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Childhood Family Disruption and Outcomes in Young Adulthood: Evidence from the 1970 British Cohort Study

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ABSTRACT

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This thesis explores the implications of parental divorce, or separation, and stepfamily formation in childhood for a cohort of young adults. It uses the 1970 British Cohort Study, which has followed up since birth those born in Britain in a week in April 1970. The age 26 survey is used to examine outcomes according to the number, type and timing of family transitions up to age 16. A regression based weighting scheme compensates for the effects of differential non-response at later stages of the study and the potential for bias in the reported date of parental separation is addressed.

Over one in four of the cohort members experienced family disruption. Using discrete-time logistic regression hazards models, the research identifies the characteristics of families more likely to undergo transitions by the time the cohort member is 16. The thesis then focuses on three outcomes: achieving fewer than five Ordinary Level examination passes; experiencing unemployment; and, for women, teenage or young motherhood. In the chapters examining educational attainment and early childbearing, the analysis controls for family characteristics from birth onwards to examine whether associations between family disruption and later outcomes are the product of the selection of certain families into disruption, a result of the environment around the time of transitions, or the effect of post disruption circumstances. The chapter considering unemployment evaluates whether certain family transitions continue to be associated with labour market experiences over and above any association with educational attainment.

Outcomes vary according to the sex of the cohort member, the type of disruption and their age at the last transition. Compared to children who grew up living with both natural parents, those who experienced the most common types of family disruption, into a lone mother or stepfather family (without ever living with stepsiblings) are not generally found to have a higher probability of more disadvantaged outcomes after taking early socio-economic circumstances into account. However, late childhood transitions seem to be associated with lower educational attainment for women, while an early move into a lone mother family may place men at a disadvantage in the labour market. Children who experienced less common transitions, such as those who lived in stepfamilies that ever contained stepsiblings or were ever taken into statutory or foster care have poorer outcomes.

The findings highlight the importance of using dynamic measures of family change when considering the life course. Financial hardship, both before and after disruption, is confirmed as a key factor influencing future outcomes. Additionally, the transmission of social capital, either through supporting the child's education or providing contacts with the labour market is important. Finally, the stress of change and potential for conflict in some post-transition families may explain the poorer outcomes among children who lived in stepfather families that contained stepsiblings but these people also tended to come from the most disadvantaged backgrounds.

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Thank you to my friends and family for encouraging me to embark on this project and for threatening all sorts of dire consequences if I didn't finish what I'd started.

Note on citations

The literature on family disruption is dominated by research from the United States. When empirical evidence is cited without reference to a country, it can be assumed to be based on US data. When citations of empirical research from more than one country are listed together, the countries from which the data originate are stated.

This thesis is the result of work done wholly while I was in registered postgraduate candidature at the University of Southampton.

Chapter 1 Introduction

1.1 Background and purpose

Between 1970 and 1986, the divorce rate in Britain nearly trebled (United Nations 1984; United Nations 1992) and by the mid 1980s nearly two-thirds of couples that divorced had at least one child under 16 (Haskey 1990). This thesis describes the levels and variety of family disruption experienced by a cohort of children born in Britain in a week in April 1970 and examines their life courses into young adulthood. While rising divorce rates and the increasing proportion of children experiencing divorce have been well documented from vital registration (Haskey 1988; Haskey 1996; Haskey 1997), less is known about the pathways through family structures in childhood, whether that is parental separation, periods in a lone parent family or the formation of a stepfamily.

There is a substantial body of literature, predominantly from the United States, concerned with the "effects" of family disruption on children. Researchers have explored these associations using a rich range of data sources including the National Survey of Families and Households (Hanson et al. 1998; Martinson and Wu 1992; Wu and Martinson 1993); the National Survey of Family Growth (McLanahan and Bumpass 1988); the Michigan Panel Study of Income Dynamics (An et al. 1993); the National Survey of Children (Allison and Furstenberg 1989; Cherlin et al. 1991; Furstenberg Jr and Teitler 1994); and the National Longitudinal Survey of Youth (Michael and Tuma 1985; Sandefur et al. 1992; Wu 1996).

In Britain, early quantitative evidence was based on the 1946 cohort study, the MRC National Survey of Health and Development (Richards et al. 1997; Wadsworth 1979), and then more recent analysis has used the 1958 National Child Development Study (NCDS). However, the value of the 1958 data is limited in two ways. First, the 1958 study refers to children growing up in the 1960s and early 1970s when family disruption was a less common experience; less than 10% of this cohort experienced a transition in parenting before they were 16 (Ferri 1984). More contemporary information on family dissolution and repartnering is becoming available from the British Household Panel Survey (Ermisch and Francesconi 1996a). These data are, however, limited by the sample size of the survey and the focus on the adults rather than children in the household.

Secondly, the NCDS only observed family structure at the surveys conducted at ages seven, 11 and 16. As information on the timing of changes in family structure between survey stages was not collected, analysis of the study has been restricted to these cross sectional measures,

either comparing family structure at 16 (Kiernan 1992; Power and Matthews 1997), or looking at children who have changed family structure between the three stages (Cherlin et al. 1995; Elliott and Richards 1991; Ní Bhrolcháin et al. 1995). It has been possible to use retrospective accounts of childhood family disruption, but these were collected over 17 years later when the cohort members were 33 (Kiernan 1997b). At the same stage, evidence was gathered about the transition experiences of the children of the 1958 cohort, although until the NCDS complete their childbearing, this group over-represents those born to a young mother (Joshi et al. 1999).

Cross sectional measures create difficulties when examining the life course of those experiencing family transitions. For example, if we considered all those living in a lone-mother family at 16, we would conflate the outcomes for those who experienced parental separation with those born to a lone-mother or who experienced multiple transitions. Evidence from the US shows that young adult outcomes can vary substantially according to the pathway followed to particular family types and more attention should be paid to prospectively collected measures of both the type and timing of childhood family transitions (Martinson and Wu 1992; Wojtkiewicz 1992; Wu and Martinson 1993).

The 1970 British Cohort Study (BCS70) is a rich data source for examining the childhood experiences of a more recent cohort. Families were asked the year of any parental separation or repartnering between waves of the study up to when the cohort member was 16. A postal survey was then conducted among the cohort members in 1996, when they were 26. This research proposed to explore whether knowing more about the timing and nature of family disruption, in conjunction with details of early social and economic circumstances, can extend our understanding of the relationship between family disruption and an individual's own educational, labour market and family formation outcomes.

The project has evolved to include a considerable amount of methodological work, preparing the data for analysis and addressing issues from file linkage to non-response bias, recall error and inter-wave inconsistency. Deriving a full record of family structure in each year from birth to age 16 required over 50 variables from across four stages of the study. Finally, the survey at age 26 was inevitably limited in the number and complexity of questions that could be asked in a postal self-completion questionnaire and the project has been led by the data on outcomes available from this stage. However, the latest wave of face-to-face interviews at age 30, released in August 2001 provides opportunities for further work.

The Research Objectives

This thesis addresses the hypothesised relationships between childhood family disruption and young adult life circumstances. The research had the following objectives:

- To derive measures of, and describe the levels and timing of, family transitions experienced by the cohort.

- To address the methodological issues of non-response and recall bias using reweighting and imputation techniques.

- To investigate the association between childhood family transitions and educational attainment.

- To examine whether there are any continuing associations between childhood family transitions and unemployment in young adulthood after taking educational attainment into account.

- To investigate the association between childhood family transitions and early childbearing among women in the cohort.

The analysis uses regression models to test the association between various independent variables, including measures of the level and type of parenting change, and outcomes in young adulthood. Although steps are taken to control for life course characteristics that predate family disruption, we lack the behavioural theories to support any causal inferences from the empirical evidence. Like most sociological analysis, the research is dealing with multiple causes (Cox and Wermuth 2001), the circumstances of young adults may be the results of a whole range of factors, from their family background, to their educational experiences, or their own personality and preferences, all of which may influence each other. Where an association is found we cannot discount characteristics of the child and the family that are often unobserved or difficult to measure in large scale survey research. Where no associations are found, we again cannot conclude that there is an absence of causation, only that with this particular data, it is "not proven" (Ní Bhrolcháin 2001). This is no different from any other piece of sociological analysis using longitudinal data but must be reiterated when dealing with a subject matter on which many people hold strong "common sense" viewpoints.

In addition to the phrase 'family disruption' the thesis often adopts the term 'family transition', which is more prominent in the US, to incorporate the range of potential changes in residential parenting arrangements apart from divorce, such as the formation of a stepfamily, other relatives joining the household or even the natural father moving in with the mother and child. As multiple family transitions in childhood become more common in Britain, the 'divorce effects' literature is itself in danger of falling into a common sense trap of over emphasising the impact of the one event of parental divorce when, from a child's perspective, other family transitions may be equally pertinent.

1.2 Researching the Life Course

Social science has long been trying to address "problems of biography, of history and of their intersections with social structures" (Mills 1959, p143) and life course methodology represents a response to this need. Our society attributes changing meaning to the passage of biological time in an individual's life by taking into account the family, social, economic and historical context (Bengston and Allen 1993; Glenn and Kramer 1987). Along the life course individuals pursue separate trajectories in their family or work life punctuated by transition events such as leaving home, getting a job, marriage or divorce. Such transitions have been defined as events that "alter the position of individuals in the social world" (Teachman 1982, p1037). How an individual adapts to these changes and reconciles their different trajectories is the subject of life course research.

Elder describes four central themes of life course research. First, the historical time in which an individual lives is central to their work and family trajectory (Elder 1994). Major economic cycles, for example, may restrict or enable the educational and work transitions of young people, setting a pathway for adult life. Secondly, age is a matter of socially constructed meanings. In each time and in different cultures there will be different expectations of a "suitable" age for major transitions such as marriage or childbearing. Deviations from these norms may create stress for the individual if, for example, their social networks consider that they are too young or too old to be raising children. In essence, a society may have a concept of whether an event is "on-time" or "off time" according to both an individual's age and their social position, but these times are by no means fixed (Neugarten 1968). Economists would place a similar emphasis on age appropriate transitions but more in terms of time for investment in relationships or searching for an appropriate partner (Becker et al. 1977). There may also be changing attitudes to the location of an event in relation to other transitions, for instance the changing response to births outside marriage in recent decades.

Thirdly, life course analysis looks at the interdependence of people's lives, particularly across generations. Parents not only transmit values and preferences to their children, but also their experiences will have an impact on their children's life course. It is hypothesised that the characteristics of a child's family of origin continue to have consequences long after they have left the parental home, particularly if their childhood included periods of economic hardship, household mobility or other disruption that may have affected their educational and employment opportunities.

Yet fourthly, this impact is not consistent in its strength or direction because of the capacity for human agency and its feedback effects (Lerner and Busch-Rossnagel 1981). Life course research has mirrored the growing sociological interest in both adults and children as active agents in shaping their own trajectories (Giddens 1991; James et al. 1998). This sociological concept of agency coincides with psychology's interest in factors that support or restrict individual resilience in the face of a stressful event. These may include external resources and social support , individual temperament or intelligence (Cohen 1987; Rutter et al. 1983; Rutter et al. 1970). All such approaches focus on trying to understand why only a minority of people who experience a stressful event suffer negative consequences. Indeed the 'challenge model' of coping behaviours (Garmezy et al. 1984) considers the positive effect of a moderate amount of stress in early life to develop perceived personal competency and self-esteem. A study found that women who experienced very low levels of stress in childhood were actually more prone to depression in adulthood than those who had experienced a moderate amount of stressful events such as moving house, changing school or parental separation (Forest et al. 1996).

Concepts of the life course have largely replaced ideas about the individual or family life cycle as a set of ordered stages of education, work and family formation in a stable social system (Aldous 1978). Instead, the life course involves flexible biographical patterns within a continually changing social system. It falls short of a theory giving us hypotheses about the likely impact of changes in family relationships, for which authors tend to revert to their specialist subject, but is more of a method to conceptualise the intersection between individual lives and macro level change over time.

1.3 Childhood family disruption and the life course of young people

The adoption of a life course framework in the 'divorce effects' literature has moved the agenda away from studies of internal family and individual functioning towards the changing social meaning of divorce and, therefore, changing potential impact on those involved, both over time and for different generations in the same family. This section introduces some of the main perspectives on the impact of parental divorce or repartnering on children that have informed the approach to the analysis in this thesis. The literature discussed in Chapters 4, 5 and 6, looking at the outcomes of disruption, is organised under the following themes.

1.3.1 Financial hardship

Financial hardship is argued to limit the transmission of human capital to the child by reducing direct investments in education or the ability to buy goods for the home that support learning or employment prospects (Becker 1991; Becker and Tomes 1986; Duncan and Brooks-Gunn 1997). Hardship can clearly put a strain on parenting (McLeod and Shanahan 1993), either if a parent is unemployed or has to work long hours to support the family, leaving less time and energy to care for the children. In turn, both the behavioural and educational development of a child might be influenced.

Family disruption has a complex relationship with economic circumstances. Families who divorce tend to be poorer in the first place (Duncan and Hoffman 1985; Hanson et al. 1998; McLanahan and Sandefur 1994), but parental separation and lone motherhood still brings about a further fall in household income (US: Hanson et al. 1998; McLanahan 1992); (UK: Bradshaw and Chen 1997; Jarvis and Jenkins 1999; Millar 1994). In the US, Pong and Ju estimated that a child's household would experience an average 25% drop in income following parental separation (Pong and Ju 2000). Following that fall in income, lone mothers may need to move to a cheaper home. In Britain, in the 1970s the majority of children experiencing family disruption moved to a cheaper home often following a 'clean break' parental divorce (Eekelaar and Maclean 1986). Also, these moves tend to involve going to a cheaper neighbourhood and maybe changing school (McLanahan and Sandefur 1994).

In Britain, during the 1970s and 1980s the gap in incomes between lone parent and two parent families widened and became more similar to the US. The proportion of children living in poor households rose from about one in 10 in 1968 to one in three by 1995/6 (Gregg and Machin 2000). Consistent with this, Ely and colleagues (1999) demonstrated that income was more closely related to family structure among members of the BCS70 than previously among

the families of the 1958 NCDS cohort, with the lowest incomes in lone mother families. So, not only is financial hardship known to have an adverse affect on the life course, but also for this cohort the chances of experiencing financial hardship were clearly related to family structure.

After separation, bringing up a child may cost more to the parents in terms of time and money spent maintaining access to the child, again reducing the resources available to directly support that child. Also, child support from the absent parent tends to fall away over time, particularly if the absent father has new biological children in a second family (Smock et al. 1999).

The transition to a stepfamily often increases household income. However, in the US, despite income levels comparable to original families, home ownership has been found to be 12% lower among stepfather families than original couple families (Hanson et al. 1998). In the UK, stepfamilies have been found to have comparable incomes to families from similar backgrounds, but are economically vulnerable due to their larger average size (Ferri and Smith 1998; Haskey 1994). Yet less is known about the allocation of resources within stepfamilies and it has been suggested that stepfathers may provide fewer resources for step than biological children (Becker and Murphy 1986). There may be demands on resources from non-resident children and incoming child support payments may, again, diminish upon the repartnering of the mother (Wallerstein and Corbin 1986).

1.3.2 Social capital and control

Family disruption is suggested to interrupt the transmission of social capital to a child through processes such as moving to a poorer neighbourhood with different social networks, reduced contact with the father and his employment networks (Biblarz and Raftery 1999) or poorer interactions with the residential parent. According to this approach, the most disadvantaged children would be those who were born into a lone mother family or those who experienced early parental separation who are known to have the least contact with their natural father during childhood (Seltzer 1994).

Studies in the US have suggested that a working lone mother may benefit the child's development and education because of the increase in household income (Haveman et al. 1991; Yeung et al. 1995), but it may also reduce supervision or support of younger children and place time pressure on older siblings to take on caring roles in the family (Weiss 1979).

Divorce has been found to be associated with lower parental control at all ages (McLanahan and Sandefur 1994) and it is suggested that maternal parenting quality diminishes for around two years after a separation as the mother adjusts to the new circumstances (Amato and Keith 1991; Chase-Lansdale and Hetherington 1990; Hetherington and Clingempeel 1992). On the specific aspect of parental supervision of the child, in the US, Hanson and colleagues found that aspects of maternal supervision actually increased after divorce, but then declined to below the levels of original families after stepfamily formation (Hanson et al. 1998). Indeed, involvement with children generally has been found to fall after repartnering, as the stepfather and children compete for the attention of the mother (Furstenberg Jr and Cherlin 1991). In Britain, children in lone parent families have reported less supervision than those living with two natural parents whilst those in stepfamilies report similar levels of supervision but less parental encouragement and involvement (Sweeting et al. 1998).

The child's own ability to acquire social capital is also part of the explanation why some children might be more or less predisposed to resilience and avoidance of negative outcomes from family disruption or other stresses (Osborn et al. 1984; Rutter 1981a; Rutter 1994). The characteristics of the individual child or the nature of their environment may act as a protective factor that can moderate the impact of stressful life events and social circumstances. Quinton and Rutter identify two key factors in the construction of resilience to a stressful event such as parental separation:

i) secure, stable and affectional relationships, and

ii) success, satisfaction and achievement in activities.

In turn, these experiences will build self-esteem, confidence and beliefs in one's own self efficacy in the face of the changes (Quinton and Rutter 1988).

In application, children demonstrating high intellectual ability at an early age have been found to be more resilient to life stressor events. They may have a better cognitive problem solving approach to their experiences or, if they are less disruptive at school they may elicit more supportive responses from adults (UK: Dubow and Tisak 1989; Rutter 1979). Similarly, children with a positive sense of self-efficacy have been found to be less prone to behavioural problem outcomes although the extent to which self-esteem can be attributed to the individual child or the parents' support for the child is harder to quantify (UK: Dubow and Luster 1990; Osborn 1990). However, protective factors may not have an independent effect on the child's development and may not necessarily be "positive" factors in their own right. For example, a person who is immune to stress may develop a more self-centred and shallow personality (Rutter 1981b).

A factor that cannot be addressed in this thesis is whether there are any genetic traits behind these levels of resilience. Some studies of alcoholism and severe mental illness among twin samples indicate at least increased predispositions to vulnerability or resilience in this context (UK: Kendler et al. 1996).

1.3.3 Change, stress and conflict

Emotional and social adjustment has been found to be lowest among those who have experienced multiple family transitions such as their parental separation, mother's repartnering and then the dissolution of the stepfamily (Amato and Keith 1991; Furstenberg Jr and Seltzer 1986; Wu and Martinson 1993). A stress, or family crisis, approach (Visher and Visher 1988) would argue that the parenting and related changes disrupt the child's established roles in the family which could lead to reactions such as anti-social behaviour, early sexual activity or leaving home, according to the age of the child (Elder 1994; White and Brinkerhoff 1981). The greater the number of changes, the more pressure is put on the child to make role transitions; possibly leading to "role overload" (Elder 1974; Elder 1985).

Different events will have different levels of undesirability, unpredictability or control for individuals according to their family position and life course experience. An event may be unexpectedly stressful if it coincides with a cluster of other transitions that have temporarily reduced the individual's capacity to cope. For a child this might involve moving house and school at the same time as parental divorce (Mclanahan and Sorensen 1985). Children taking on financial or caring responsibilities in a family experiencing disruption or other type of hardship may be at risk of "accelerated role transitions" where their life course has deviated from expectations for their age (Elder 1974; Elder 1985).

The impact of any disruption may also vary according to the family dynamics prior to the event of separation. Although stressful, divorce may be a highly positive event for those engaged in highly conflicted interactions prior to that separation (Wheaton 1990). Among young adults who experienced parental divorce, those whose parents were highly conflicted before the separation have been found to have stronger sense of well-being than those who lived in low conflict households (Amato et al. 1995). Conflict, and its resolution, has been shown to be more relevant than parental separation, per se, when considering the behaviour of the child and outcomes for the young adult (UK: Cherlin et al. 1995; Elliott and Richards 1991; Emery 1982; Peterson and Zill 1986; Rutter 1981a). In longitudinal analysis, controlling for child well-being, behaviour or educational performance prior to any family

disruption, when conflict may be affecting behaviour, reduces the size of the effect of parental separation or repartnering on later adjustment (US: Furstenberg Jr and Teitler 1994; Hanson et al. 1998; Morrison and Cherlin 1995), (UK: Cherlin et al. 1995; Elliott and Richards 1991).

Some of the measures of the poorest well-being have been found amongst the young adult children of quarrelsome parents who did not separate (Morrison and Coiro 1999). Among those whose parents did divorce, the ensuing levels of conflict between the ex-spouses and in the home is associated with the speed with which any initial behavioural responses, such as anti-social behaviour and a decline in educational attainment, dissipate (Chase-Lansdale and Hetherington 1990; Hetherington et al. 1983a).

Although the increased responsibilities that some children take on in the household following parental separation can be stressful, a second time of conflict can occur if the child is required to relinquish those responsibilities upon the formation of a stepfamily. Girls who have spent long durations in lone mother families have been found to perceive that their previous status and contribution to the household has been undermined by the arrival of the stepfather (US: Weiss 1979); (UK: Gorell Barnes et al. 1998); one reason why the formation of a stepfamily is often a stressful period (UK: Burgoyne and Clark 1984). The levels of conflict within a stepfamily household may be overstated given the higher likelihood of having teenage children in the household (Furstenberg Jr 1987) but the combination of that conflict with any continuing conflict with the absent parent means that, overall, children in stepfamilies are exposed to more arguments (Hanson and McLanahan 1996).

Finally, the individual may not only experience stress and conflict within the family, but may also come up against attitudes and expectations from the community about family disruption. For example, there is evidence of bias in teachers' ratings of children's educational performance and behaviour if they know their family background (US: Amato 1991), (UK: Douglas 1964; Wadsworth 1979), which could have feedback effects on the child's behaviour.

