those presented in Table 3, but the NLSY terms were somewhat higher.

Income also has a strong impact on children's outcomes in the United States where the income coefficients are almost as well determined as those of maternal qualifications. In the NCDS, however, only the income coefficient for math is statistically significant. The effects of an approximately three fold increase in family income is estimated at around 2 to 3 percentage points on the American scores and about half this in Britain. The weaker estimates of income effects in Britain may reflect misspecification (eg in the handling of the household's needs) rather than an absence of economic determinants on the eastern side of the Atlantic, however. When we used dichotomous indicators of poverty for the British sample (car access, home ownership and presence of an earner) instead of this continuous measure of income, our estimates were better determined, but we choose to present these results for international comparability.

As non-intact families are at a disadvantage with respect to both parental qualifications and current income, the inclusion of these factors in the model might be expected to rob the family structure terms of explanatory power, and they do. Only three of the 12 family history coefficients in the NLSY, and one in the NCDS, remain statistically significant. The sizes of the estimated terms are diminished, although they still retain a negative sign and broadly similar values in the two countries. In the United States, children in 'lone-lone' families still have significantly lower reading recognition scores than do children in intact families, and children from 'split-lone' and 'lone-step' families have higher levels of behavior problems. In Britain, children in step-families formed after lone motherhood, have math scores, all else equal, 2 percentage points below those of children in intact families. The lack of any statistically significant effect of family history on children's math scores in the United States once income, maternal education and presence of siblings are controlled for, is consistent with the findings of Cooksey (1997). That children of lone mothers in Britain are not significantly different from children in intact two-parent families in terms of their academic skills is also consistent with the earlier findings of Wiggins and Wale (1996).

When we included these additional control variables, we anticipated a reduction in the levels of unexplained variance, especially at the family level. This indeed occurred at the family level in the U.S. sample for reading and math, but not for behavior, and not at all in the British sample. The unexplained variance for each child is also virtually unaffected. The covariances (not shown) are little affected at the child level as well, although at the family level covariances are reduced for the NCDS and approximately halved for the NLSY sample. The presence of unexplained variation within and between families is an important reminder that differences persist between these units of analysis.

4. Conclusions

The greater diversification of family forms in the United States than in Britain led us to anticipate that alternatives to intact family living might have less of an impact on children's cognitive and behavioral development in the U.S. Overall, however, our results show remarkable similarities between Britain and the US. The main difference is that the models fit the larger US sample better.

On our first question of whether children living with both natural parents differ from those in other family situations, we find that they do not differ greatly, in either country, although changes in family living situations tend to show up more in children's behavior than in their cognitive development. No one type of non-intact situation is particularly implicated. Reconstituted families were particularly close to intact two-parent families.

Second, we asked whether differences we found in the simpler model could be attributed to other things we know about the families apart from the absence of a natural father. In line with findings of much prior research, we find mother's education and family economic circumstances to be important intervening factors in both countries, and especially in the United States. These results are consistent with the theoretical arguments that intact families are able to provide greater levels of economic and human capital to their children than is often the case in other family forms. That children of lone mothers who have gained a stepfather still show higher levels of behavior problems, even after controlling for maternal educational and family in-

come, is consistent with the argument that social capital is also an important family asset. However, much variability between families, and especially children, remains unexplained by the predictors we are able to measure with our large scale, multi-purpose surveys. This is particularly true of the British sample.

In general, our findings suggest less of a disadvantage associated with non-intact family experiences than many other studies, or indeed popular perception. The paradox of the popular perception and our undramatic findings is partly reconciled by our confirmation that the so-called handicaps of the non-intact family work partly through economic disadvantage. Our findings are compatible with, but not proof of, the resilience of children. We should remember that the children observed here are still relatively young. We cannot say whether they will take to crime as adolescents, escape difficulties when they join the labor market, or become teenage parents or divorcees. Research on the parental generation of the NCDS, for example, suggests there may be 'sleeper' effects when the children we have studied here reach late adolescence or adulthood. Furthermore, some of the children observed in intact families currently will later experience family disruption, which may or may not have been foreshadowed in the responses we have analyzed.

It should also be pointed out that the outcomes used in this paper may not be reliable indicators of a child's emotional well-being or happiness. Perhaps children who are desperately unhappy about family change, such as those whose stories have been reported by Childline (1998) can nevertheless cope with cognitive tests, and perhaps also rate well in terms of the behaviours measured by their mothers, but this need not mean they have experienced no anguish. On the other hand, general samples such as ours are likely to be less biased toward cases of family malfunction than if they had been drawn from cases seeking or receiving some sort of clinical help.

The assumption that associations are effects (and that lack of associations implies no effects) remains only an assumption. We have not attempted to rule out reverse causality or all spurious relationships. We have not observed all relevant factors. In particular those concerning the processes of family fission, or staying together. For example we know little about conflict or instability in the intact families, conflict between parents at the time of any split, the degree of contact the child has with any absent parent, the quality of parenting, the auton-

omy of children or what they expect of their parents. The children have only been observed once (so far at least in NCDS), so we cannot examine evidence before and after a family change (as has been done for the NCDS first generation by Elliott and Richards, 1991, for example).

An unexpected lesson from juxtaposing the samples from the two countries was a warning not to interpret insignificant coefficients in the smaller sample as an absence of effects. We were also surprised that the estimated impact of family diversity had not weakened more in the United States where it is more prevalent.

The policy lessons of our results should emphasize the child poverty which is extensive in both countries. Policies to tackle child poverty or to prevent early motherhood, which can in turn prevent the curtailment of women's education, are likely to have more impact on child development than any policy that attempts directly to re-establish universal intact families. The fact that our incremental addition of regressors showed several factors playing a part in accounting for the family structure differentials does not suggest any one policy lever.

It would be premature to conclude family breakup leaves children unharmed, or that the development of the Second Demographic Transition (Lesthaeghe, 1991) has no adverse consequences for children. The 'pendulum of opinion' about the effect of non-traditional family living on children's wellbeing is pushed to neither pessimistic nor optimistic extreme. We find stronger evidence for some disruption of child development in the United States where there are fewer intact families (but a better designed sample) than we do in Britain. However, we also find fairly strong evidence that parental disruption does not *invariably* wreak havoc with the lives of children as we have measured them. It is important to point out that there remains substantial unexplained variation between families, and children. To some extent this is because of the difficulties of measuring the complex processes at work, but there is also likely to be an element of chance. This variability of children's apparent reactions to diverse experiences of parental partnership warns against typecasting children from 'broken homes' as beyond hope.

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