1.4 The historical context

1.4.1 The social and political environment

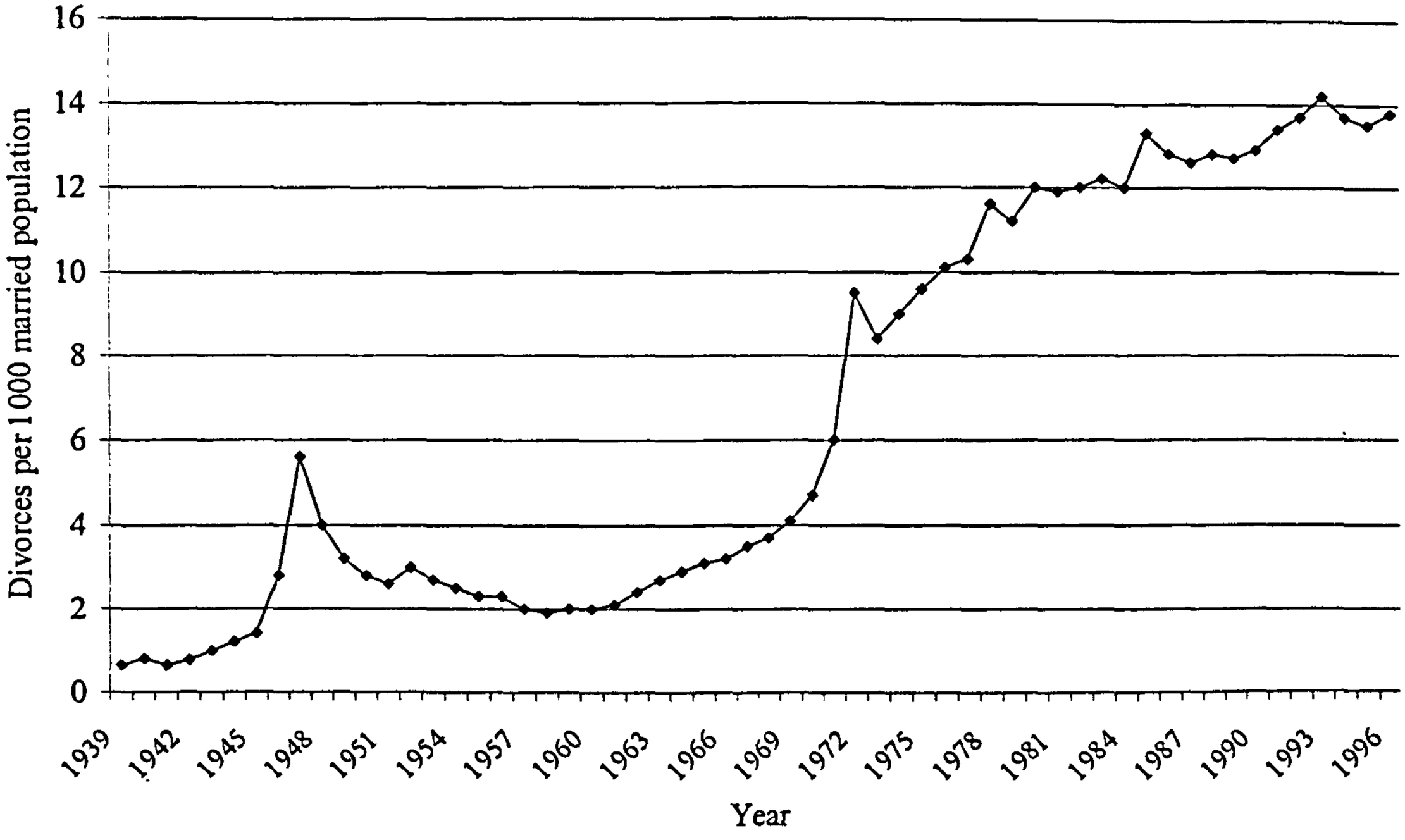
The childhood of the 1970 cohort would have been very different not only from that of their parents but even from that of the 1958 NCDS cohort, upon whom much of the longitudinal evidence of divorce effects is based. The median age of the mothers of the BCS70 children was 25. Born shortly after World War II, these mothers would have reached adulthood in a period of unprecedented prosperity during the 1950s and early 1960s, but also during a time of pressure for women to return to the home and support nuclear families. These parents were one of the last cohorts to grow up at least expecting a predictable sequence of education, stable employment, marriage and parenthood.

The 1970 cohort exemplify the growing heterogeneity of experiences that characterised growing up without these certainties. Some families would have been affected by the industrial disputes of the mid-1970s, even more would have experienced the economic hardship of the early 1980s, but there was a great deal of variety across the social classes and regions of the country. Around half of the BCS70 cohort left school at 16, often for a variety of youth training schemes rather than employment and they were the last cohort to be eligible for social security benefits before its abolition for 16 to 18 year olds in 1988. The cohort would not vote in a General Election until they were 22 and were unlikely to remember a government before the Conservatives took power in 1979. Teenagers leaving home in the late 1980s were more likely to live independently or cohabit, rather than marry, than their predecessors (Kiernan and Estaugh 1993), with a corresponding decline in the proportion of weddings involving teenage brides. The cohort was 14 when the first person was diagnosed with AIDS in the UK. However, given that the safer sex messages were initially targeted at gay men, we would not expect to see much effect on the sexual activity of the cohort as teenagers.

1.4.2 Trends in divorce

Although not all of the cohort members were born to married parents, much of the evidence on separation and repartnering is based on the registration of legal events such as marriage and divorce. Much less is known about the trajectories of those born to unmarried parents. Figure 1.1 shows the trends in divorce rates in England and Wales since World War II. The 1970 cohort was born during a steep increase in rates of divorce that began in the 1960s and did not level off until the 1980s. In the course of their childhood rates increased nearly threefold from 4.7 per 1000 married couples in 1970 to over 12.8 per 1000 in 1986 (Office for National Statistics 1999c).

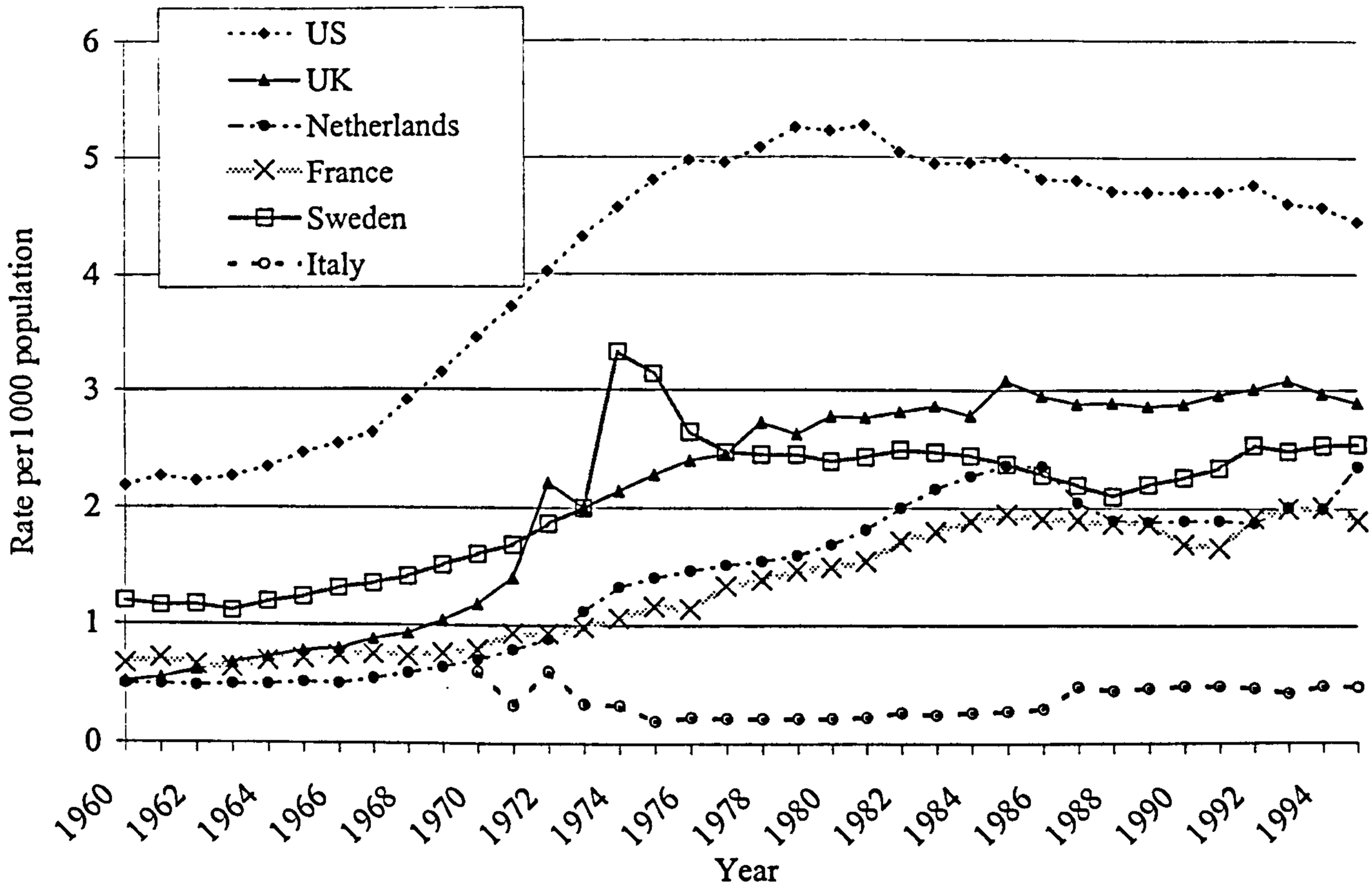
Figure 1.1 Divorces per 1000 married population, England and Wales 1939-1996



Sources: (Office for National Statistics 1999c; Stone 1990)

This trend coincided with sharp increases in divorce across most Western countries in the 1970s. Whilst rates in Britain were always below those in the US, by the mid 1970s the rate of increase became faster than previously comparable European countries such as the Netherlands and France, and more similar to Scandinavian countries such as Sweden (Figure 1.2).

Figure 1.2 Divorces per 1000 population, selected countries, 1960-1996



Sources: (United Nations 1999, Table 25; United Nations 1992, Table 34; United Nations 1984, Table 33; United Nations 1969, Table 34)

Until the beginning of the 20th century divorce was almost exclusively an aristocratic privilege for those with the resources and access to the legal system. The rates increased somewhat following the 1937 Matrimonial Causes Act that permitted divorce on the grounds of adultery, three years desertion, or cruelty. The presumption though was of a matrimonial offence causing the failure of the legal contract of the marriage rather than notions of incompatibility. Early research among those who did divorce tended to be couched in terms of individualised problems and psychological failure.

After the implementation of the 1969 Divorce Reform Act in 1971 (allowing divorce on the grounds of irretrievable breakdown of the relationship) already rising divorce rates began to soar. Although one can still point to 'micro' level precursors of divorce in the characteristics of couples (that will be considered among the parents of the BCS70 cohort in Chapter 3), earlier notions of individual deviance became increasingly hard to apply (Thornes and Collard 1979). Instead, commentators turned to more structural explanations to try and understand Britain's "divorce crisis".

Some pointed to changes in the legal framework as a causal factor in people's divorce behaviour. The 1937 reforms were widely believed to have legalised the separation of many couples whose only option had been informal separation (Gillis 1985). However, the surge in divorces following the 1969 Act led to alarm at the time that behaviour was being affected by the 'ease' of divorce. With hindsight few would argue that the 1969 reforms brought about more than a one-off surge in divorces that was part of an underlying trend in the increased risk of marital dissolution (Haskey 1996; Richards 1996). Analysis in the Netherlands concluded similarly that there is a short run impact of legislation if it brings down the costs of divorce but that the law itself does not influence behaviour (van Poppel and de Beer 1993). Those who take an economist's perspective would dismiss entirely any effect of divorce law stating that it simply reflects and codifies social change rather than precipitating it (Michael 1988).

Alternatively, some economists emphasise the association between the growth in women's earnings from the late 1960s in the West and the rise in divorce rates (Becker 1991; Michael 1988; Smith 1997). Although the continuing discrepancy between men's and women's wages brings into question some economists' ideas of married women's potential for economic independence following divorce (Maclean 1989), it was at least possible for some women to support themselves outside marriage in a manner that had not been feasible for a previous generation. Within marriages, women's increased labour force participation was also causing other tensions. Cherlin concluded that US couples who married in the 1960s and 1970s experienced a time-lag between women's changing work roles and the adjustment of both men's and women's attitudes towards domestic work and child care, which created particular stresses on these marriage cohorts (Cherlin 1981). In Britain, evidence about levels of female dissatisfaction in marriage, combined with records of women divorce petitioners outnumbering men by three to one in the 1970s and 1980s, indicated that divorce was becoming a feasible option taken by increasing numbers of women (Bernard 1976; Thornes and Collard 1979).

From a sociological perspective, others would argue that couples increasingly resorted to divorce because of the growing idealisation of marriage as a source of personal fulfilment in late 20th century Western societies (Beck and Beck-Gernsheim 1995; Farber 1973). Indeed, Britain is consistently found in Eurobarometer surveys to score highest on attitudes to marriage as a source of love and affection but lowest on attitudes that it is a location for childrearing (Utting 1995). Equally, changes in contraceptive technology in the 1960s gave women more control over the amount of time they spent childbearing and childrearing whilst also making it safer to have a sexual affair. Stone (1990) points to the rise in the proportion of

divorces granted to men for their wife's adultery between 1950 and 1970 (from 48% to 70%) as evidence of this growing equality of the sexes in the freedom to conduct extra-marital affairs. Another factor peculiar to the generation of parents of the BCS70 cohort was the falling mean age at first marriage; from over 25 for brides in 1931 to a low point of 22 by 1971, when 28% of all marriages included at least one teenager (Office for National Statistics 1999c). Indeed, 38% of the mothers of the cohort members were married before their 20th birthday. Given the higher vulnerability of youthful marriages to divorce (UK: Ermisch 1989; Kiernan 1986); the risk of separation among these marriage cohorts would be that much higher.

An idea that has achieved more prominence in the US than in Britain is the proposed association between the extension of welfare rights and social assistance for the costs of divorce with rising martial dissolution. Legal aid for divorce was introduced in Britain at a limited level in 1914 and subsequently expanded in 1920, 1949 and 1960. Some would argue that this financial assistance had a greater impact than legislative change, although the association is contested (UK: Chester 1972). Similarly, whilst some US commentators view social welfare payments as a cause of divorce (Michael 1988), there is little empirical evidence from British data of such an association (Smith 1997).

Parental repartnering

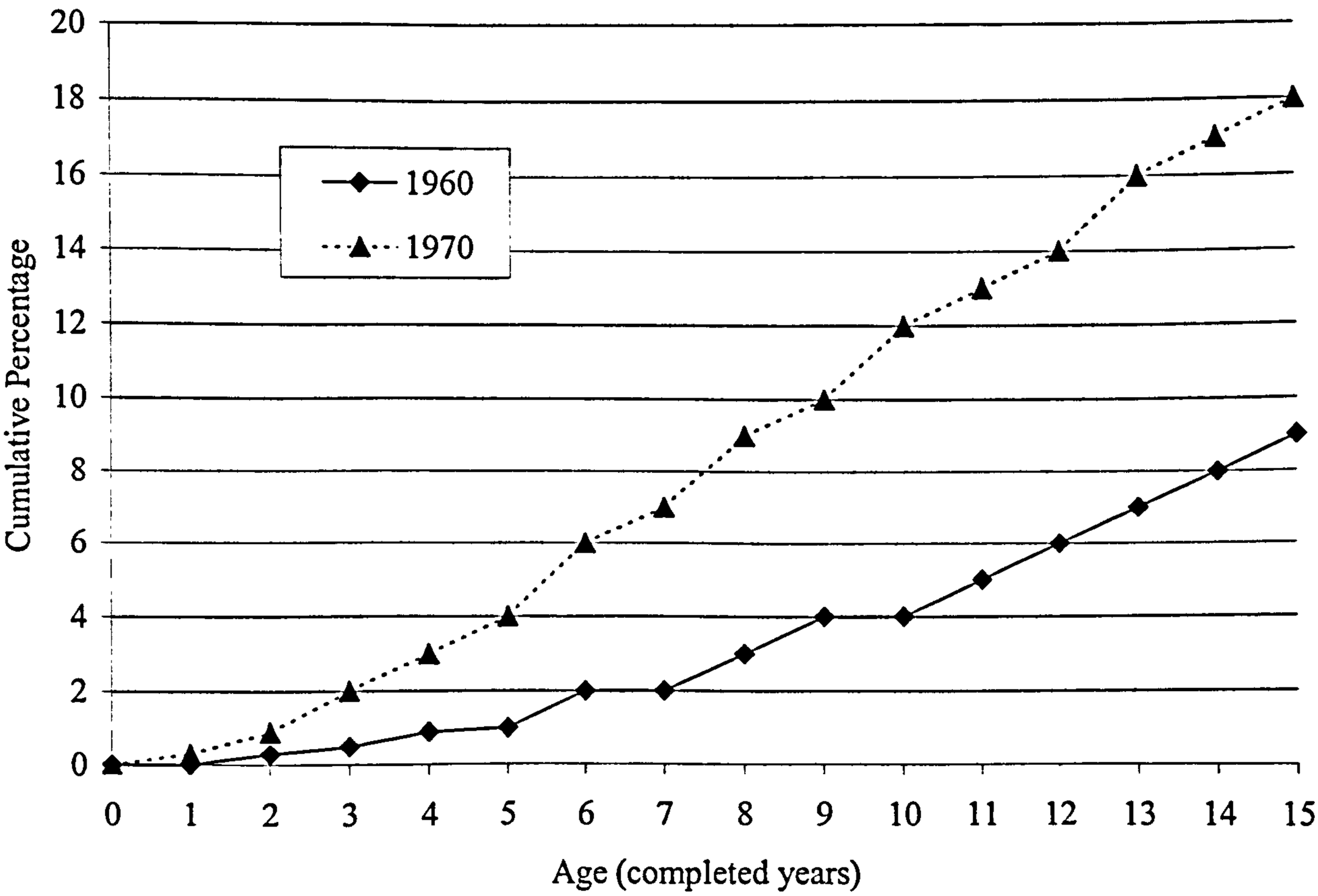
Despite the rising incidence of divorce, rates of remarriage remained high in the 1970s and early 1980s, falling only in the late 1980s as more couples began to cohabit after divorce. In 1985, nearly one third of marriages included at least one divorced partner and one in eight was the remarriage of two divorcees (Haskey 1987). In the mid 1980s, two thirds of British women remarried within six years of divorce, with even higher rates among men (Ní Bhrolcháin 1988). For the parents of the BCS70 we may expect rates to be somewhat slower given the evidence that children tend to slow the repartnering rates of mothers (Bumpass et al. 1990; Spanier and Glick 1980).

In all, whilst it is possible to point to the 'proximate causes' of rising divorce from the 1960s to the 1980s, no single explanation is likely to emerge for both the overall changes in divorce rates within developed countries or the divergence in trends across countries (Goode 1993). The question for this analysis of the BCS70 is how the experiences and behaviour of parents impacted on the life courses of their children.

The number of children experiencing divorce

The previous section reviewed the changing rates of divorce among all married couples. Not only was the incidence of divorce rising, but over the same period the average duration of marriage at separation was falling. Children born in 1970 were not only more likely than previous cohorts to experience their parents' divorce but it was also more likely to occur at a younger age. Figure 1.3 shows the cumulative percentage of children who had experienced the legal divorce of their parents, by age, in England and Wales among those born in 1960 and 1970. Whilst rates of experience of parental divorce by age 16 doubled between these cohorts, from 9% of those born in 1960 to 18% of those born in 1970, the proportion of children experiencing divorce before aged 10 tripled from 4% to 12% (Haskey 1997). If children in the cohort were experiencing parental separation at a younger age than their predecessors then, in turn, they had a higher probability of their parent entering a new marriage or cohabitation before they were 16.

Figure 1.3 Cumulative percentage of children who have experienced parental divorce by age, England and Wales, 1960 and 1970 birth cohorts



Source: Haskey (1997) Table 1

The legal framework for divorce

In the late 1980s and 1990s there were a number of pieces of legislation where the state redefined parental obligations independent of marital status or residence[1]. In the decades preceding this there was less emphasis on the rights of the child, or on the role of the non-residential parent. In the 1960s courts were unlikely to encourage or enforce contact and the 1973 Matrimonial Causes Act continued to sanction the principle of the "clean break" divorce and did not prescribe the nature of continuing financial or familial relationships. From the late 1960s through the 1970s a much higher proportion of fathers in Britain lost touch with their children upon parental separation than do today. Many who had kept in contact stopped when the mother remarried, believing it to be in the best interests of the child (Bradshaw and Millar 1991; Eekelaar and Clive 1977). At the same time, levels of maintenance payments were low throughout this period. Even though divorced mothers were more likely to receive maintenance than never married lone mothers, Bradshaw and Millar (1991) estimated that still only 32% of this group were receiving any payments. Similarly, about six out of 10 lone mothers were claiming social assistance in the late 1980s (Goodman and Webb 1994).

Another related product of divorce settlements at this time was the likelihood of the child moving to a new house. Eekelaar and Maclean's study of maintenance after divorce in the 1970s and early 1980s found only 26% of mothers and children staying in the marital home. (Eekelaar and Maclean 1986). Their more recent study of family change in the 1990s found around half of the children stayed in the family home upon parental separation, partly due to changing legal attitudes to divorce settlements and a less fluid housing market (Maclean and Eekelaar 1997).

From the 1980s concern grew both that absent fathers were evading financial obligations, and that fathers were being denied parental rights that could benefit the child. The long-term effects of changes in family law since the late 1980s are still to be seen, but the relationships between childhood experience and adult life may well be different as a result. In total, compared to children growing up today, the children in the NCDS and BCS70 study who experienced parental separation were less likely to have contact with their absent parent, less likely to receive financial support from that parent, and more likely to move house.

[1] Through legislation such as the 1989 Children Act, 1991 Child Support Act and 1996 Family Law Act.

Changing attitudes to marriage and divorce

The qualitative study of members of the 1958 NCDS at age 33 (Gorell Barnes et al. 1998) found many of those who had grown up in stepfamilies experienced the prevalent attitude in the 1960s that it was better to "shield" a child from the details of parental separation or even death. They reported that the dominant ideal of stable married life made divorce a sometimes shameful and taboo issue and the increase in life expectancy made disruption due to parental death a far less common feature of children's lives. Indeed, this follow up study of NCDS subjects who had lived in a stepfamily as a child, found that one-fifth of the mothers had misrepresented the household situation to an interviewer at one of the childhood stages of the study, most commonly excluding a new cohabiting stepfather from their description of the household.

The 1970 cohort grew up during a period of rapid demographic and social change, accelerating the trends experienced by the 1958 cohort. Between 1970 and 1986 the rate of births outside marriage had more than doubled to 21% and the divorce rate had doubled (Central Statistical Office 1990). Nearly 14% of families were headed by a lone parent and although the majority of lone mothers were divorced or separated, the most rapid rise (that was set to continue into the 1990s) was in the numbers of single, never married mothers (Haskey 1989). By the 1980s, it is arguable that less stigma was attached to divorce or lone parenthood even if the economic consequences may not have changed to such a degree (Ford et al. 1995; Millar 1994).

In total, the analysis of the family lives of the 1970 cohort must set their experiences in the context of the changing social, legal and economic backdrop. Table 1.1 summarises the changes in the legal framework of family policy that accompanied the lives of both the 1958 and 1970 cohorts. It presents these changes alongside the contemporary political, economic and cultural backdrop.

Table 1.1 Events during the lives of the 1958 and 1970 cohort

Year	Changes in family law	NCDS cohort age	BCS70 cohort age	Political, economic or cultural events[2]
1957	**Affiliation Proceedings Act** allows an unmarried mother to seek maintenance for a child from the father through magistrates courts within 3 years of the birth of the child **Maintenance Agreements Act** allows written agreements on financial arrangements to be altered by a court if there has been a change of circumstances			
1958	**Matrimonial Proceedings (Children) Act** requires judges to be satisfied that custody arrangements are in the best interest of the child	0		
1960	Eligibility for legal aid for divorce petitioners expanded	2		
1961		3		First man in space. Bay of Pigs Crisis. Berlin Wall built.
1962	**Law Reform (Husband and Wife) Act** abolishes the immunity of one spouse against a civil action by the other	4		
1963	**Matrimonial Causes Act** introduced reforms because of concern that fault based divorce was preventing the reconciliation of many couples.	5		Nelson Mandela jailed. JF Kennedy assassinated.
1965		7		Vietnam War begins
1966		8		England wins the world cup
1967		9		Homosexual acts between consenting men over 21 legalised. Abortion legalised. NHS makes contraception available to all women on "social grounds".
1968	**Maintenance Orders Act** removes upper limit for court maintenance awards	10		
1969	**Family Law Reform Act** lowers the age at which the rights and duties of a parent over a child terminated from 21 to 18. Gives illegitimate children equal rights to claim inheritance on intestacy as those born within marriage.	11		
1971	**1969 Divorce Reform Act** implement, allows divorce due to irretrievable breakdown of the relationship.	13	1	
1973	**Guardianship Act** gives men and women equal parental rights over children. **Matrimonial Causes Act** reduces emphasis on reconciliation to a requirement for solicitors to have discussed it with their client before commencing divorce proceedings.	15	3	Britain joins the European Common Market.

[2] Adapted from Evandrou and Falkingham 1997, Table 1.1

Table 1.1 Continued

Year	Changes in family law	NCDS cohort age	BCS70 cohort age	Political, economic or cultural events
1974	**Finer Committee** recommends a guaranteed maintenance allowance to alleviate poverty among lone parents (not implemented)	16	4	Wilson's Labour Government elected. Inflation tops 20%. Comprehensive education introduced.
1975	**Children Act** confirms sole legal right over a child born outside marriage to the mother	17	5	**Equal Pay Act (1970) and Sex Discrimination Act** implemented
1979		21	9	James Callaghan loses election to Margaret Thatcher's Conservative government following winter of discontent.
1980		22	10	**Housing Act** introduces tenants rights to buy council homes.
1982		24	12	Unemployment in Britain reaches 3 million. Falkland Islands War
1984	**Matrimonial and Family Proceedings Act** repeals the principles that a former wife's standard of living should be maintained at the level she experienced in the marriage.	26	14	First person diagnosed with AIDS in the UK.
1985		27	15	Famine in Ethiopia, Live Aid.
1987	**Family Law Reform Act** removes the association between the marital status of the parents and their legal obligations to the child.	29	17	Margaret Thatcher elected for a third term. Stock market crash (Black Monday, October 19th)
1988		30	18	**Social Security Act** excludes most 16 to 18 year olds from claiming Income Support and reduces rates for 18 to 25 year olds.
1989	**Children Act** extends the rights of children and abolishes the principle of sole custody in favour of joint parental responsibility	31	19	Berlin Wall comes down
1990		32	20	Nelson Mandela freed. Poll tax riots in London. Margaret Thatcher resigns. Student loans introduced as maintenance grants are frozen for higher education.
1991	**Child Support Act** introduces a national agency for the calculation and enforcement of child support payments.	33	21	Gulf War. USSR dissolves.
1993		35	23	Maastrict treaty ratified.
1995	**Child Support Act (amendments)** removes some of the inflexibility of the 1991 act following protests from absent parents	37	25	
1996	**Family Law Act** introduces a 12 month minimum waiting period between the initiation and granting of a divorce in which couples are required to attend at least one mediation session.	38	26	Job Seekers Allowance replaces Unemployment Benefit.

The sociology of changing times

Reviewers of empirical evidence in the US have argued that as the prevalence of divorce has increased since the 1950s and 1960s, the strength of associations with poorer outcomes in adulthood has weakened (Amato and Keith 1991)[3]. Theoretically, this would coincide with sociological ideas of growing individualisation of life courses in which the ties between family of origin and one's own life experiences are becoming looser (Beck 1992; Giddens 1991).

For children today it is argued that parental separation is becoming a "quasi-normative" life event (Funder 1996). Although still neither expected nor desired – as with many other life events – the increasing incidence has meant that an individual has a certain degree of anticipation and rehearsal for the event that provides some normative structure to the transition and assists in adaptation. With the rapid rise in divorce and remarriage rates there has been a growth in the heterogeneity of the divorcing population and pool of people available for repartnering, it can be argued that the expectations of the divorced and non-divorced become more similar as the experience becomes more common. In turn, children growing up in the 1980s compared even to the 1960s had an expanded range of peer group and information resources on which to draw in order to adapt and develop through a number of family circumstances. More recent cohorts of children may, therefore, develop different adaptations to new family forms to their parents' generation. For example, there is some evidence of children conceptualising a more additive definition of nuclear family than other adult members of their family (Furstenberg Jr 1987). "Transitional theorising" about childhood as a passive stage of socialisation has arguably underestimated the extent to which children exercise their own agency in their responses to childhood circumstances (James et al. 1998). Intra-cohort analysis allows us to examine the possibility that the increasing diversity of families experiencing transition as well as the development of normative structures for such changes will be reflected in outcomes for children.

1.5 Structure of the thesis

The next chapter describes and evaluates the quality of the survey data used in this project; including its original purpose, methodologies and response patterns. The consequences of sample attrition are addressed through the development of a reweighting scheme. The chapter also describes a second issue that arose in the course of setting up the data for analysis: recall

[3] However, an analysis of family disruption and educational attainment among three successive cohorts in the UK did not find support for this claim (Ely et al. 1999).

error. Systematic biases in the retrospective recall of the timing of events would directly impact on the analysis in this thesis and the steps taken to minimise these effects are described.

Chapter 3 presents the estimates, after reweighting, of the levels, type and timing of family transitions experienced by members of the cohort by age 16. It then considers factors associated with experiencing parental separation, and even repartnering. Analysis of the outcomes of disruption must take into account the fact that family disruption is far from a random event, and that precursors of disruption may also be precursors of negative outcomes for the young person. Factors found to be important in this analysis will be fundamental background controls to be tested in the later chapters examining the young adult outcomes.

Chapter 4 is the first of three chapters considering the association between childhood family disruption and young adult outcomes, beginning with educational attainment. It looks at the different probabilities of achieving fewer than five Ordinary level passes according to the type and timing family transitions, and further consequences for leaving school and higher qualifications. Chapter 5 builds on Chapter 4, asking if, after taking the young person's educational attainment into account, family disruption continues to be associated with the experience of unemployment in young adulthood. The period that the cohort left education and entered the labour market, between 1986 and 1992, was a time of considerable economic change and the analysis addresses this important structural influence on the life course of this cohort. Chapter 6 focuses on the women in the BCS70, looking at the probability of early childbearing according to the type and timing of childhood family transitions. Data limitations meant that an analysis of young fatherhood was not possible. Supporting documentation of the data issues and methodological approaches taken in all of the analyses in Chapters 2 to 6 are provided in the technical Appendices.

Chapter 7 concludes with a review of the key findings in the context of the family disruption and life course literature and reflects on the research and policy implications. It also examines both the challenges encountered in using the BCS70 data and possibilities for future work using the age 30 wave of the study.

Chapter 2 The 1970 British Cohort Study

This chapter provides an overview of the representativeness and quality of the data used in this research. First, it examines the levels of non-response at each stage of the survey and the possible biases that result. It then considers options for imputation or reweighting and describes the weighting schemes that have been adopted. Finally, it considers the accuracy of the recalled information about changes in family structure that is given by the parents at each stage up to age 16.

2.1 Sample coverage and response on the 1970 British Cohort Study

2.1.1 The survey design

The 1970 British Cohort Study (BCS70) is a longitudinal study following up all those born in Britain in the week 5-11 April 1970[4]. Since then, there have been four stages of attempting to collect information from the full cohort, at age five, 10, 16 and, in 1996, at age 26. A fifth stage was undertaken in 1999/2000. The survey was originally designed as a study of perinatal mortality and the provision of ante- and post-natal services (Despotiduou and Shepherd 1998). Over the years the study has broadened to include a wide range of socio-economic, demographic, health and attitudinal information using a variety of data collection instruments (Table 2.1).

At birth, the study was sponsored by the National Birthday Trust along with the Royal College of Obstetricians and Gynaecologists. The mother was interviewed by a midwife and some further details were obtained from clinical records. At the five and 10 year follow ups (conducted by the Department of Child Health at the University of Bristol), health visitors interviewed the parents, the children were given ability tests and the school health service supplied medical information. Additionally at 10, class and head teachers were given a self-completion questionnaire and the children received a medical examination. At age 16, the International Centre for Child Studies issued 16 separate survey instruments ranging from parent, teacher and head teacher questionnaires, through medical examinations to questionnaires given to the cohort members themselves. The cohort members were also asked to undertake a series of educational tests and keep activity diaries for two separate four day periods. By age 26, the study was the responsibility of the Social Statistics Research Unit at City University and a single self-completion postal questionnaire was sent to all cohort members who could be traced (Bynner et al. 1997).

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[4] The birth survey included births in Northern Ireland but these children were not followed up unless they moved to Britain.

Table 2.1 Sources of data at each stage of the BCS70

Age	Birth 1970	Age 5 1975	Age 10 1980	Age 16 1986	Age 26 1996
Survey title	British Births Survey	Child Health and Education Study	Child Health and Education Study	Youthscan	BCS70 26 year survey
Sources	Mother	Parents	Parents	Parents	
			School		
		Educational Tests	Educational Tests	Educational Tests	
	Medical	Medical	Medical	Medical	
			Cohort member	Cohort member	Cohort member

Source: Adapted from Despotidou & Shepherd (1998), Table 1.1

This project was undertaken when the cohort study was available only in its unlinked separate stages. The data was supplied by the UK Data Archive in a total of 22 files and analysed using Stata Version 6 (Stata Corporation 1999). Consistent with the survey documentation, 23 cases were dropped as they contained only age 26 data with no previous record. Details of the procedures followed for merging the datafiles, and the outcomes of that process, are detailed in Appendix I.

2.1.2 Sample coverage

Overcoverage

By definition, a sample of all children born in a certain week means that the original births sample frame would not suffer from problems of overcoverage usually caused on household surveys by the selection of empty properties, institutions, or otherwise ineligible addresses. At later stages in the study there may be sample overcoverage when the target population has shrunk because of respondent death or emigration. For example, between 1970 and 1975, 156 of the study children were known to have died (Osborn et al. 1984). However, as Nathan (1999) has highlighted in his review of attrition on longitudinal surveys, these ineligible cases cannot be identified on the BCS70 datafiles as they do not contain administrative information concerning the causes of non-response.

Undercoverage

Although registration data were used, some mothers were not traced for the initial births survey and the base coverage rate is estimated to be 98% of the total births in the sample week

(Osborn et al. 1984). Chamberlain and colleagues estimated that 280 children born in Britain during the reference week were excluded from the births survey, but were alive and eligible for the next wave at age five (Chamberlain et al. 1975). Indeed, the process of sampling through school registrations at age five, 10 and 16 led to the discovery of many of the children who were missed from the initial sample. Apart from those born in Britain, the survey has also been supplemented at later waves with children of immigrants who were born in the reference week and were again identified from school registers. As immigrant children were not systematically traced for the survey there is most probably undercoverage of this group.

2.1.3 Case level response patterns

Inevitably, in a prospective study of this nature a considerable number of cohort members cannot be traced, do not reply to attempts to make contact, or decline to continue taking part in the study. In calculating response to the different stages of the survey, the first step is to establish who, from the initial achieved sample, was eligible for later waves. The original 1970 births survey included interviews with mothers

> "of all babies born (alive or dead) after the 24th week of gestation from 00.01 hours on Sunday 5th April to 24.00 hours on Saturday 11th April 1970"
>
> (Institute of Child Health 1989, piii)

This included stillbirths and early neonatal deaths, as well as live births. In total, interviews were conducted with the mothers of 16,567 babies in Britain[5], of which 16,160 were recorded as live births (Osborn et al. 1984). However, in more recent calculations of survey response, allowance has been made for babies who did not survive the first week of life reducing the total to 16,135 (Despotiduou and Shepherd 1998) (Table 2.2). A further 21 children were born in Northern Ireland, but subsequently emigrated to Britain where they were retained in the study.

Table 2.2 The Initial Achieved Sample

Born in Great Britain and included in births survey	**16567**
Less	
Foetal death	*234*
Early neo-natal deaths	*173*
Initial achieved sample	**16160**
Less early infant deaths	*25*
Final achieved sample	**16135**

[5] Just over 2% of the cohort members were twins or triplets.

The total count of achieved interviews at later stages includes both those who took part in the births survey as well as children new to the study. The published response tables usually present the response rate as a percentage of the initial achieved sample. However, at each stage the target population will vary according to the levels of respondent deaths and emigrations between stages as well as the number of new immigrants. Nathan (1999) has presented alternative response rates as a percentage of an estimated target population after allowing for these factors. The two sets of results are presented in Table 2.3

Table 2.3 Response rates on the BCS70

Survey Stage	Despotidou and Shepherd (1998)		Nathan (1999)	
	Achieved Interviews	Response Rate %	Achieved Interviews	Response Rate %
Estimated population total	*16464*		*17067*	
Birth - 1970	16135[1]	98	16570[2]	97
Age 5 - 1975	13135	80	13135	77
Age 10 - 1980	14875	93	14875	87
Age 16 - 1986	11628	72	11628	68
Age 26 - 1996	9003	56	9003	53

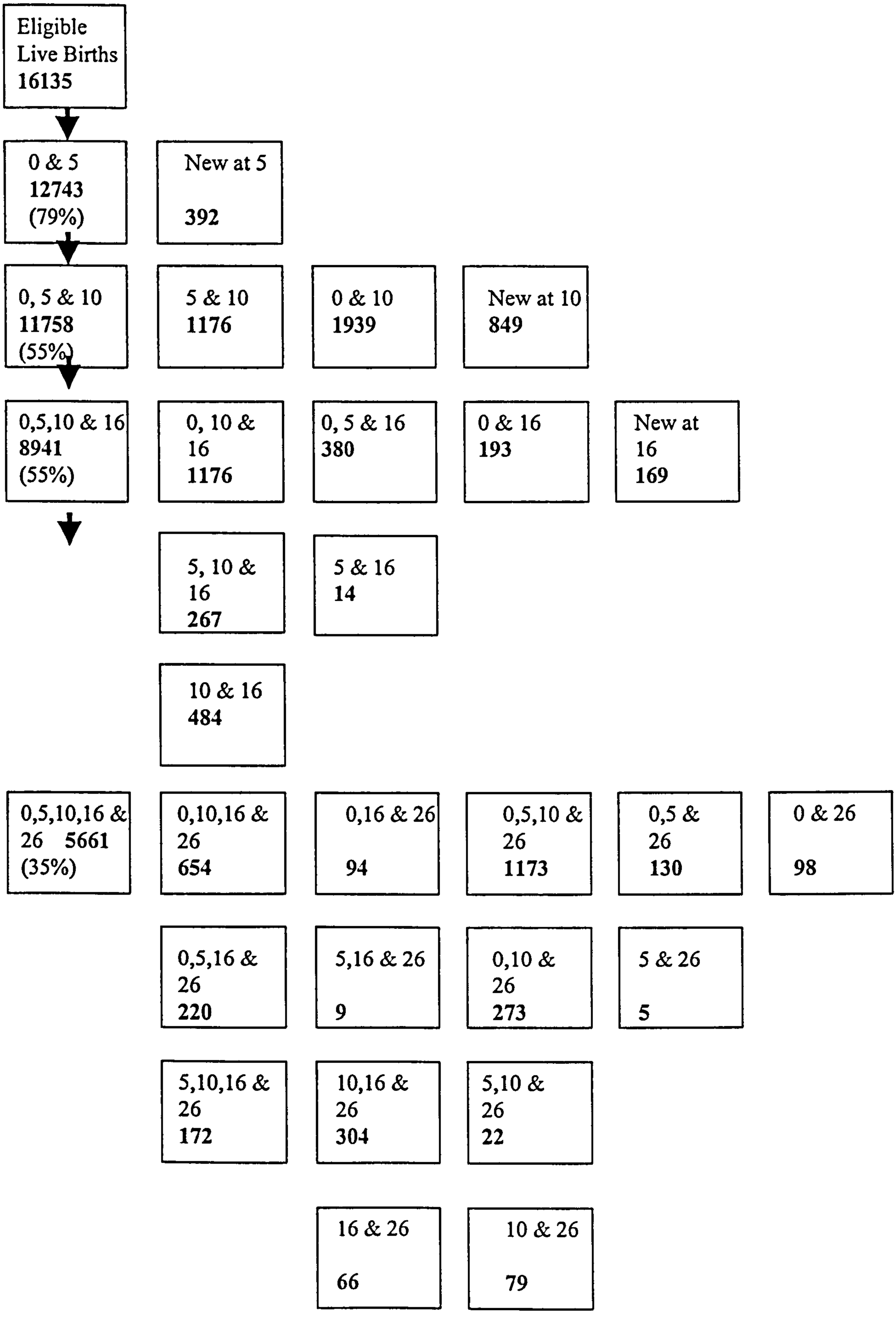
Notes

1 Despotidou and Shepherd calculate response at the Birth Survey as a proportion of the estimated number who were born in Great Britain between the target dates and lived to at least 7 days old (Despotiduou and Shepherd 1998).

2 Nathan calculates the response rate at the Birth Survey using the larger total of responding cases which include foetal deaths and early neonatal deaths, totalling 16,570 cases (Nathan 1999).

Another characteristic of a longitudinal study is the incidence of wave non-response, when a cohort member is absent at one stage, but reappears later on. Figure 2.1 shows the pattern of response from birth through to age 26. The chart shows that over one third of the initial achieved sample (rather than eligible sample) participated in every stage up to and including, the age 26 survey. The largest single category at age 26 of wave non-responders is those who were missing at age 16, but have data for all other stages. The next largest group are those who are missing at the age five stage only. This overall loss to follow up as well as patterns of wave non-response among those retained at age 26 means that we must consider the extent to which those still in the study differ in their social and demographic characteristics from those who have been lost.

Figure 2.1 Wave response patterns on the BCS70



2.1.4 Item non-response

An achieved interview is defined as the completion of one or more of the survey instruments at each stage. At birth, age five and 26 there was only one questionnaire; however, at age 10 and 16 there were a number of instruments and some individuals were missing the home/parental questionnaire that would be central to the analysis of family structure (Table 2.4). Among those who had completed the home questionnaire, item non-response could affect the analysis.

Table 2.4 Completion of parental questionnaire at each stage

Stage	Achieved sample	Number completing parental questionnaire	*% of achieved sample with parental questionnaire*	Number with complete parental information	*% of parental response with information on family transitions*
1970 – Birth[1]	16181[1]	16181	*100*	16164	*100*
1975 - age 5	13135	13135	*100*	13135	*100*
1980 - age 10	14875	13871	*94*	13715	*93*
1986 - age 16	11628	9584	*82*	9467	*81*

1 Achieved sample defined here as all live births (n=16,160) plus 21 Northern Ireland births who migrated to Great Britain.

A total of 278 cases who responded at age 16 had to be dropped from the analysis because they were missing the parental interview or did not have sufficient information on parenting history to derive the record of family transitions in childhood. Further details of the cases dropped from the analysis are given in Appendix 1.

Immigrants to Britain

Finally, 13 respondents who had immigrated to Britain after 1980 were excluded from the analysis on the grounds that their childhood experiences were not predominantly in Britain.

2.2 Response bias

2.2.1 Calculating response bias

It is clearly a concern for this thesis that the achieved sample in adulthood continues to be representative of the cohort. Shepherd (1997) has documented the differential non-response patterns on the BCS70 and some of the resulting biases. A positive response bias indicates that the respondents with that characteristic are over-represented in the achieved sample whilst a negative bias indicates under-representation. Response bias is calculated as:

$$\text{Percentage response bias} = \frac{\%\text{ achieved sample} - \%\text{ target sample}}{\%\text{ target sample}} * 100$$

By age 26, there is an under-representation of men, those born outside Britain and those with minority ethnic group backgrounds. There is also a weaker negative bias against those with disadvantaged social and educational backgrounds. Table 2.5 summarises some results of the existing analyses of bias at age 26 in relation to the characteristics of the achieved sample at the stage previous to that one. It should be noted, therefore, that the target percentage will itself reflect differential response to the earlier stages of the survey. Children who experienced a combination of family disruption and mobility are of particular interest to this study and there are negative response biases by age 26 against those who were born to young or single mothers. Those who were living with both natural parents are slightly over-represented. Those who had moved house many times between waves would be difficult to trace.

Table 2.5 Response bias among the age 26 respondents

	Target[1] %	Achieved % at age 26	Difference %	Bias %
1970 Birth Survey				
Teenage mother (at birth of cohort member)	8.7	7.9	-0.8	-9.2
Single mother	4.1	3.5	-0.6	-14.6
1975 Follow up				
Parents have no educational qualifications	38.0	34.7	-3.3	-8.68
Child living with both natural parents	91.5	92.5	1.0	1.1
Family has moved 3 or more times since 1970	9.8	9.1	-0.7	-7.14
1980 Follow up				
Has great difficulty reading	3.1	2.4	-0.5	-22.58
Child lived with both natural parents since birth	87.3	88.3	1.0	1.15
Child has lived with only one parent	0.6	0.5	-0.1	-16.67
Family moved 4+ times since 1975	13.3	13.2	-0.1	-0.75
1986 Follow up				
Child lives with both natural parents	81.7	82.2	0.5	0.61
Family lived at 4+ addresses since 1980	1.7	1.4	-0.3	-17.65

Source: Despotidou and Shepherd (1998)

1 The target percentage was calculated on the basis of the achieved sample at the previous survey stage and the estimated eligible sample for the birth survey.

2.2.2 Factors associated with wave non-response

Table 2.5 showed the biases against those entirely lost to the study by age 26. However, cohort members who took part in the study at age 26, but were missing at earlier stages may have not responded due to the similar circumstances to those lost to follow up. This study uses data for respondents who took part in the survey at age 16 and 26 which comprises over 80% of the respondents at age 26. Table 2.6 examines how this group may differ from the group who took part in the survey at age 10 and 26 but were missing the age 16 data. The differences between the proportions were tested for significance using a t-test.

From these examples we can see that those who were lost to the survey at age 16, but returned at 26, were more likely to come from manual social class backgrounds and to have been born to a mother who began childbearing in her teens. As far as their own life courses were concerned, the clearest difference between the groups, for both men and women, is in the proportion who left school at 16. Nearly 58% of the men and 52% of the women who were missing from the age 16 survey completed their education at the statutory school leaving age compared to 46% and 37% respectively of those who took part in the study at age 16. Non respondents at 16 were also more likely to have become parents by the time of the age 26 survey, although there was no significant difference in the rates of entry into marriage by this age. Finally, the women who did not respond at 16 were also more likely to have experienced unemployment than those who took part in the survey although this was not the case for men. In total, this comparison of the two groups of respondents at age 26 shows that restricting the analysis to those cases responding at both age 16 and 26 introduces further biases to the data.

Table 2.6 Comparison of family background at age 10 and characteristics at age 26 according to whether included in the age 16 survey

	Respondents at 10 and 26 (missing age 16 survey)	Respondents to parental questionnaire at 16 and response at 26
All respondents		
Mother teenager at first birth	24.9	19.2***
Manual Social Class at birth (by father's occupation)	72.2	65.4***
Total	*1435*	*5957*
Men		
Completed education by 16	57.9	46.5***
Parent by age 21[1]	-	-
Parent by age 26	25.1	18.0***
Ever unemployed for one month or more by 26[2]	60.8	57.5
Ever married by 26	27.5	25.0
Total	*757*	*2618*
Women		
Completed education by 16	51.7	38.7***
Parent by age 21	14.4	10.7***
Parent by age 26	37.1	30.2***
Ever unemployed for one month or more by 26	58.0	52.6***
Ever married by 26	38.2	40.3
Total	*773*	*3339*

* *Denotes a significant difference at the 10% level*
** *Denotes a significant difference at the 5% level*
*** *Denotes a significant difference at the 1% level*

1 The age at becoming a parent is excluded for men as the age of any children were only asked if they were living in the same household. This excluded nearly one quarter of children born to men in the study by age 26.

2 Question 9 of the Age 26 postal questionnaire asks the respondents to report how many periods of one month or more they have spent "unemployed and seeking work" since they were 16 (Despotiduou and Shepherd 1998).

2.2.3 The external validity of the data

A further method by which we can measure the extent of the response bias on the BCS70 is to compare the characteristics of the respondents remaining in the study at age 26 with national survey or registration data. Men and women aged between 25 and 27 who took part in the 1996/7 General Household Survey (GHS) were selected as an approximate match to the BCS70 cohort. The response rate on the 1996/7 GHS was 72%, which although higher than the BCS70 is also likely to under-represent the same types of young people that dropped out of the BCS70. A difference in the samples to note is the restriction of the GHS sampling frame to private households, thereby excluding those who are resident in any form of institutional accommodation. Also, the BCS70 sample design excludes any 26 year old who immigrated to Britain after age 16.

Secondly, vital registration data are published for birth cohort years in England and Wales (Office for National Statistics 1999a). This enables comparison of the pattern of some demographic events occurring to members of the BCS70 to the trends among the national population who were born in 1970. Another possible source, the 1991 Census, has not been used in this comparison because of the rapid change in the partnership and family formation patterns of people in their twenties in the 1990s. For example, 53% of women born in 1965 had been married at least once by exact age 26. By the time the 1970 cohort reached the same age in 1996, there had been a 13% fall in this proportion to 40%(Office for National Statistics 1999c).

Marital behaviour

Table 2.7 shows the proportion of the BCS70 cohort who had ever been married by the 1996 survey, compared to figures from registration data for England and Wales for the cohort born in 1970. Nationally, there is a considerable increase in the proportion married between exact age 26 and exact age 27. The proportions married on the BCS70 fall within this range, although the percentage of women ever married is slightly lower than might be expected. Table 2.8 then goes on to compare the current legal marital status of the cohort with those aged between 25 and 27 within the GHS. Note that the standard errors for the estimates derived from the GHS are relatively large due to the smaller eligible sample size. Both men and women on the BCS70 are more likely to be single than those in the GHS. However, given the marriage rate between the ages 25 and 27 the difference should be interpreted with caution.

Table 2.7 Percentage of men and women ever married by age, England and Wales, BCS70 age 26

	Registration data for 1970 cohort*		BCS70
	By exact age 26	By exact age 27	
	Percentage ever married		
Men	23	28	26
Women	40	45	40

* Source: Office for National Statistics (1999), Table 3.36

Table 2.8 Current legal marital status, 1996/7 GHS (respondents aged 25 to 27), BCS70 age 26

Marital Status	GHS		BCS70	
	%	Standard Error	%	Standard Error
Men				
Single	66	2.2	74	0.7
Married (first marriage)	28	2.1	24	0.7
Married (remarried)	1	0.5	0	-
Separated	3	0.8	1	0.2
Divorced	2	0.6	1	0.2
Widowed	-	-	-	-
Total	*466*		*4028*	
Women				
Single	52	2.2	60	0.7
Married (first marriage)	39	2.2	35	0.7
Married (remarried)	1	0.4	1	0.1
Separated	4	0.9	2	0.2
Divorced	3	0.8	3	0.2
Widowed	-	-	0	-
Total	*505*		*4818*	

Household living arrangements

Apart from legal marital status, Table 2.9 differentiates between those who are married, cohabiting or living alone/sharing and whether they have dependent children living with them. Apart from the differences in marital behaviour, men in the BCS70 who had married were less likely to be living with dependent children than those in the GHS sample. Men in both surveys were equally likely to be cohabiting either with or without children. Again, women on the BCS70 were less likely to be married with dependent children than those in the GHS. They were also less likely to be lone mothers than women in the GHS. Instead, the women in BCS70 were more likely at 26 to be either single or in marriages or cohabitations without children.

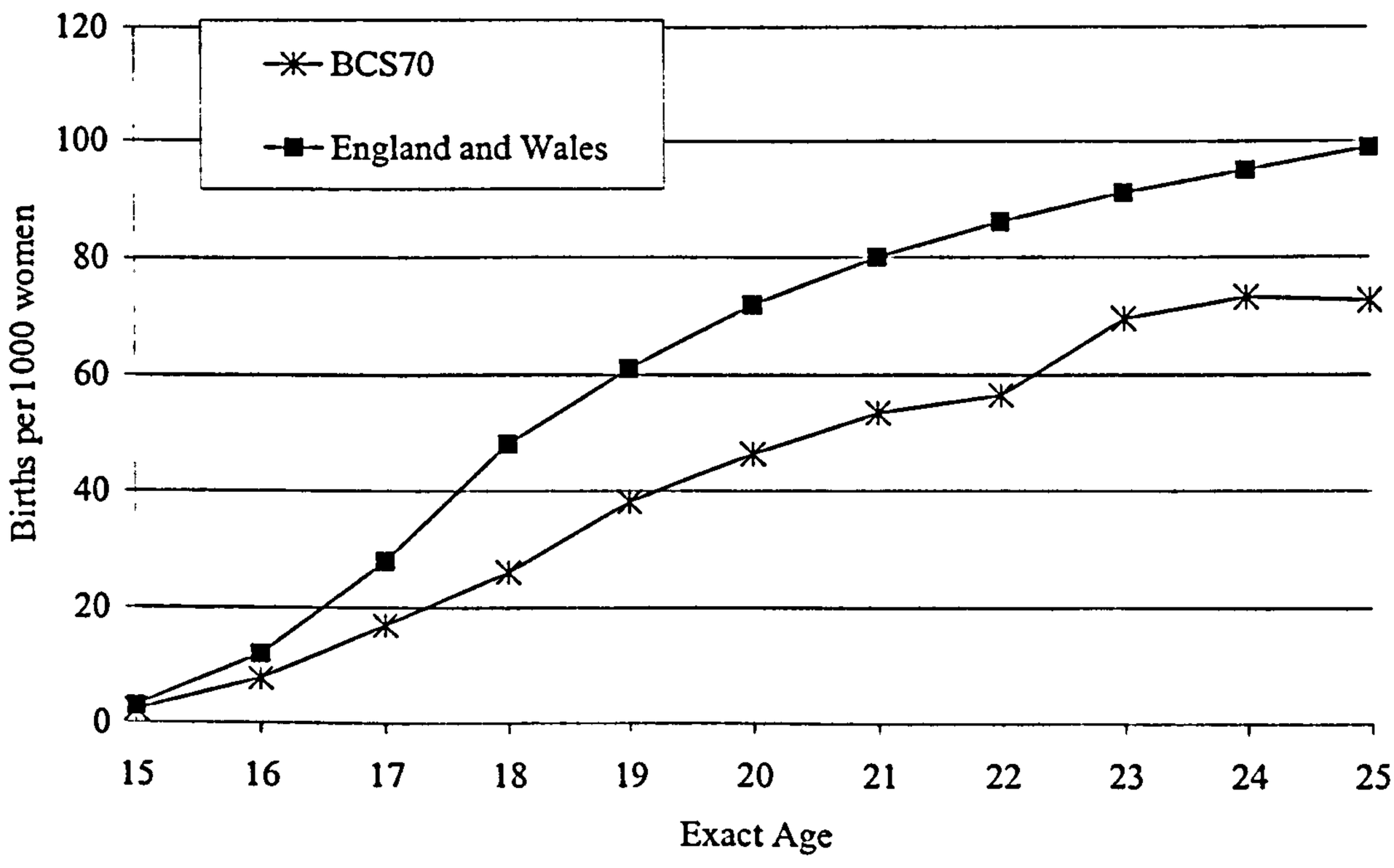
Table 2.9 Family type, 1996/7 GHS 25 to 27 year olds, BCS70 age 26

Family type	GHS		BCS70	
	%	Standard Error	%	Standard Error
Men				
Married couple, no children	13	1.6	12	0.5
Married couple and child(ren)	16	1.7	11	0.5
Cohabiting couple, no children	18	1.8	19	0.6
Cohabiting couple and child(ren)	7	1.2	6	0.4
Lone father and child	1	0.5	0	-
Single	46	2.3	51	0.8
Total (n=100%)	*466*		*4028*	
Women				
Married couple, no children	15	1.6	18	0.6
Married couple and child(ren)	25	1.9	16	0.5
Cohabiting couple, no children	13	1.5	19	0.6
Cohabiting couple and child(ren)	6	1.0	7	0.4
Lone mother and child	14	1.5	6	0.3
Single	27	2.0	32	0.7
Total (n=100%)	*505*		*4818*	

Childbearing

The lower incidence of living with dependent children found among the BCS70 women is reflected in the consistently lower birth rate at each age up to 26 on BCS70 compared to national rates (Figure 2.2).

Figure 2.2 Birth rate among women born in England and Wales in 1970 and BCS70



* Source: National Rate: (Office for National Statistics 1998, Table 10.1)

Educational attainment

The GHS can also be used to evaluate the representativeness of the educational attainment of the cohort. Men and women in the BCS70 are less likely to have no qualifications than those in the GHS. Similarly cohort members are more likely to have gained a degree than in the GHS. Comparison of the intermediate qualifications is less straightforward and may partly reflect the different modes of data collection on the surveys (BCS70, self-completion. GHS, face-to-face) (Table 2.10).

Table 2.10 Highest educational attainment, 1996/7 GHS 25 to 27 year olds, BCS70 age 26

Highest educational attainment	GHS		BCS70	
	%	Standard Error	%	Standard Error
Men				
Degree or higher	16	1.9	23	0.7
Further education, not degree	11	1.6	5	0.4
A level or equivalent	20	2.1	10	0.5
GSCE/ O level equivalent	27	2.3	38	0.8
CSE Grades 2-5	12	1.7	18	0.6
Foreign qualification[1]	3	0.9	-	-
None	10	*1.5*	7	*0.4*
Total (n=100%)	*377*		*3801*	
Women				
Degree or higher	16	1.7	19	0.6
Further education, not degree	8	1.2	5	0.3
A level or equivalent	16	1.7	12	0.5
GSCE/ O level equivalent	32	2.2	43	0.7
CSE Grades 2-5	11	1.4	16	0.5
Foreign qualification	4	0.9	-	-
None	13	*1.6*	5	*0.3*
Total (n=100%)	*467*		*4598*	

Note the high proportion of women in both samples reflects the differential response by sex among this age group.

1 This category does not apply to the BCS70 sample selected for this study due to the exclusion of immigrants to Britain after 1986.

Discussion

The findings of this comparison with national survey and registration data are consistent with the evidence of the internal bias within the study against those from more disadvantaged backgrounds (Shepherd, 1997). In all, compared to its predecessor, the 1958 National Child Development Survey (NCDS), the BCS70 is more biased in favour of those from more advantaged backgrounds and those who have had more stable childhoods. Therefore the raw

data up to age 16 are likely to under-represent the levels of family disruption in childhood and by 26, possibly the more negative outcomes of such disruption.

2.3 Options for imputation and weighting

Although the overall response rate at the age 16 survey was 68%, only 81% of families gave parenting history information, reducing the effective response rate for this analysis to 58% of the original birth survey or about 55% of the estimated eligible births. As non-response at later stages of the study is associated with early disadvantage and family disruption, it is likely that estimates of family disruption up to 16 will over-represent those from more stable backgrounds. Similarly, any models of outcomes at age 26 will encounter further biases due to non-response. This type of wave non-response can be viewed in two ways. Firstly, it can be seen as a set of item non-responses in the cohort member's datafile and imputation could be used for those items. This approach would create a complete file for longitudinal analysis. Alternatively, one can compensate through weighting adjustments proportional to a calculated probability of that case responding. In this section the applicability of these two approaches is evaluated with reference to the age 16 data.

2.3.1 Imputation methods

Item imputation aims to reduce the bias in survey estimates caused by ignoring records in multivariate analysis when answers to certain questions are missing. Continuous variables may be imputed through a regression framework that uses auxiliary information as independent variables to predict the response to a missing item. Brick & Kalton (1996) describe a regression equation to impute the value of y for a record i where the value of y is missing. First the equation is fitted using y_{ri} where r represents the respondents to the question, then $\hat{y}_{mi}$ denotes the imputed values for record i when the value of y is missing. The equation for the imputation would be:

$$\hat{y}_{mi} = b_{ro} + \sum b_{rj} z_{mij} + \hat{e}_{mi}$$

(Brick and Kalton 1996, Equation 3.1)

where y represents the variable with missing values to be imputed (which is a continuous variable) and z (z_1, z_2, ... z_p) represents the other (auxiliary) variables that are going to be used to impute the value y assuming that there are no missing values in variables z. The intercept is represented by b_{ro} and b_{rj} are the estimated coefficients for the regression of y on z obtained from the records that have a value for y. z_{mij} is the value of z_j for record i with a missing y value and $\hat{e}_{mi}$ is a residual term. If the error term is ignored in a deterministic approach (i.e.

$\hat{e}_{mi} = 0$), then all the imputed values would be on the regression line which may be the best prediction but would not reflect the residual variability. Alternatively, with stochastic methods, the shape of the distribution of y values would be closer to the true variance of y and although the inclusion of the residual term may add random noise, such an approach may be preferred for analysis which uses a large number of proportions; for example, in this study the proportion of births to young mothers (Brick and Kalton 1996; Kalton 1983).

In a longitudinal study such as the BCS70, there is a large amount of auxiliary data from the birth and early childhood stages that may be regressed against the variables with high levels of missing data at age 16. However, the key variables for imputation in this study would be categorical, in particular the family structure from ages 10 to 16. Here, some form of donor imputation scheme could be applied. One method would divide the sample into imputation classes defined by the auxiliary variables associated with the value of the variable to be imported. By creating small classes, the aim is to create groups within which the 'missing at random' assumption of imputation: i.e. the probability of an item being missing does not depend on the value of the missing item itself is not violated. A value for the categorical variable to be imputed can then be taken from a donor selected from that class by 'probability sampling' among the available donors (Kalton 1983). Kalton also recommends that if two or more items are being imputed then it is preferable to use the same donor, otherwise the covariance between the items will be attenuated and inconsistent values may be imputed.

In evaluating the usefulness of these methods for imputing a number of key variables at age 16, such as family structure and previous disruption such as house moves or parental divorce, there are a number of factors which indicate that imputation would not be appropriate. Most importantly, imputation methods are designed to compensate for a low level of item non-response affecting multivariate analysis. In the BCS70, of those cohort members responding at age 26, 34% were missing the parental questionnaire at 16, a much higher proportion than is intended for these methods. This level would create problems firstly for the creation of imputation classes where the non-responders can be reliably assumed to be missing at random, but also there is likely to be a high level of dependency on a small number of donors whose characteristics are homogeneous with the non-responders. It would, therefore, be likely that there would be a high degree of multiple use of the same donor which is discouraged by Kalton (1983). Also, the reliance on imputation for such a high proportion of cases would exacerbate the problem of the under-estimation of confidence intervals for parameters (Little and Rubin 1989). Further, a particular problem of imputing family structure at each age up

to 16 is the requirement that the type of family must have a degree of consistency with what has happened before. For example, the imputation scheme would have to be designed to avoiding imputing a family including a natural father if he has died. The possible combinations of disallowed circumstances would, therefore, be complex to apply and, on balance, has been judged to be outside the scope of this thesis. However, a limited amount of imputation was possible to create a year of parental divorce or repartnering where it was missing from otherwise complete responses. The details of this process are given in Appendix I.

There are two main approaches to dealing with such levels of missing data without imputing any values. First, considering item non-response within waves it is feasible to retain those for whom data is missing as a distinct category within each independent variable (Berrington and Diamond 1999). Alternatively, using the 1958 NCDS Hobcraft incorporates cases who are missing entire waves but overcomes the difficulties that would be caused when missing at one variable perfectly predicts missing at another (because it is drawn from the same wave) by deriving inferential variables from across a number of stages. For example, poverty is established if there is evidence from at least two out of the three waves of low household income (Hobcraft 1998). In this analysis, the concern to map circumstances with changing family structure favours the first approach where non-response is recorded within waves and no assumptions are made about changes (or lack of them) between waves.

2.3.2 Reweighting

As described earlier, non-response bias may cause underestimates of the levels of childhood family disruption among this cohort. Reweighting the data would aim to produce less biased estimates of the target population (i.e. the cohort) characteristics, either at 16 (for Chapter 3), or 16 and 26 (for Chapters 4 to 6), by compensating for differential probabilities of response. This probability could be calculated by creating a number of weighting classes using some key auxiliary variables such as sex, ethnicity or region. The data are then reweighted by the inverse of the observed response rate in each of these classes (Kalton 1983). Alternatively, where a large number of auxiliary variables are available the adjustment can be based directly on a logistic regression model where an individual's response probability is regressed on all the auxiliary variables available for both respondents and non-respondents. The adjustment is then the inverse of each individual's response probability. This is the most 'random' approach to response allowing each sample member to have a certain, if unknown, response probability (Bethlehem, 1988) although the weight will rely on the predicted response from the regression model rather than the observed one. In practice, Maughan and colleagues provide an example

of applying this method to the 1958 NCDS (Maughan et al. 1998). This approach was adopted in this thesis.

Within the BCS70 there is a very large number of potential auxiliary variables available to predict response at 16 and then at 16 and 26. Some guiding principles were followed to select the variables and avoid the creation of some extremely large weights (Brick and Kalton 1996; Kalton 1983; Rizzo et al. 1996). These include:

- Variables should be available for respondents and non-respondents.
- Variables used in the model should be related to the main concern of the study.
- Focus on main effects of variables.
- In the event of large weights been created, smaller categories of the auxiliary variables should be collapsed if they have similar response probabilities before moving on to examine the distribution of the remaining weights which may still need to be trimmed.

Initial precedence was given to information that was most widely available for all cohort members such as sex, ethnicity, region of residence at birth, social class and mother's age. Here, if the data was missing at the original birth survey it could be obtained from any of the subsequent stages and, therefore, could be added in from the earliest available stage. There could be issues of consistency here in cases of social or geographical mobility. However, categories were kept very broad to encompass most cases with divisions such as "manual/non manual" family backgrounds or regions as large as "The North" or "The South East".

Secondly, variables were selected from the birth or age five stage which were of intrinsic interest to the study and, among those who responded, did not contain high levels of missing values. These included the age at which the cohort member's mother began childbearing, family structure at five, the number of house moves by age five, whether the child was the first born of the mother, educational attainment at five and also birthweight which was found to be significant by Maughan and colleagues (1998).

Variables from the age 10 survey were not used in the model. By this stage, response patterns were well established. Here, the single most significant predictor of non-response at 16 was non-response at 10, overshadowing any variability within the responding group. Less than 20% of cohort members who were non-respondents at age 10 went on to take part in the age 16 survey. The resulting weights for these cohort members were potentially very large when

combined with information from previous waves. Also, there is no administrative information at age 16 to help judge whether the respondent's family refused to take part in the survey or were never traced. Either way, data from age 10 did not seem to add any further information to the reasons for response that were not already available by age five.

So, the models of response at 16, and then 16 and 26, used data that was either universally available or could be taken from the birth and/or age five survey. Here, there was one final problem that is caused by the violation of the principle that data should really be universally available for both respondents and non-respondents. Although a high proportion of the cohort members responded at birth and age five, some were missing the birth data, some the age five and some both. Although a valid "not known" category was created within each variable if a respondent was missing at both the birth and age five studies, then for some variables, "not known" at one auxiliary variable perfectly predicted "not known" at another, creating correlations between what should be independent variables in the model. This problem was overcome by creating the response model through a two stage process.

1. The model examining the relationship between a number of auxiliary variables and response at 16 was run initially using only those cases with data at birth and age five.

2. The auxiliary variables which were selected, but had correlated "not known" categories, were then collapsed into one large derived variable with categories representing all the possible combinations of circumstances including one category of "missing at birth and age five"

Details of how this worked in practice are given below.

Selecting the auxiliary variables

The logistic regression models the probability of an individual i, p_i, having a parental interview record at age 16 (or 16 and 26), given a vector of independent variables $\underline{Xi}$ so that:

$$\log\left(\frac{p_i}{1-p_i}\right) = \beta_0 + \underline{\beta_1' X_i}$$

where β_0 and β_1 are unknown parameters.

The co-variates were tested using forward stepwise and then backward elimination techniques available in Stata (Stata Corporation 1999). In building a logistic model, the stepwise regression allows the retesting of each variable as new variables are entered which may have more explanatory power in relation to the outcome variable and reduce the importance of the earlier factor. With forward stepwise, variables are allowed to "enter" the model if they achieve the required level of significance and then, after all such variables have been selected, the least significant term is considered again and if it is now "insignificant" (according to the required level) it is removed from the model. After that the "most" significant excluded term is retested to see if it should be added to the model if it is significant. The procedure repeats until no further variables can be added or removed.

Such an automated stepwise procedure is often criticised for the way that it restricts the researcher's control of the selection processs as well as other statistical problems such as increasing the risk of identifying associations that have occurred by chance (Judd and McClelland 1989). In this case, where the analysis was more exploratory than hypothesis driven, the stepwise method was used but it will not necessarily be appropriate throughout this thesis. Co-variates were selected if they entered the model at the 5% significance level and removed if they slipped below this level after considering subsequent variables. This was a lower threshold than used in later in the thesis with the specific intention of retaining a larger number of variables upon which to base the response probability weight. Table 2.11 shows the response outcome measures that were considered in the models. The probability of response at both age 16 and 26 was calculated separately for men and women to allow independent analysis of these two groups with weights that summed back to the original total for that sex. Table 2.12 shows the variables tested for their association with these outcomes.

Table 2.11 Response measures selected for reweighting

	% responding	*Total*
Parental response rate at 16	54.5	17380
Parental response at 16 and response at 26 (men)	29.1	*9008*
Parental response at 16 and response at 26 (women)	39.9	*8372*

Table 2.12 Variables tested for their association with parental response at the age 16 and cohort member response at 26

Variable	Wave data gathered	Prediction of parental response at 16	Prediction of parental response at 16 and response at 26	
Sex	All	***	n/a Men	n/a Women
Ethnic Group	All	***	***	***
Region		***	*	**
Social class by father's occupation	All	*	***	***
Age of mother in 1970	All			
Birth Order	Birth	***	**	***
Age of mother at first birth	Birth		*	
Mother's marital status at birth	Birth and age 5	***	***	***
Parent's educational level	Birth and age 5		*	*
Birthweight	Age 5	***	***	***
English Picture Vocabulary Test result at age 5[6]	Age 5	***	***	***
Family type at age 5	Age 5			
Ever in care by age 5	Age 5	**	**	*
Number of house moves between 0 and 5				

* denotes significance at the 10% level
** denotes significance at the 5% level
*** denotes significance at the 1% level

Variables found to be associated with response at the required 5% significance level which also depended on the response status at birth and age five were combined into a composite variable that avoided the problem of the 'not known' category at one variable perfectly predicting the 'not known' category at another. This composite variable finally consisted of:

- Parents' age at completing full time education
- Family type at age five;
- Picture Vocabulary Test (age five).

An initial variable with more detailed measures of vocabulary test results and both parent's educational level created a number of categories with very small cell sizes. Rizzo and colleagues (1996) suggests grouping cells according to the similarity of their predicted response rate from the regression model so that no weighting class contains fewer than 30 cases. In this case, parents' age at completing education was collapsed into two categories according to whether either parent had continued past age 15 or not. There were no statistically significant differences between the coefficients for a more expanded variable with

[6] The English Picture Vocabulary Test is an adaptation of the American Peabody Picture Vocabulary Test (Brimer and Dunn 1962). Scores were transformed using the proportions under the standard normal distribution to give a mean of zero and standard deviation of one.

dummies for either the mother or the father continuing in education. Similarly, the results of the vocabulary score were collapsed into a simple division between the top half of the distribution of the scores and the lower half or not known. The frequency for this resulting variable is given in Appendix I, Table I.1.

Table 2.13 shows the results of the final fitted model for probability of response at 16 taking the variables found to be significant in the initial selection but now collapsing those which were dependent purely on the birth and/or age five stage.

Table 2.13 Parameter estimates from logistic regression models of i) parental response at 16 and ii) parental response at 16 and response at 26, men and women

Reference categories are underlined	Response at 16		Response at 16 and 26 Men		Response at 16 and 26 Women	
	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$
Mother's age at first birth						
>=20	0	-	0	-	0	-
<=19	-0.11***	0.04	-0.15**	0.06	-0.26***	0.06
Ethnic Group						
White	0	-	0		0	-
African/Caribbean	-1.13***	0.11	-1.23***	0.22	-1.30***	0.20
Asian	-0.11	0.10	-0.51***	0.17	-0.70***	0.17
Composite Variable of Information from Birth and Age Five information						
Living with both natural parents at age five and..						
Parent's education: *Either/ both age 16 or later and...*						
Education score at 5:						
Higher	0	-	0		0	-
Lower	-0.23***	0.06	-0.45***	0.09	-0.29***	0.08
Not known	-0.17*	0.10	-0.21	0.14	-0.10	0.14
Parent's education: *Neither beyond age 15 and*						
Education score at 5:						
Higher	-0.27***	0.06	-0.27***	0.08	-0.17**	0.09
Lower	-0.45***	0.05	-0.51***	0.08	-0.53***	0.08
Not known	-0.32***	0.09	-0.57***	0.14	-0.27**	0.13
Not living with both natural parents at age five and..						
Parent's education: *Either/ both age 16 or later and...*						
Education score at 5:						
Higher	-0.46***	0.15	-0.49**	0.22	-0.61***	0.22
Lower	-0.45***	0.14	-0.60**	0.23	-0.62***	0.20
Not known	0.16	0.33	-0.74	0.57	0.10	0.44
Parent's education: *Neither beyond age 15...*						
Education score at 5:						
Higher	-0.41***	0.15	-0.19	0.20	-0.70***	0.23
Lower	-0.64***	0.10	-0.96***	0.18	-0.78***	0.15
Not known	-0.49*	0.25	-0.08	0.36	-0.68*	0.38
Missing age five stage	-1.30***	0.17	-1.56***	0.25	-1.38***	0.08
Missing birth and age five stage	0.00	0.18	-0.57**	0.26	-0.70***	0.13

Cont/d.....

Table 2.13 Continued

Reference categories are underlined	Response at 16		Response at 16 and 26 Men		Response at 16 and 26 Women	
	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$
Number of house moves by age 5						
<u><=1</u>	0	-	0	-		
2 or more	-0.11**	0.04	-0.14**	0.07		
Not known	-0.24	0.16	0.18	0.23		
Sex						
<u>Male</u>	0	-	n/a		n/a	
Female	0.25***	0.03				
Region of birth						
<u>North + Yorkshire & Humberside</u>	0	-			0	-
North West	-0.32***	0.06			-0.18**	0.09
East Midlands	0.08	0.08			-0.16	0.11
West Midlands	-0.22***	0.06			-0.27***	0.09
East Anglia	0.55***	0.11			0.52***	0.14
South West	-0.11	0.08			-0.07	0.11
Wales	0.14*	0.08			-0.09	0.12
South East	-0.53***	0.05			-0.34***	0.07
Scotland	-0.09	0.07			-0.09	0.10
Overseas/not known	-0.84***	0.13			-0.73***	0.21
Birth order						
<u>First born</u>	0	-			0	-
Second or later child	-0.13***	0.03			-0.21***	0.05
Social Class at birth (by father's occupation)						
Manual			0	-	0	-
Non Manual			-0.21***	0.06	-0.22***	0.06
Not known/No father figure			-0.36**	0.14	-0.55***	0.13
Constant	0.88***	0.06	-0.16***	0.06	0.67***	0.09
Total	*17380*		*9008*		*8372*	

* denotes significance at the 10% level
** denotes significance at the 5% level
*** denotes significance at the 1% level

-2 Log Likelihood= Response at 16: 11094.11
Response at 16 and 26 (men): 5178.83
Response at 16 and 26 (women): 5244.83

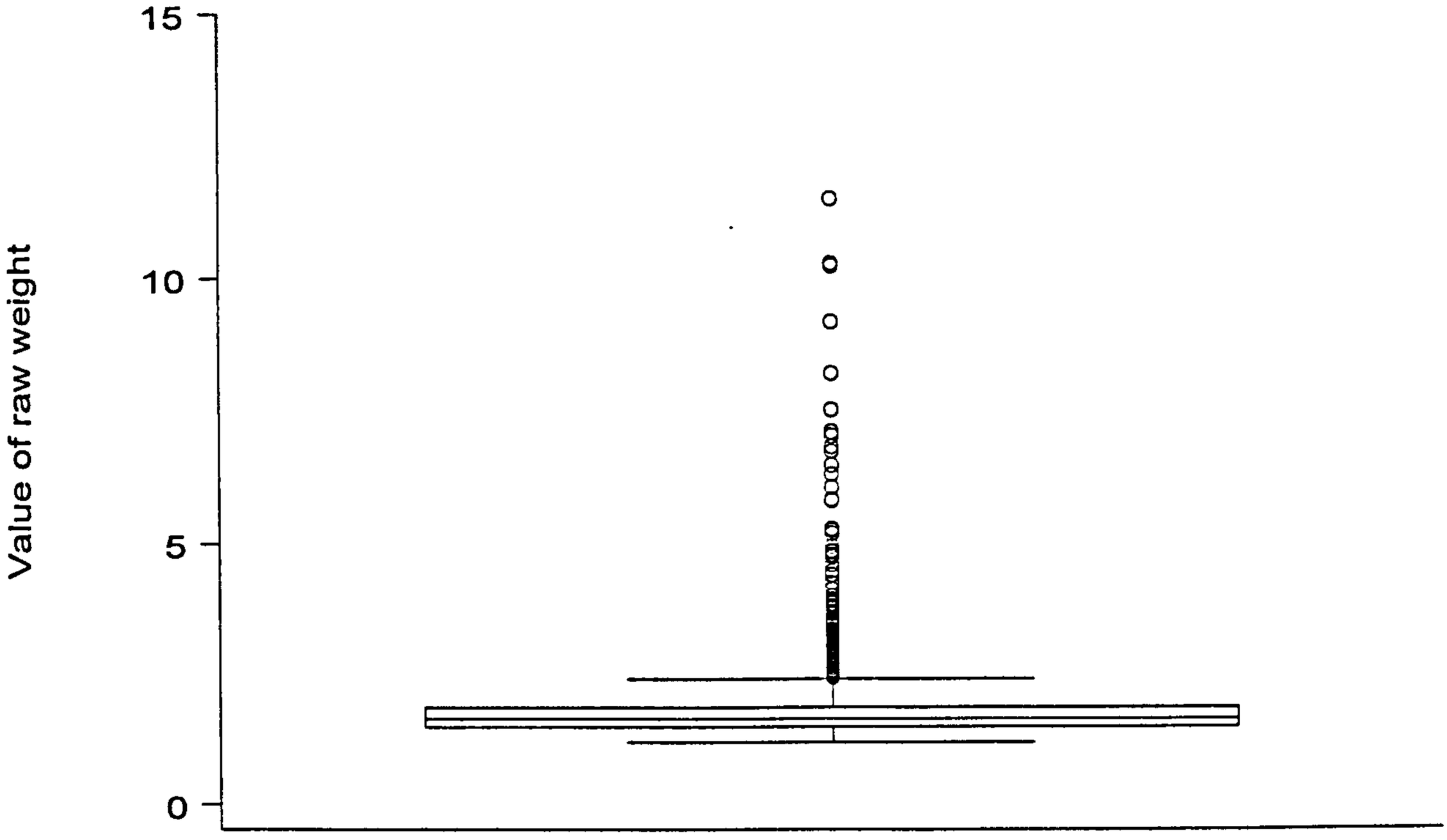
Table 2.14 shows the range of the predicted probabilities generated for each model

Table 2.14 Range of predicted probability of i) response at 16 and ii) response at 16 and 26, men and women

	Response at 16	Response at 16 and 26 (men)	Response at 16 and 26 (women)
Minimum probability	0.06	0.04	0.03
Maximum probability	0.86	0.51	0.77
Mean	0.54	0.29	0.40
SD	0.16	0.10	0.14

Using these models, each case was assigned a weight of the inverse of its estimated response probability based on the regression of the auxiliary variables for that case for the full sample. At 16, the lowest weights produced by this scheme were just over one, for which a typical example would be a white, first-born girl, born to an older mother, living in East Anglia, living with both parents at age five with a high Picture Vocabulary Test score at five. The highest weights might be exemplified by a black, second or further-born boy, born to a teenage mother, living in the South East, not living with both parents at five and with a low Vocabulary test score at five. Similar differences were reflected in the weights for response at 16 and 26. Figure 2.3 illustrates the distribution of the weights produced from the response probability at 16 model among those who did respond and give family structure information at age 16 (n=9467).

Figure 2.3 Box plot of the untrimmed weights for response probability at 16 among respondents at age 16



The median value of the weights for response at 16 was 1.6. Indeed, 95% of the values were under 3.2. However, the tail of the weights reaches 11.5 (Figure 2.3). This is a common occurrence when using a large number of auxiliary variables (Kalton 1983). The weights for response at 16 and 26 produced similar distributions . The weights for men ranged from 1.9 to 20.6 with 95% of weights below 8.7 whilst for women the range was 1.3 to 29.8 with 95% below 6.3. Large weights can lead to a loss of precision in survey estimates but trimming the largest weights to a lower level can increase the bias of the estimates (Brick and Kalton 1996)

.

This analysis adopted an empirical approach to trimming the weights by the estimated Mean Square Error (MSE) trimming (Potter 1990). Potter's review of weight trimming procedures found either the MSE or more involved "Taylor" Procedure to be most accurate as they utilise both the data and an estimate of the mean square error. Although the longer Taylor procedure was considered preferable as it incorporates an estimator of the bias introduced by the trimming into the weight trimming procedure, the two methods were found to perform similarly in practice and, therefore, the more straightforward MSE method was adopted.

The MSE procedure uses the estimated mean square error at a given trimming level for one or more data items that are important to the analysis. There is a point at which the reduction in the sampling variance after trimming is offset by the increase in the square of the bias introduced into the estimate. The MSE is estimated by:

$$\hat{MSE}\left(\hat{\bar{Y}}_t\right) \cong \left(\hat{\bar{Y}}_t - \hat{\bar{Y}}\right)^2 - \hat{Var}\left(\hat{\bar{Y}}\right) + 2\sqrt{\hat{Var}\left(\hat{\bar{Y}}_t\right)\hat{Var}\left(\hat{\bar{Y}}\right)}$$

Where

$\hat{\bar{Y}}$ = the estimate of the mean using the untrimmed weights

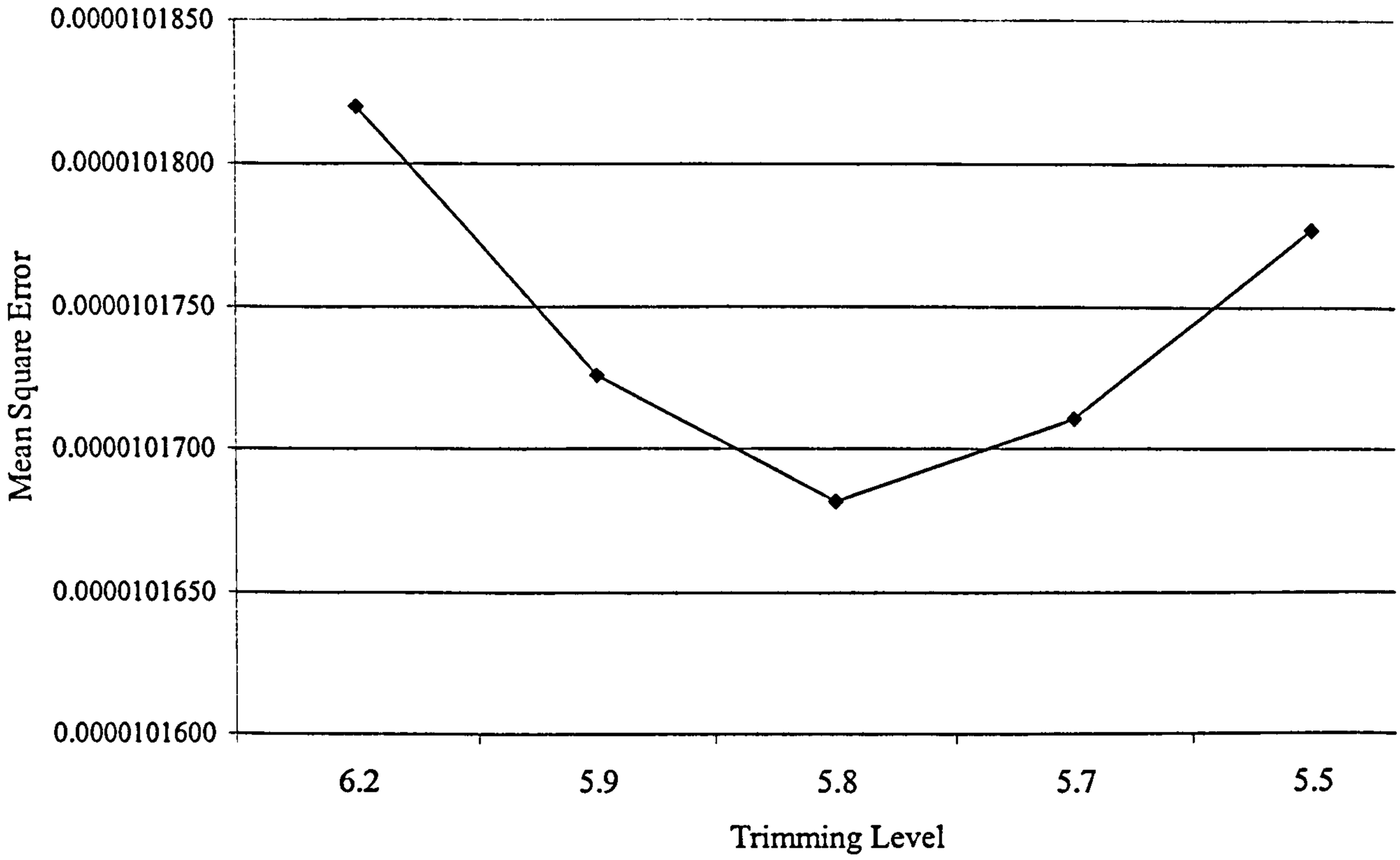
$\hat{\bar{Y}}_t$ = the estimate of the mean using the trimmed weights

$\hat{Var}\left(\hat{\bar{Y}}\right)$ = the estimate variance of $\hat{\bar{Y}}$ and

$\hat{Var}\left(\hat{\bar{Y}}_t\right)$ = the estimated variance of $\hat{\bar{Y}}_t$

In this study, the proportion of children still living with both parents at age 16 were selected as that key item at 16 as well as the proportion of women who had become mothers by 21 and men fathers by 26 for the weights at 16 and 26. The MSE was evaluated at various trimming levels working down from the largest weight. Each time a trimming level was tested, the excess weights created by the trimming was redistributed proportionally among the weights under that level. As the level falls, the redistribution is increasingly likely to push some weights back over the trimming level. If this is so, the trimming is simple repeated and the excess weight redistributed again until all the weights are below the required level. The optimal point minimising both the level of sample variance and estimated square bias was found to be 5.8 for the age 16 weights, 4.6 for women's response at 16 and 26 and 9.6 for men. Figure 2.4 shows graphically the change in variance against the estimate square bias at selected levels using the age 16 weight trimming as an example.

Figure 2.4 Mean Square Error of Estimate of Proportion of Children Still Living With Both Natural Parents By Selected Weight Trimming Levels



The weighting scheme produces lower estimates of the proportion of cohort members living with both natural parents at 16 than the unweighted frequencies and slightly lower levels of educational and occupational attainment by 26 (Tables 2.15 and 2.16). Although small, all the differences between the weighted estimates and unweighted frequencies were found to be significant at the 1% level with a t-test. Therefore although reweighting has made the survey estimates closer to national figures (where available), the trimming will cause the proportions to still fall short of these levels.

Table 2.15 The impact of weighting on selected variables at 16

Variable	Unweighted data	Using weights from regression prediction probabilites	Standard errors of weighted estimate
Mother teenager at first birth	21.9	24.1	0.005
Manual Social Class at birth (according to father's occupation)	69.1	70.1	0.005
Living with both natural parents at 16	75.4	73.4	0.005
Total	*9467*	*17380*	

Table 2.16 The impact of weighting on selected variables at 26

	Unweighted respondents to parental questionnaire at 16 and response at 26	Weighted estimate	Standard errors of weighted estimate
Men			
Completed education by 16	46.5	48.8	0.010
Parent by age 21[1]	-	-	
Parent by age 26	18.0	20.0	0.008
Ever unemployed for one month or more by 26[2]	57.5	59.0	0.010
Ever married by 26	25.0	25.8	0.009
Total	*2618*	*9008*	
Women			
Completed education by 16	38.7	40.4	0.009
Parent by age 21	10.7	12.0	0.006
Parent by age 26	30.2	32.5	0.008
Ever unemployed for one month or more by 26	52.6	52.6	0.009
Ever married by 26	40.3	40.9	0.009
Total	*3339*	*8372*	

1 The age at becoming a parent is excluded for men because children's ages were only asked if the child was still in the household, excluding nearly one quarter of children born to men in the survey by age 26.
2 Question 9 of the Age 26 postal questionnaire asks the respondents to report how many periods of one month or more they have spent "unemployed and seeking work" since they were 16.

The limitations of reweighting

Whatever weighting scheme is adopted it will always be limited by the characteristics of those who have stayed in the survey. It must be assumed that the respondents who are given large weights because they had low probabilities of response are not substantially different from those who dropped out of the survey. However, those who dropped out completely could well be extremely disadvantaged groups for whom there is virtually no representation in the survey at ages 16 and 26. The group who experienced disruption but remained in the survey are likely to have unobserved differences from those who dropped out and if these differences are pertinent to adult outcomes, modelling the association between early life experiences such as family disruption and young adult outcomes will produce a distorted picture that represents only the experiences of those who have had relatively stable lives.

Just over 1,000 cohort members have not been traced since the initial birth survey. From what we know about wave non-respondents it can be suggested that these children might have had the most disadvantaged and disrupted childhoods. Table 2.17 examines, using indicators

from the birth survey, the extent to which this extreme group differs from the respondents to i) the birth survey as a whole and ii) respondents who were in the survey at 16, but were allocated the very highest weights. The exceptionally low follow-up rates of cohort members born to a lone mother is notable. In 1970, some of these children may have been adopted or taken into care. Alternatively, the mother may have formed a new relationship by the time of the next survey and may have moved a number of times or had reservations about participating in the survey. The question remains as to whether the unobserved characteristics of the non-respondents lost at the very early stages are such that the analysis cannot adequately consider their experiences. In particular, this comparison has illustrated that although reweighting compensates for some of the bias, the experiences of cohort members who were born to a lone mother may be misrepresented in this survey.

Table 2.17 Characteristics of respondents lost to follow up after the birth survey

Birth circumstances	All respondents to the birth survey	Cohort members lost to follow up after birth survey	Respondents at age 16 with top 10% of weights (>=3.47)
	%	%	%
Social Class of Father			
I/II	15.9	14.7	15.7
IIINM	11.2	8.7	9.0
IIIM	44.1	35.2	36.5
IV/V	20.5	19.2	23.1
Other	3.4	5.8	5.5
Unsupported (no father figure)	4.8	16.4	9.4
% in lone mother family	5.9	20.4	12.7
% born to mother who began childbearing as a teenager	24.1	32.0	36.8
% born to teenage mother in 1970	9.7	15.8	14.4
Total	*16,135*	*1208*	*1751*

2.4 The quality of recalled information

A final issue in this examination of the validity of the data is the accuracy of the recall information given by the respondent. This thesis is concerned with the timing and duration of moves in and out of particular family types using the respondent's recall of the year of a particular event. It therefore relies heavily on the responding parent's retrospective recall of the date at which parenting figures left or joined the household. At each stage of the study if the child was no longer living with either natural parent, the respondent was asked for the year that the child was separated from that parent. If a child was separated from a natural parent soon after birth, this meant that the same question would have been asked in the 1975, 1980 and 1986 surveys. In creating the parenting history, the date given at the survey soonest after the event was taken as the valid date and was not overwritten by any subsequent response. However, this method makes assumptions about the accuracy of recall over time which are now examined in more detail.

2.4.1 The nature of remembering autobiographical events

Ideally, in examining the accuracy of retrospective recall one would compare the date given by the respondent with an external data source such as registration, medical or other civic records (Auriat 1993). This method is not possible on the BCS70 both because of the anonymised nature of the records and the focus on the separation of the child from the parent rather than an officially recorded event such as the date that a court granted a *decree nisi* or *decree absolute*. Alternatively, the consistency of the responses given at separate stages of the study can be investigated (Berrington 1997; Field 1981; Peters 1988; Ross et al. 1998).

Theories about the psychological processes of autobiographical memory consider the likelihood of forward telescoping (i.e. bringing the event forward in time closer to the interview date) or the reverse process of backward telescoping. Factors influencing recall are both temporal, involving the timing of, and distance from the event, and non-temporal, considering the nature of the event itself (Friedman 1993). The greater the amount of time lapsed since an event, the more likely survey respondents have been found to experience memory lapses or to forward telescope responses (Groves 1989). This is consistent with Chronological Organisation Theory that posits that the judgement of the timing of an event depends on the age of the memory as well as the number of intervening events that have occurred since then (Murdock 1974). The more time that has elapsed the more intervening, less important, events may be forgotten and the major event is then recalled as being closer to the present day (Thomson et al. 1988).

Apart from the age of the memory, a number of approaches consider how the nature of the event affects its likelihood of being forward or backward telescoped. There is evidence that the dates of only a very few events are 'directly encoded' into our memories at the time that they occur. Instead, people have been found to estimate rather than remember dates, building on knowledge of the event and contextual associations (Brown et al. 1985). Events with 'high knowledge', elaborateness or vividness have been found to be given more attention by respondents and to be more likely to be forward telescoped, particularly if they have a high emotional impact (Loftus et al. 1986; Robinson 1992). Bradburn and colleagues suggest that forward telescoping is more common in survey rather than laboratory research because of survey research interest in what tend to be 'high knowledge' events such as marriages or births (Bradburn et al. 1987). Also, such key events may have been 'rehearsed' (i.e. actively recalled or retold) by the respondent many times since the event, thereby enhancing the clarity of the memory (Cohen and Faulkner 1988). Conversely, some unpleasant events such as a separation, which may be considered less socially desirable, are rehearsed less and are more difficult to gather accurate answers for in the survey context (Groves 1989).

Apart from the timing and nature of the event, there are numerous other contextual factors that may affect the accuracy of the recalled time of the event. Studies have found there to be a 'reminiscence peak' between early adolescence and about age 30 where there is an overrepresentation of recalled events in this time period because of the clustering of highly significant life events in this period which are easier to recall with reference to each other (Cohen and Faulkner 1988; Thomson et al. 1988). Other theories focus on the structure of events where perhaps memory is built up hierarchically from a 'lifetime period', such as time in a particular job or home, upon which 'general events', over a period of days or weeks, are referenced, and then single datable events are located with reference to both of these underlying structures (Conway and Bekerian 1987; Reiser et al. 1986).

So, from the survey and psychological evidence we might expect the separation from the partner to be a vivid and therefore, 'high knowledge' event which is more likely to be forward telescoped. Alternatively, people may avoid rehearsing the event as much as, for example, the details of a wedding day and so it may be less salient in memory and also considered a less socially desirable fact in the survey context. Finally, separation is usually far from a specific event (Thompson and Spanier 1983). Instead people may look back on what has been described as a 'general event' where the departure of one of the partners may take many weeks, if not months, to become permanent, behind which lies the 'lifetime period' of the breakdown of the relationship.

2.4.2 The records of parental transition on the BCS70

The childhood fieldwork was conducted between 1970 and 1986 before the full establishment of time chart or calendar methods to improve the visualisation and, therefore, memory accuracy when collecting dates of lifetime events in surveys (Freedman et al. 1988). Questions on the timing and cause of the separation from the natural parent were filtered on the establishment in the parent-relationship question that the child was no longer living with the natural parent. At age 10 and 16 the remaining parent was asked an identically worded question to recall the year of the separation. The question at age five was worded slightly differently and was, therefore, excluded from this analysis of recall error. The analysis was also restricted to only those children who were still living with at least one natural parent at age 16, because of the difference in experience from those who had fostered or adopted a cohort member. Finally, parents who reported earlier in the questionnaire that they had been "a lone parent since birth" were excluded as the interviewer would, by default, then record the date of separation as 1970 or would leave the question blank.

Levels of missing data in 1980 and 1996.

Tables 2.18 and 2.19 show the responses given in 1980 and 1986 among those who reported at either stage that the child had been separated from a natural parent by 1979. In around one-third of cases that report the date of separation at either survey there is no date given at all at the other stage. Looking at those who did give a date, among those separated from the natural father, there is 55% agreement of the dates and similarly 59% agreement among the smaller group who have been separated from their natural mother, but are still living with the natural father.

Table 2.18 Year of separation from natural father as reported by mothers in 1980 and 1986

Year reported in 1980	Year reported in 1986												
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980+	Missing	*Total*
	Number of responses												
1970	51	7	2	0	0	0	0	0	1	1	2	19	*83*
1971	7	27	7	0	1	1	0	0	0	0	0	15	*58*
1972	4	6	19	8	1	0	1	0	0	0	1	19	*59*
1973	3	1	12	36	5	1	5	3	0	0	0	11	*77*
1974	1	0	7	10	38	4	3	0	1	1	0	15	*80*
1975	1	1	3	4	13	35	6	0	0	1	0	28	*92*
1976	0	0	2	0	10	14	41	7	3	0	1	15	*93*
1977	2	0	3	0	1	3	13	24	4	2	3	26	*81*
1978	0	1	0	0	3	0	3	9	20	4	0	33	*73*
1979	1	0	0	0	0	0	1	0	12	25	6	30	*75*
Missing	33	8	16	7	16	10	11	4	17	13	0	0	*135*
Total	*103*	*51*	*71*	*65*	*88*	*68*	*84*	*47*	*58*	*47*	*13*	211	*906*

Total = Children separated from their natural father by 1979 according to either the age 1980 or 1986 survey

Table 2.19 Year of separation from natural mother as reported by fathers in 1980 and 1986

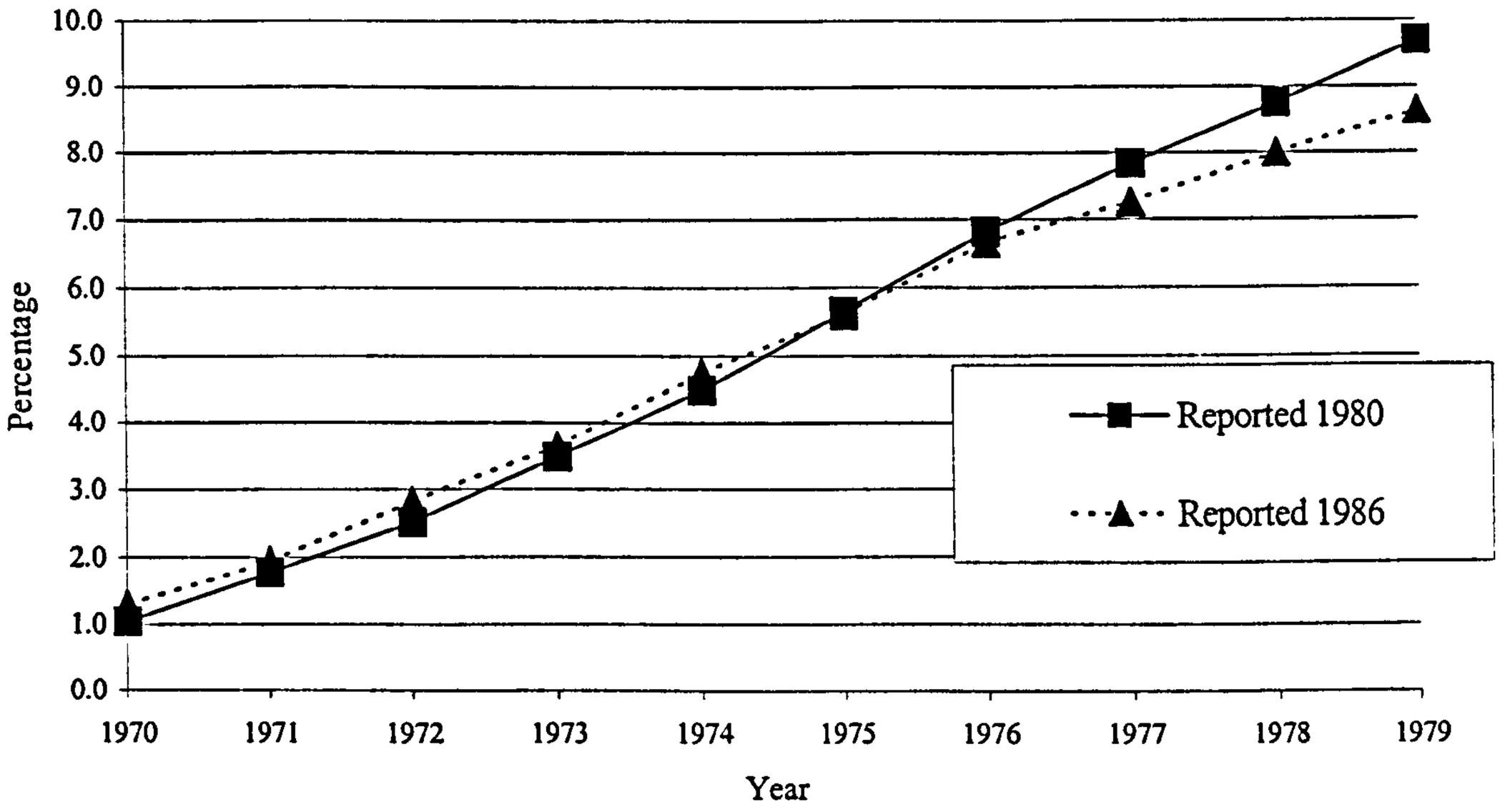
Year reported in 1980	Year reported in 1986												
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980+	Missing	*Total*
	Number of responses												
1970	0	1	0	0	0	0	0	0	0	0	0	0	*1*
1971	1	2	1	0	0	0	0	0	0	0	0	0	*4*
1972	0	0	5	2	0	1	0	0	0	0	0	1	*9*
1973	0	0	2	7	1	1	0	0	0	0	0	2	*13*
1974	0	1	0	2	1	0	0	0	0	0	0	2	*6*
1975	0	0	0	0	1	3	1	0	0	0	0	4	*9*
1976	0	0	0	0	0	1	1	0	0	0	0	1	*3*
1977	0	0	0	1	0	1	3	7	1	1	0	3	*17*
1978	0	0	0	0	0	0	1	1	8	0	0	5	*15*
1979	0	0	0	0	0	0	1	0	0	6	1	0	*8*
Missing	0	4	1	1	0	2	0	1	0	2	0	0	*11*
Total	*1*	*8*	*9*	*13*	*3*	*9*	*7*	*9*	*9*	*9*	*1*	18	*96*

Total = Children separated from their natural father by 1979 according to either the 1980 or 1986 survey

Separation from the natural father

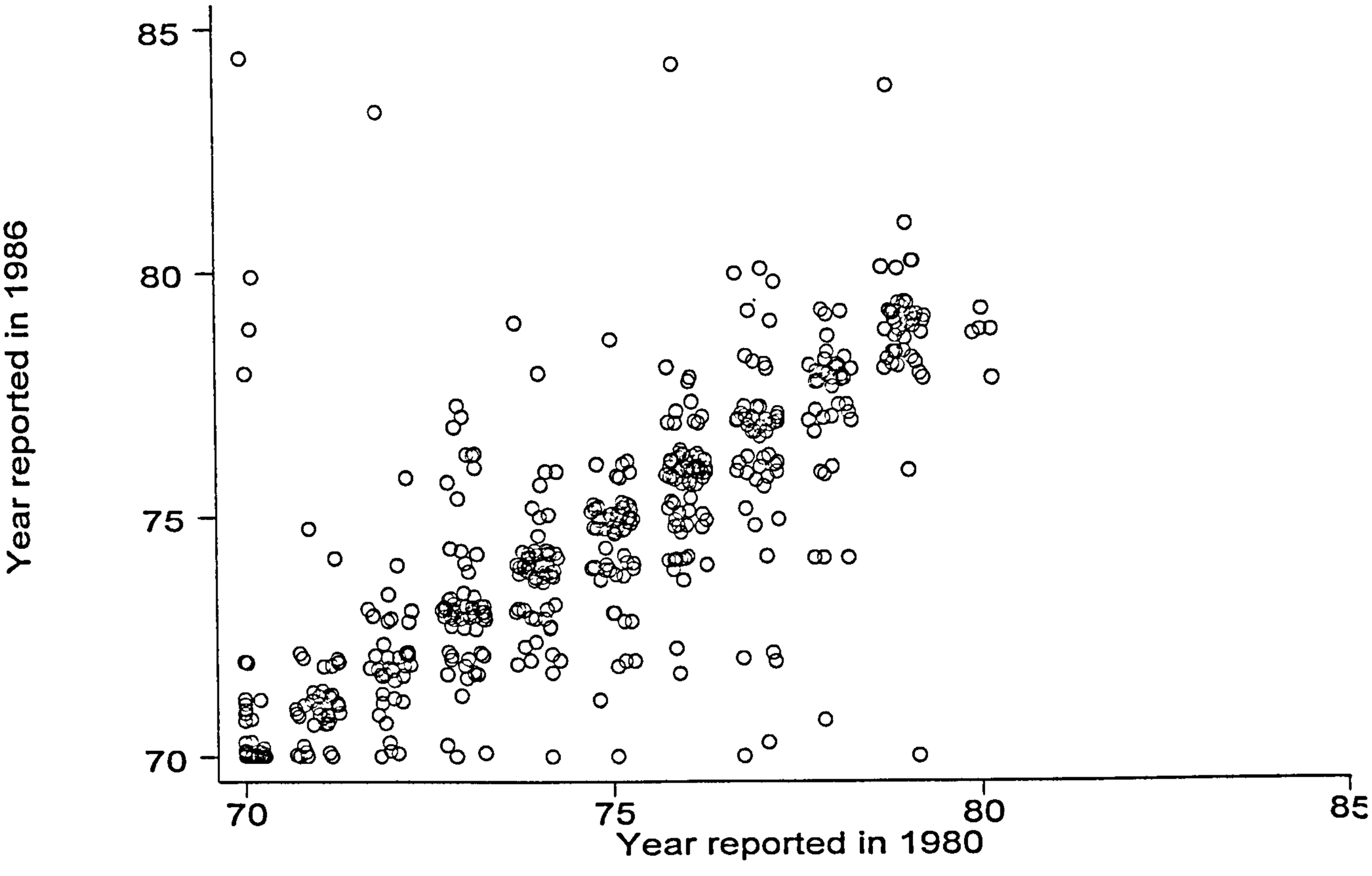
The analysis continues with children separated from their natural father. The group who were separated from their natural mother was much smaller making analysis less reliable. Figure 2.5 shows the cumulative percentage of cohort members recorded as separated from their natural father between 1970 and 1979, as given in each stage of the study. At this aggregate level there is quite a high degree of agreement between the surveys, although in the 1980 survey a slightly higher proportion of mothers had reported the departure of the father by 1979. In the 1986 survey there is also a very small, but consistent tendency, to be more likely to report a transition in the early years of the child's life up to 1974.

Figure 2.5 Cumulative percentage of children separated from their natural father as reported by mothers in 1980 and 1986



At the individual level, Figure 2.6 plots the reported year of separation in 1980 and 1986. It reveals that there are considerable inconsistencies in the reporting of parental separation by individual respondents. As only the year of separation is reported, the points have been jittered to show the density of the distribution at different years reported. Whilst 56% reported a consistent date, overall the mothers were actually more likely to backward telescope the event (28%) rather than bring it forward in time (16%).

Figure 2.6 Year of separation from natural father as reported by mothers in 1980 and 1986
(jittered points)



2.4.3 Regression analysis of inconsistent reporting of year of separation

This section examines whether factors discussed earlier are contributing to the presence or absence of date information and the accuracy of that information. Table 2.20 presents variables initially tested in four logistic regression models of recall accuracy using a combination of forward stepwise and backward elimination procedures with a –2 log likelihood test statistic[7]. Variables tested included the age of the mother, her educational level and socio-economic status, as well as region of residence. Intervening events were included in the form of the number of house moves during the cohort member's childhood and whether a new stepfather had moved in by age 10 or 16. The nature of the event was recorded as either divorce/separation, death of the parent or not known. Two variables reflecting the timing of the event were also added. One variable identified whether the separation was recalled as being in 1970, possibly due to a contextual linking with the birth of the child. The second was a broader category reflecting if the separation was recalled as occurring in the early 1970s, at the greatest time distance from the current interview. As numbers were quite small, factors which improved the fit of the model at the 5% level were retained.

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[7] See Section 2.3.2 for details of the logistic regression model

Table 2.20 Covariates tested for selection in logistic regression models of recall errors by mothers of cohort members who separated from their partners between 1970 and 1979

Variable	Model 1 *Whether any date given in both 1980 and 1986*	Model 2 *Whether gave the same date in 1980 and 1986*	Model 3 *Whether gave an earlier date in 1986 than 1980*	Model 4 *Whether gave a later date in 1986 than 1980*
Mother's age at birth of cohort member	**	*	*	
Mother's age at birth of first child				
Mother's age left full time education				
Mother's qualification level		**	*	
Region of birth of cohort member				
Number of house moves by 1986				
Whether repartnered by at 5				
Whether repartnered by at 10				
Whether repartnered by at 16	***		***	***
Family social class in 1980	*	*	*	
Reason for separation from father	***	***		
Whether separated by 1975	**			
Whether separated in 1970				
Whether present at birth and/or age 5 stage		***	**	

*** denotes significance at the 1% level
** denotes significance at the 5% level
* denotes significance at the 10% level

Model 1 included all cases where the child had been separated from the natural father, but was still resident with the natural mother at 16 (n=906). It excluded cases where the mother stated that she had been a lone parent since birth as the date of separation was either not asked or by default was 1970.

Models 2, 3 and 4 used cases selected for Model 1 but then only retained those that had given a valid date for separation from the natural father in both 1980 and 1986 (n=565).

Presence or absence of date information

The results of the logistic regression models are presented in the tables throughout this thesis as the coefficient $\hat{\beta}$ and the standard error of that coefficient $se(\hat{\beta})$. In the text the coefficients are often converted to an odds ratio (OR) along with a 95% Confidence Interval (95% CI). This interval is important when looking at estimates for smaller groups where the confidence interval may be large and the difference from other studies should be interpreted with caution (Ely 1999)[8].

Women who had repartnered by 1986 were more likely to give a date, possibly because the separation was earlier than for those who were lone mothers in 1986 (OR 3.0, 95% CI 2.2-4.2). Those who were separated or divorced rather than being widowed were more likely to give a date on both occasions (Table 2.21). Women who were older when they gave birth to the cohort member were slightly less likely to give a date on both occasions.

---

[8] The odds ratio from the logistic model is obtained from the odds for the category of interest, for example women in stepfamilies ($X_1 = 1$) compared to the reference category, here women who were lone mothers ($X_1 = 0$). The log odds for the women who were lone mothers would be

$$\log_e \text{odds(stepfamily)} = \hat{\beta}_0 + (\hat{\beta}_1 \; 1) = \hat{\beta}_0 + \hat{\beta}_1$$

and those who had repartnered would be

$$\log_e \text{odds(lone mother)} = \hat{\beta}_0 + (\hat{\beta}_1 \cdot 0) = \hat{\beta}_0 .$$

The odds ratio is then the ratio of these two odds expressed as:

$$\text{OR} = \frac{\text{odds(stepfamily)}}{\text{odds(lone mother)}} = \frac{e^{(\beta 0 + \beta 1)}}{e^{\beta 0}} = e^{\beta 1}$$

In short, the odds ratio is obtained by exponeniating the coefficient of the predictor variable (Kleinbaum et al. 1998, p659). An Odds Ratio can also be expressed as a percentage where, for example, a ratio of 0.45 would equate to the odds for one group being 45% of the odds for another.

The 95% Confidence Interval is derived from the coefficient in conjunction with the standard error where the 95% confidence interval for β_1 is

$$\beta \pm 1.96 * se(\beta)$$

which again can be exponentiated into a range of odds ratios.

Table 2.21 Parameter estimates from logistic regression model of whether mother gave any year of separation in 1980 and 1986

Reference categories are underlined	$\hat{\beta}$	$se(\hat{\beta})$
Family type at 16		
Lone mother	0	-
Stepfamily	1.11***	0.16
Reason for separation		
Divorce or separation of parents	0	-
Death of father	-1.18***	0.28
Reason not known	-1.88***	0.25
Mother's age at birth of cohort member		
Up to 19	0	-
20-24	-0.14	0.22
25-29	0.16	0.24
30-34	0.07	0.30
35+	-0.87**	0.42
Constant	0.24	0.21

Total=separated mothers who responded to 1980 and 1986 surveys
n=911 -2 Log Likelihood= 527.78

*** denotes significance at the 1% level
** denotes significance at the 5% level
* denotes significance at the 10% level

Recall accuracy

Models 2, 3 and 4 evaluate the factors associated with giving either a consistent date, a more recent date in 1986 (forward telescoping) or an earlier date in 1986 (backward telescoping) and are restricted to those who gave a date at both stages of the survey (Tables 2.23 to 2.25). Among those who gave a date at both stages of the survey it is not surprising to see that widows were more likely to recall the same year than those who had been divorced or separated. Also, although only just reaching the 5% significance level, it appears that women with higher educational qualifications were more likely to recall the same year than those with none (Table 2.22).

Mothers who had been wave non-responders at either the birth and/or the age five stages were more likely to give inconsistent answers between the age 10 and age 16 stages (Table 2.23) Also, women who had repartnered were more likely to push the separation date back in time in their response in 1986 than those who were still lone mothers (OR 1.8, 95% CI 1.1-2.7). Similarly, those who had not repartnered were more likely to forward telescope the date than those who had (Table 2.24).

Table 2.22 Parameter estimates from logistic regression of whether the mother gave the same year of separation in 1980 and 1986

Reference categories are underlined	$\hat{\beta}$	$se(\hat{\beta})$
Reason for separation		
Divorce or separation of parents	0	-
Death of father	1.02***	0.48
Reason not known	-0.67	0.41
Response pattern before age 10		
Respondent at birth and age 5	0	-
Missing birth stage only	-1.15	0.72
Missing birth and age five stage	-1.11***	0.37
Missing age five stage only	-0.58**	0.25
Mothers qualification level		
None	0	-
Up to O level or equivalent	0.01	0.20
A level or equivalent and higher	0.55**	0.28
Not known	0.03	0.36
Constant	0.32**	0.14

Total = women who gave a year of separation in both 1980 and 19986
n=565 -2 Log Likelihood= 373.17

*** denotes significance at the 1% level
** denotes significance at the 5% level
* denotes significance at the 10% level

Table 2.23 Parameter estimates from logistic regression model of whether mother gave an earlier year of separation in 1986 than in 1980

Reference categories are underlined	$\hat{\beta}$	$se(\hat{\beta})$
Family type at 16		
Lone mother	0	-
Stepfamily	0.57***	0.22
Response pattern before age 10		
Respondent at birth and age 5	0	-
Missing birth stage only	1.28*	0.68
Missing birth and age five stage	0.74**	0.36
Missing age five stage only	0.38	0.27
Constant	-1.50***	0.19

Total = mothers who gave a year of separation in both 1980 and 19986
n=565 -2 Log Likelihood= 324.87

*** denotes significance at the 1% level
** denotes significance at the 5% level
* denotes significance at the 10% level

Table 2.24 Parameter estimates from logistic regression model of whether mother gave a later year of separation in 1986 than in 1980

Reference categories are underlined	$\hat{\beta}$	$se(\hat{\beta})$
Family type at 16		
Lone mother	0	-
Stepfamily	-0.66***	0.23
Constant	-1.21***	0.18

Total = mothers who gave a year of separation in both 1980 and 1986
n=565 *-2 Log Likelihood= 248.70*

*** denotes significance at the 1% level
** denotes significance at the 5% level
* denotes significance at the 10% level

Discussion

Without a time-line or calendar history technique this study was probably more prone to recall error than more recent surveys. The fact that mothers whose partners had died were more likely to give consistent responses than those who had separated supports is not surprising. An event as unusual and traumatic as the death of a partner at this stage of the life course is likely to be among the few 'directly encoded' events in memory and the date may well have had to be repeated on a number of occasions. Furthermore, in the case of divorce or separation, the survey may be recording a 'general event' that lasted several months and could easily have crossed from one year to the next, rather than any single event that can be attributed to a precise date. Women who had repartnered may have backward telescoped the event because of a social desirability influence in the interview situation (Groves 1989) leading the respondent to push the date back in time to leave a longer gap before repartnering. The fact that those who began childbearing early were more likely to forward telescope the event is interesting and may reflect the clustering of life changes among those who became young mothers during the "reminiscence peak" from early adolescence to age 30.

Overall, using the date of parenting transition given at the time closest to the event may risk a certain amount of forward telescoping if the separation was still a vivid memory at the interview but does avoid the biases found in the age 16 data. Although the derived parenting histories will inevitably have some dating inaccuracies, Courgeau has found this to have a relatively small impact in comparable work on duration in places of residence (Courgeau 1992). The data still retains the total number of parenting changes that the child has experienced and the sequence of those transitions is preserved.

Chapter 3 The experience of family disruption among the BCS70

Evidence reviewed in Chapter 1 indicates that the 1970 cohort were more likely to experience parental separation than their predecessors, they tended to be younger when it occurred and, in turn, they had a higher probability of moving into a stepfamily by age 16. This chapter describes the level and types of family disruption experienced by the cohort and makes some comparisons with the experiences of the members of the 1958 NCDS. Throughout this description the proportions presented are estimates produced after reweighting for response probabilities at 16 (as described in Section 2.3). The second half of the chapter looks at how the demographic behaviour and occupational status of the parents places some cohort members at greater risk of family disruption than others. Family characteristics found to be precursors of disruption may also be precursors of certain outcomes in young adulthood. Factors found here to be precursors of family disruption will be tested in the following chapters for their independent association with outcomes in young adulthood before considering the importance of family disruption.

3.1 Levels of family transition among the cohort

Deriving information on family transitions

Fieldwork for the 1958 NCDS was conducted during childhood at birth and ages seven, 11 and 16. At each stage the current family structure was established but if the parents had separated the survey did not ask for the date of separation. Therefore, analysis of family dynamics has been restricted to either current family status at one stage of the study (Kiernan 1992; Kiernan 1996, family type at 16); (Power and Matthews 1997, whether parental divorce by 16); (Hope et al. 1998, whether parental divorce or death by 16), or to changes between seven and 11 and 11 to 16 (Elliott and Richards 1991, parental divorce by seven, 11 or 16); (Ní Bhrolcháin et al. 1995, family type at 16 and whether parental divorce, death or other separation between seven and 16); (Cherlin et al. 1995, whether parental divorce or death between seven and 16). The BCS70 fieldwork was conducted in childhood at birth and ages five, 10 and 16. At each stage, retrospective questions were asked about dates of separation, periods in a lone parent family (age 10 only) or the arrival of a step-parent (age 16 only). Combining all the available data allows for the construction of detailed individual parenting histories for the cohort member, plotting the timing and duration of family transitions.

A transition is defined as a change in the residential parenting arrangements for the child regardless of the legal status of the union or separation. First the *prevalence* of family transitions, measuring the overall levels of parenting change experienced by the cohort by the

time they were interviewed at age 16, is presented. Secondly, the *timing* of the transition considers the age of the child when transitions occurred. Thirdly, the measure of family structure *sequencing* differentiates cohort members according to the particular sequence of family types that they have moved through. Finally, the *duration* of time spent in any family structure allows comparison according to, for example, the length of time in a lone parent family. Creating such a record of each child's parenting history required considerable data cleaning and resolution of inconsistencies both across and within waves of the study. In 2% of the sample the timing of parental separation or repartnering was imputed rather than have to discard the cases. Full details of the data editing and imputation are given in Appendix I.

3.1.1 The prevalence of family transitions

Table 3.1 shows the number of parenting transitions experienced by age 16. Overall, about 28% of the cohort experienced any change in residential family structure and nearly all of these involved only one or two changes. Those born to lone mothers were over three times as likely to experience three or more changes in childhood than those born to two natural parents, but levels were still relatively low at 8%.

Table 3.1 Total number of family transitions by the age 16 survey according to family structure at birth

(weighted estimates)

Total number of transitions	**Family structure at birth**		
	Both natural parents	Lone mother	All*
			Percentage
No transitions	75.3	17.2	71.6
Any transitions	24.7	82.8	28.4
Of which....			
One transition	12.2	63.3	15.4
Two transitions	10.1	10.0	10.1
Three or more transitions	2.4	8.5	2.9
Unweighted base	*8962*	*443*	*9467*
Weighted base	*16254*	*1062*	*17316*

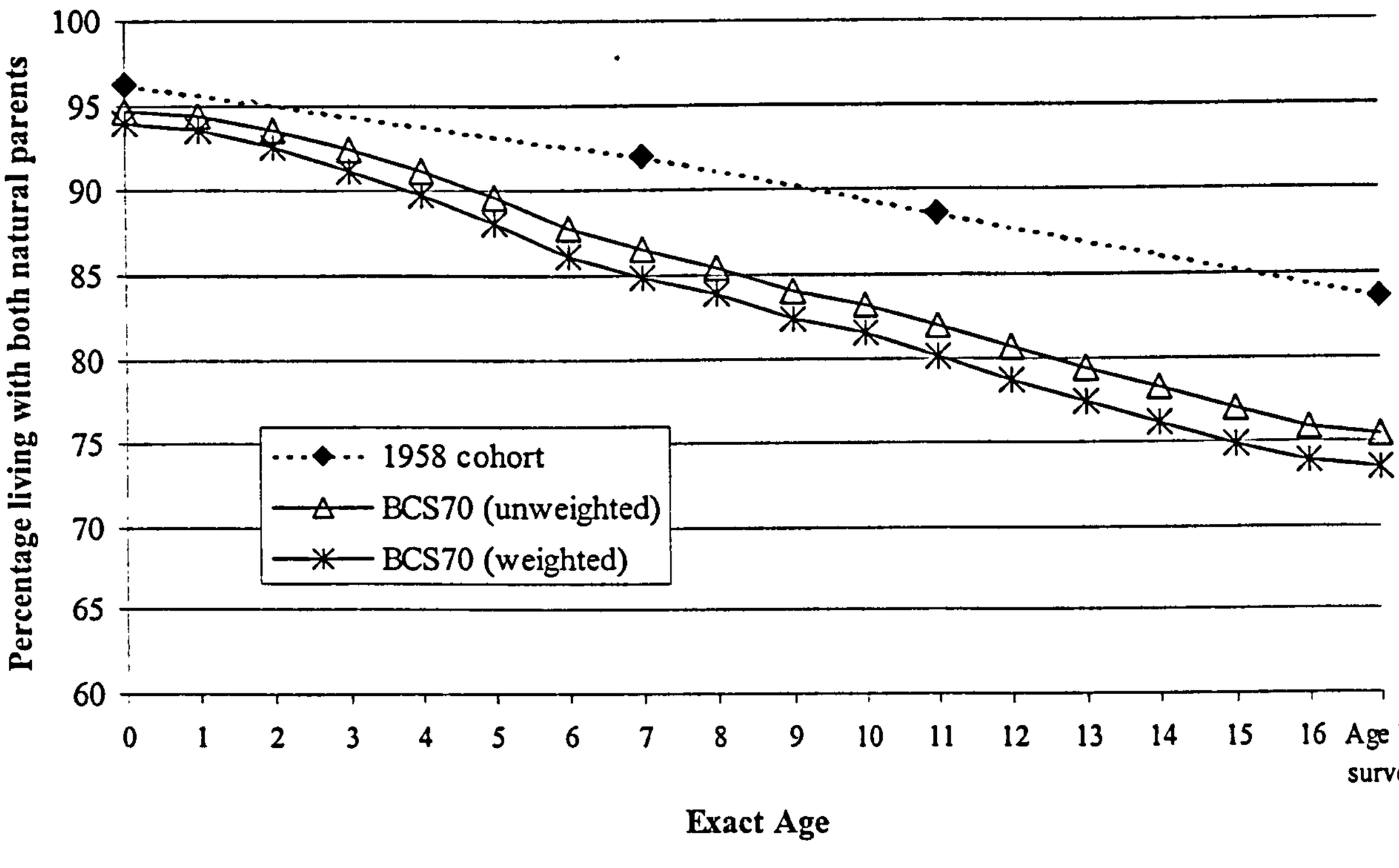
* includes 62 children whose family structure at birth was not known

3.1.2 The timing of family transitions

Children living with both natural parents at birth

If a child's parents separated we know the time that one parent left the household rather than the dates of any eventual divorce. Figure 3.1 compares the proportion of children in the BCS70 who were still living with both biological parents at each age with the proportions observed at the childhood stages of the 1958 NCDS. Also, for illustration, the weighted and unweighted estimates are presented for the 1970 cohort showing the small, but consistently positive, effect that the weighting has on the proportion of children estimated to be living in a "non-intact" family. Note that the age 16 survey was approximately three to six months after the cohort members' birthday. For those whose parents did separate, the mean age of the cohort member at parental separation was just under seven.

Figure 3.1 Percentage of children living with both biological parents by age, 1958 NCDS and BCS70
(weighted and unweighted data)



1958 NCDS Source: Ferri (1984), Table A3.1

Family transitions among children born to cohabiting parents

The previous description grouped married and cohabiting biological parents when considering the levels of parental separation. Births to unmarried cohabiting couples were still relatively rare in 1970 and on the BCS70 only 2% of cohort members are estimated to have been born to

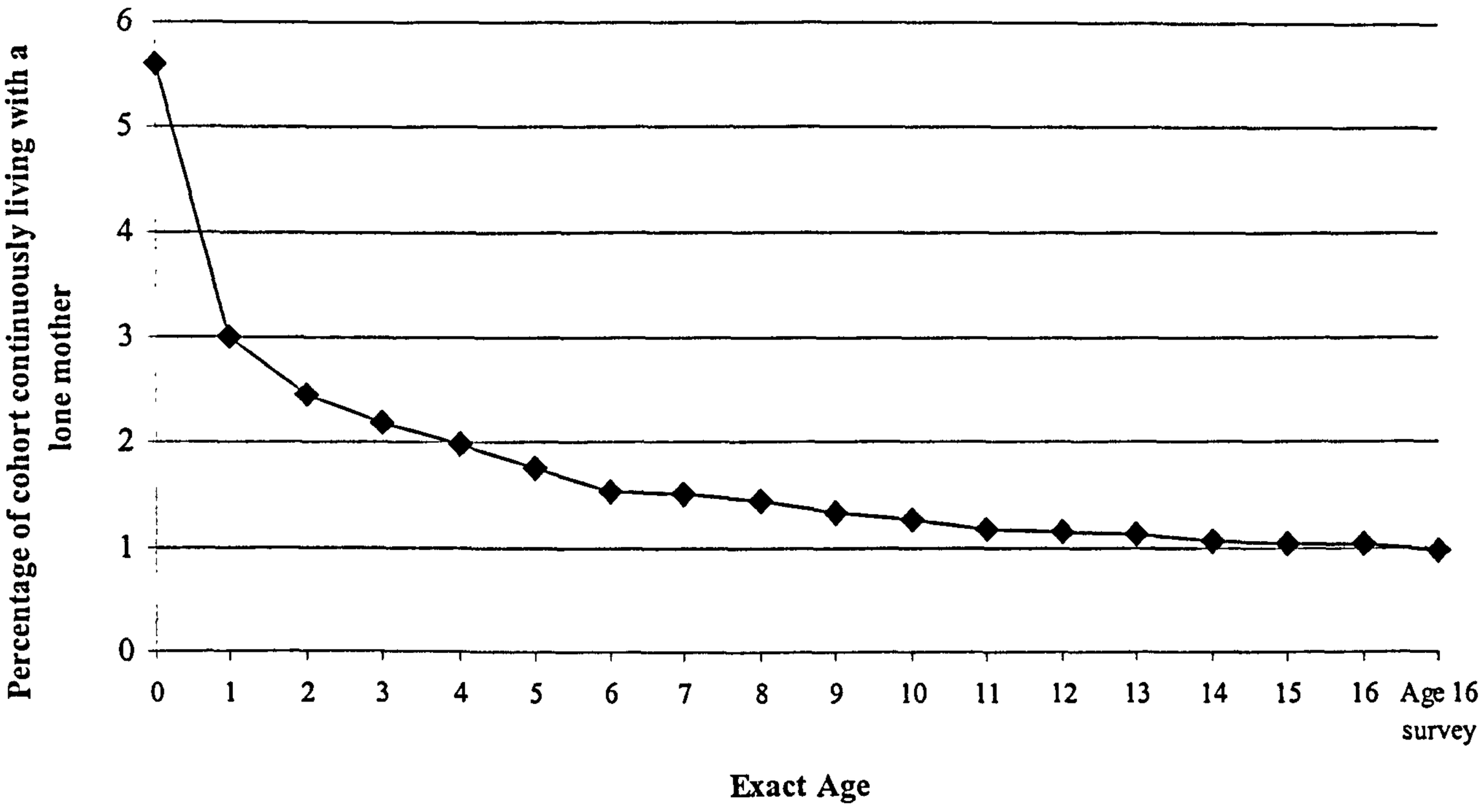
this family type[9]. Although these children were far more likely to experience parental separation than those born to married parents, growing up with both biological parents was still the majority experience (55%). However, those who did experience parental separation were more likely to do so at younger ages than children born to married parents.

Children living with a lone mother at birth

Nearly 6% of cohort members were born to a lone mother. The majority (83%) of these children experienced some change in family structure. Figure 3.2 shows the proportion of children who continued to live with a lone mother at each age. The sharp rate of change in the first year is accounted for by a number of factors. First, 1.3% of children in the survey were born to a woman who was not married, gave no details of the father at the birth survey and stated that she was not supported by him in any way. However, at a later survey the father figure in the household was reported to be the natural father. This change in the residence of the natural father is consistent with evidence from the 1958 cohort where a small proportion of men who were not living with the mother at the birth of the child subsequently moved in (Clarke et al. 1997). Some of the BCS70 parents did confirm that the mother had spent a spell as a lone mother before the father moved into the household, but others did not. It cannot be confirmed whether these other families contained the natural father all the time, but for some reason this information was withheld from the interviewer; whether the father moved in around the time of the birth; or even whether the father figure at the later stages is, in fact, a stepfather. In 0.7% of cases in the survey, the child was taken into statutory care or given up for adoption immediately following the birth. Most of the remaining children who experienced a transition by age one moved into a stepfamily. There continues to be quite a rapid rate of maternal repartnering at the pre-primary school ages; then the rate slows and there is very little change after about age 12. In all, about 1% of BCS70 members lived continuously with a lone mother from birth to age 16.

[9] Marital status rather than residential family structure was collected at the birth survey. The 92% of parents who were married were assumed to be living together. A further 2% of parents appeared to be cohabiting according to other questions asked about the father at the birth survey and retrospective accounts from the later stages. Full details of how cohabitation was inferred are given in Appendix I.

Figure 3.2 Percentage of children who were born to, and still living, with a lone mother by age, BCS70
(weighted estimates)



Aggregate changes in family type over time

Figure 3.3 shows the composition of family types among those not living with both biological parents for each year from birth to age 16, again using weighted data. At birth, most of this group were in a lone mother family but by age one, nearly 2% of cohort members had been adopted. After that, there is a steady rise in the proportion of children living in lone mother families, levelling off to around 11% in the teenage years. At the same time, the proportion living with a mother and stepfather increases steadily across the years from under 4% at age five, to 7% at age 10 and 10% at age 16. This aggregate figure masks the movement between these two groups as some women become lone mothers for the first time, others repartner after a period in a lone parent family and a third group revert to lone parenthood after a period in a stepfamily.

By the age 16 survey, 73% of the BCS70 cohort were living with both biological parents, 11% were living with a lone mother and 10% with a mother and stepfather. By this stage a small proportion were living with their father (2%) or father and stepmother (1%). Boys were over-represented in both of these groups making up 59% of children in the category compared to 50% of those living in a lone mother or stepfather family and 52% of children still living with their natural parents. Finally, a further 3% were adopted, in care, foster homes or living with other relatives or guardians.

Figure 3.3 Family type among those not living with both biological parents by age, BCS70
(weighted estimates)

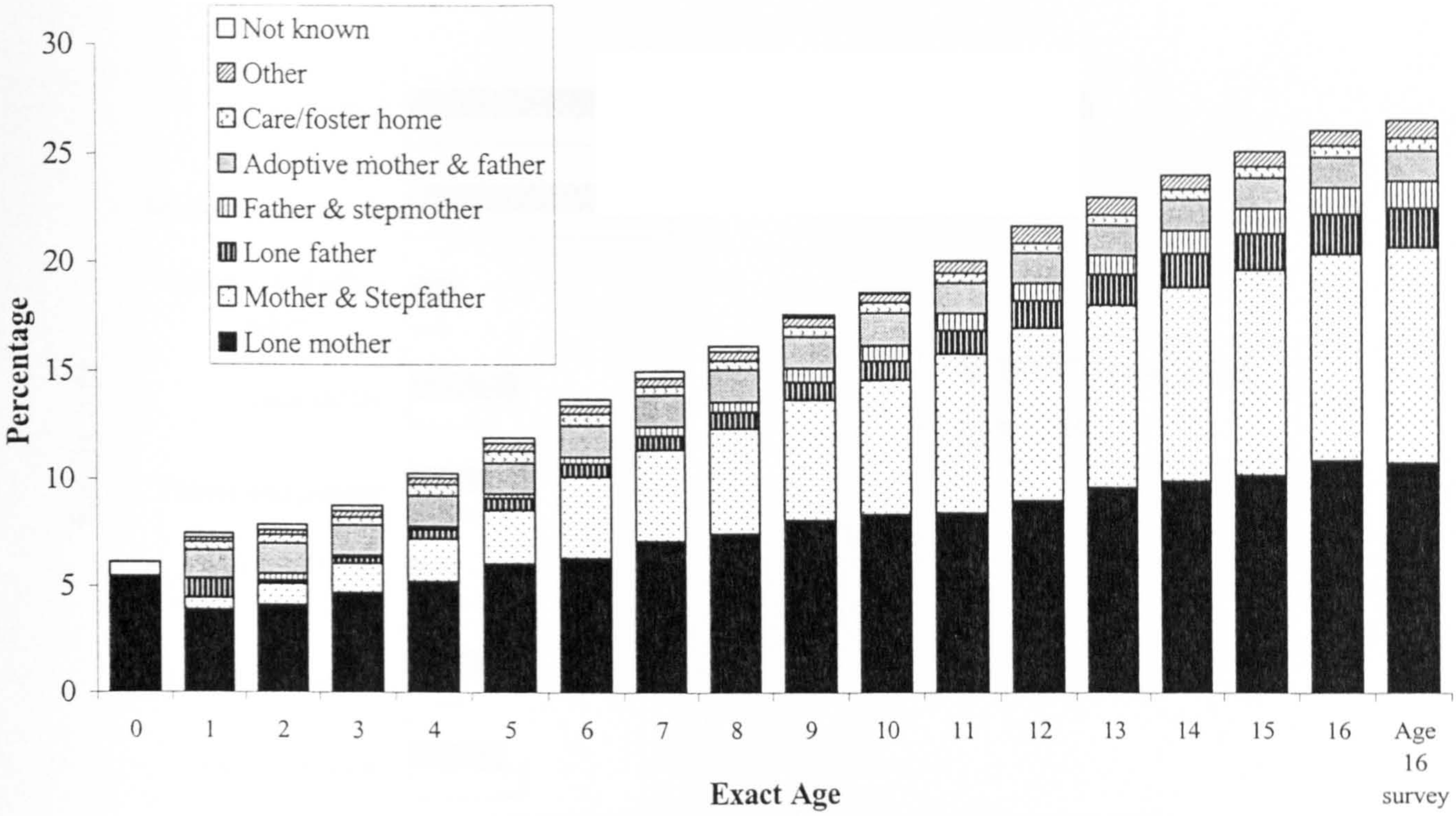
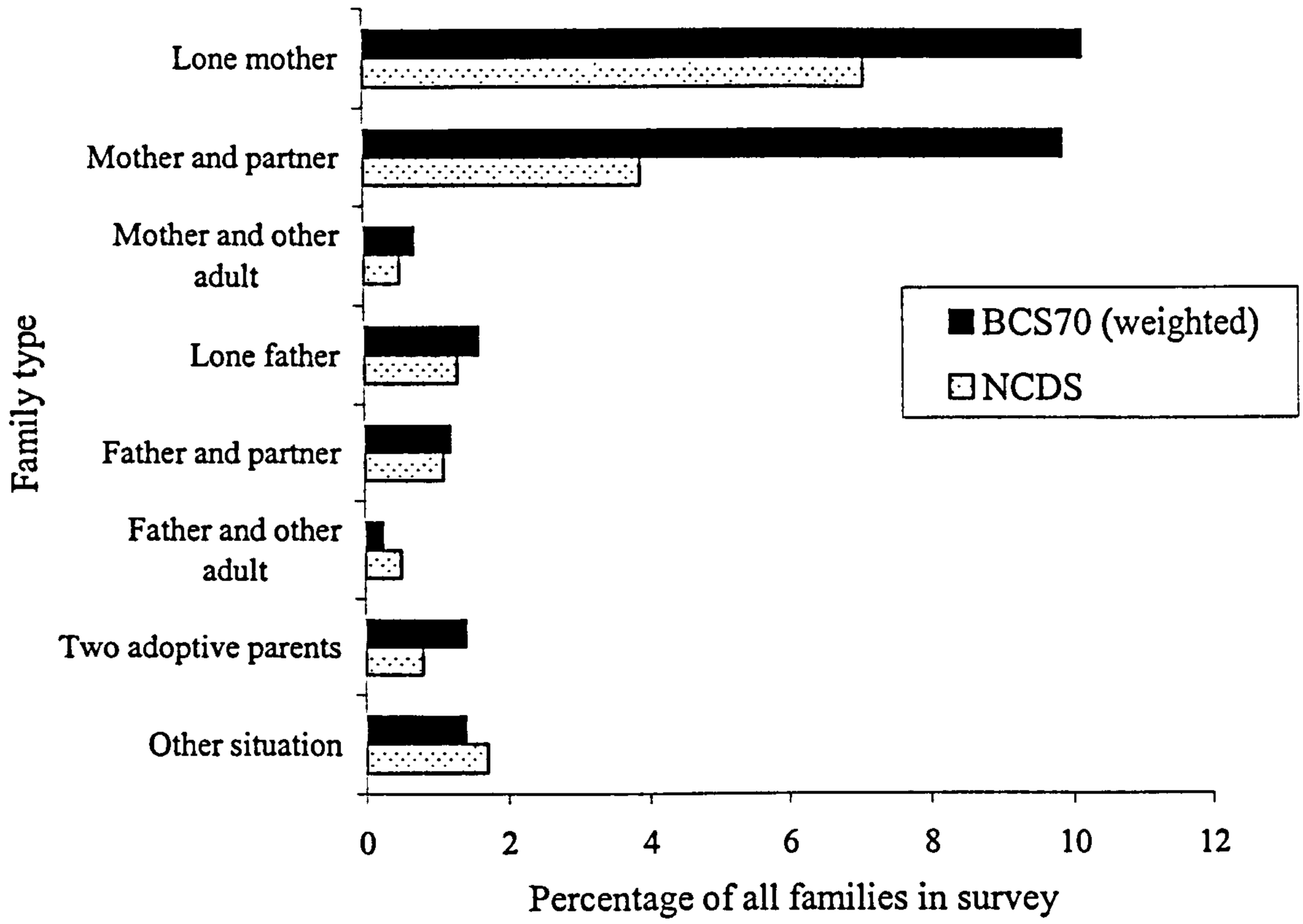


Figure 3.4 shows a comparison of family structure at 16 among those no longer living with both natural parents on the NCDS and BCS70. Although the overall proportion not living with both natural parents increased, the most dramatic rise was in the proportion living in a stepfather family, from about 4% on the NCDS to 10% on BCS70. On the BCS70, 44% of children no longer living with their natural father were in a stepfamily by 16, compared to 34% on the NCDS (Ferri 1984). Of these, about one in five were living, or had ever lived, with stepsiblings. Others had experienced the birth of a half sibling in the new stepfamily but in this analysis those siblings are grouped together with full biological siblings. The experience of those separated from their mother was somewhat different. These children were most likely to have been adopted soon after birth (28%) or to be still living with a lone father (36%); only 24% were in a stepfamily.

Figure 3.4 Family structure at age 16 among those not living with both biological parents, NCDS and BCS70
(BCC70 weighted estimates)



NCDS Source: Fogelman 1983, Table 4.1

3.1.3 The sequence of family transitions

The previous section presented the aggregate picture of family structure at each age. However, it did not document the individual moves in and out of particular family types. Table 3.2 presents the percentage distribution of cohort members according to selected sequences of their family situation between birth and age 16. Following a format developed in the US (Martinson and Wu 1992; Wu and Martinson 1993), it reveals that over 86% of the cohort members' childhood experiences can be summarised as either growing up with both natural or adoptive parents or moving from both natural to either a lone mother or mother and stepfather family (with or without a period in a lone mother family). However, a further 21 sequences are required to classify another 11% of the sample. The remaining 3% of cohort members experienced unique or extremely unusual family sequences. The picture is, therefore, of common experiences for the majority of children with a great deal of diversity among the remaining minority.

Table 3.2 Percentage distribution of selected sequences of family structure from birth to age 16
(weighted estimates)

Family Trajectory	%
Main sequences	
(bio-m, bio-f)	70.6
(bio-m, bio-f) ∏ (bio-m)	8.1
(bio-m, bio-f) ∏ (bio-m) ∏ (bio-m, stp-f)	6.2
(bio-m, bio-f) ∏ (bio-m, stp-f)	1.2
(bio-m, bio-f) ∏ (bio-m) ∏ (bio-m, bio-f)∏ (bio-m)	0.3
Other sequences	
(bio-m, bio-f) ∏ (bio-m) ∏ (bio-m, stp-f) ∏ (bio-m)	0.4
(bio-m, bio-f) ∏ (bio-m) ∏ (bio-f, stp-m)	0.1
(bio-m, bio-f) ∏ (bio-m) ∏(bio-m, bio-f) ∏ (bio-f)	0.1
(bio-m, bio-f) ∏ (bio-m) ∏ (bio-m, bio-f)	1.0
(bio-m, bio-f) ∏ (bio-m) ∏ (stat-c)	0.1
(bio-m, bio-f) ∏ (bio-m, stp-f) ∏ (bio-m)	0.2
(bio-m, bio-f) ∏ (bio-f)	1.6
(bio-m, bio-f) ∏ (bio-f) ∏ (stp-m, bio-f)	0.7
(bio-m, bio-f) ∏ (stp-m, bio-f)	0.2
(bio-m, bio-f) ∏ (stat-c)	0.2
(bio-m, bio-f) ∏ (stat-c)∏ (bio-m)	0.1
(bio-m, bio-f) ∏ (stat-c) ∏ (bio-m, bio-f)	0.2
(bio-m, bio-f) ∏ (gr-par)	0.1
(bio-m)	1.0
(bio-m) ∏ (bio-m, bio-f)	1.4
(bio-m) ∏ (bio-m, bio-f)∏ (bio-m)	0.1
(bio-m) ∏ (bio-m, stp-f)	1.4
(bio-m) ∏ (bio-m, stp-f) ∏ (bio-m)	0.1
(bio-m) ∏ (bio-m, stp-f)∏(bio-m) ∏ (bio-m, stp-f)	0.1
(bio-m) ∏ (stat-c)	0.1
(adpt-m, adpt-f)[10]	1.2
Other sequences	3.2
Unweighted base	*9467*
Weighted base	*17316*

Key:

bio-m	Biological mother
adpt-m	Adoptive mother
stp-m	Stepmother
bio-f	Biological father
adpt-f	Adoptive father
stp-f	Stepfather
gr-par	Grandparents
stat-c	Statutory/foster care

In later chapters children in stepfather families are separated according to whether they had ever lived with stepsiblings in their childhood. Overall, 4% of the cohort spent some time sharing their home with one or more children from their step-parent's previous partnership. Of those who lived in stepfather families, about one fifth had residential stepsiblings whilst the proportion was closer to half for those who lived in stepmother families. However, the numbers in this latter category were too small to create sub-groups in the analysis.

[10] These children were adopted at birth. Those adopted after their first birthday were allocated to other sequences.

3.1.4 The duration in family types

Adding together the information for each cohort member on the level, timing and sequencing of any family transitions provides a unique record of his or her exact parenting history. From the NCDS data , children in a lone mother family at 16 would have had little additional information about how they came to be in that type of family. Some may have only just experienced parental separation whilst others may have gone through multiple transitions before living in a lone mother family.

In total, children on the BCS70 who were living with a lone mother at 16 had done so for a mean of just over seven years whilst those with mothers who repartnered after separation had spent nearly three years in lone mother households. The mean durations in a lone father family were shorter, just under six years among those still in a lone father family at 16 and nearly 2.5 years for those whose father had repartnered. Children born to a lone mother who went on to live with a new partner spent an average of four years in a lone mother household.

3.1.5 Variations according to the cause of separation

Among the 1958 NCDS cohort, 40% of 16 year olds no longer living with their biological father had experienced his death (Ferri 1984). The sharp rise in divorce and separation in the 1970s meant that among BCS70, teenagers whose father had died constituted only 14% of children not living with their biological father at age 16. Those living without their biological mother were far more likely to be doing so because she had died (33%). The remainder had experienced either the separation of their parents, been taken into care, fostered or adopted.

Children whose parents had separated were more likely to be living in a stepfamily at 16 (49%) then children whose father had died (23%). This is consistent with other evidence that, at all ages, women who are widowed have a longer average duration before repartnering than those who are separated (Coleman 1989; Ferri 1984). Also, the mean age of the child at the death of the father was nearly eight and a half, compared to just under seven among those whose parents had separated, leaving a shorter period of time in which the mother might repartner before the age 16 survey. Children who were not living with their natural mother at 16 were also less likely to be in a stepfamily if their mother had died rather than separated from their father.

3.1.6 Other changes associated with family disruption

Family disruption may bring about other changes in household arrangements that, in themselves, are independently related to the outcomes under consideration in this thesis. As discussed in Chapter 1, children in the 1970s were more likely to move out of the marital home and change school following parental separation than they are today. For the BCS70 survey only details of changes in secondary schooling were collected but we do have records of the number of house moves. Children who experienced no family disruption moved a mean of 1.4 times before the age 16 survey whereas those who had experienced a parenting change moved a mean of 2.2 times. Not surprisingly, there was a positive association between the number of family transitions and the number of house moves.

3.2 Factors associated with parental separation

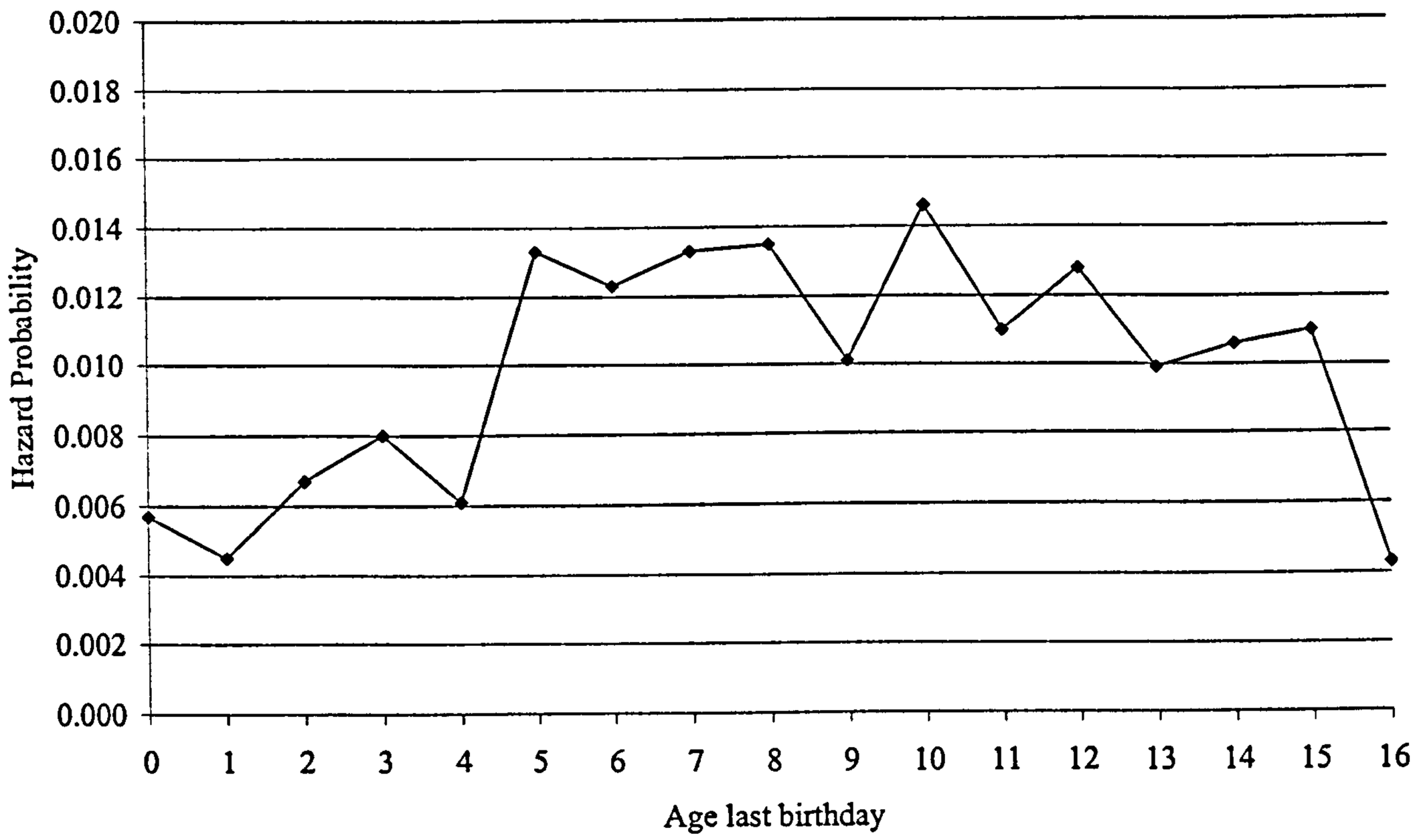
Divorce is not a random event. It is part of a process reflecting a number of individual, family and surrounding societal characteristics. Family characteristics that are associated with the outcomes of interest later in this thesis may also be precursors of family disruption. It will be important to control for these family of origin characteristics that predate disruption to look at whether parental separation and repartnering, per se, is associated with the young adult life course. The purpose of this section is to consider, from the perspective of the cohort member at the time of their birth, the hazard of experiencing parental separation according to family circumstances. By definition, this does not form a generalisable analysis of what types of partnerships are likely to end in separation because the couples in this study are all parents. Neither were the parents the focus of the study, so we lack detail of their backgrounds, health and well being, and relationship quality that would be collected in a full study of marital duration. Also, the observation stops at the time of the age 16 survey and it is likely that a number of parents separated subsequent to that date; therefore the observations are right censored. Finally, we should bear in mind the historical nature of this analysis. Factors associated with divorce in the 1970s and 1980s cannot be assumed to be the same as those for more recent marriages.

3.2.1 Life table analysis of rate of parental separation

This section examines the probability of permanent parental separation for children born to married parents. Those born to lone mothers and the small proportion born to cohabiting parents were excluded as there is less information about their fathers. Using single decrement life table methodology, Figure 3.5 plots the probability of parental separation at each age from birth to 16 among cohort members. The rates are heaped at age five and 10 due to respondent recall and year rounding errors, with a consequently low hazard probability at ages four and

nine. The probability also falls for the observation in the 16th year as the survey was conducted three to six months after their 16th birthday so the duration of exposure to risk was reduced to between one quarter and one half of a full year. From the child's perspective, there is a relatively low probability of parental separation in the first few years of life followed by a rise up to, and during, primary school age after which the hazard of separation among those remaining with both parents falls slightly.

Figure 3.5 Hazard Probability of parental separation by age among cohort members born to married parents



However, this plot of the probability of parental separation by the age of the cohort member does not take into account either the circumstances of the cohort member's family or where the cohort member fits into the life course of that family, particularly his or her position in the birth order and the parents' marital duration. We need to consider not only the extent to which these pre-existing characteristics of the family may predispose them to separation, but also whether the effects of these circumstances on relationship stability may change over time. The next section reviews factors that are hypothesised to be associated with the hazard of separation. It then goes on to introduce the methodology of event history analysis that will be used to address this question.

3.2.2 Parental characteristics associated with the hazard of separation

The literature on the hazard of partnership dissolution can be divided into three broad areas; the demographic characteristics of the couple and their family of origin; socio-economic

background and current circumstances; and finally, community and societal factors which may support or discourage divorce.

Demographic characteristics

Age at marriage is consistently found to have an association with the hazard of marital dissolution even after controlling for other characteristics of the couple (US: Booth and Edwards 1985; Teachman 1982; White 1990); (UK: Berrington and Diamond 1999; Kiernan and Mueller 1998). Although some authors have found youth to be particularly associated with a high risk of dissolution in the early years of the marriage (Martin and Bumpass 1989), others have found the effect to persist even at longer durations (Morgan and Rindfuss 1985; Murphy 1985). The reasons for this relationship are attributed to both the immaturity of the couple and a lack of role models of marital life (Morgan and Rindfuss 1985), and, from an economic perspective, the reduced amount of time that has been invested in searching for a suitable partner (Becker 1991). Murphy (1985) found that the negative effect of a one year increase in age of marriage on the hazard of dissolution was far greater at younger ages than for women marrying in their mid 20s or later.

Divorce has been also found to be less likely among older people and, usually corresponding to this, those who have been married for longer durations (Fergusson et al. 1984; South and Spitze 1986). This is likely to be a product of both selective attrition, removing those predisposed to divorce from the married group, as well as some factors surrounding the increased losses from leaving the marriage and reduction in the pool of available remarriage partners (South and Lloyd 1995). The model, therefore, tests the duration of the marriage at the birth of the cohort member as well as the age of the parents.

Additionally, marriages where the husband is much older than the wife, or the wife at all older than the husband, have been found to be more prone to divorce (Bumpass and Sweet 1972; Tzeng 1992). Therefore, the analysis examines if the cohort members are more likely to experience parental separation if their parents' ages differ in these ways.

Other aspects of the couple's demographic behaviour include their own premarital cohabitation as well as any other previous marriages or cohabitations. Men and women who cohabit before marriage have been generally found to have higher rates of dissolution (US: Axinn and Thornton 1992); (UK: Haskey 1992). However, in Britain, the associations have been found to vary differently for men and women according to the duration of the cohabitation (Berrington and Diamond 1999) as well as whether the individual has had a

previous cohabitation with another partner (Kiernan and Mueller 1998). People who have cohabited are generally found to have less traditional attitudes and lower religious affiliation (US: Axinn and Thornton 1992), (UK: Berrington and Diamond 1999) and may be more likely to consider separation as a solution to marital discord. Finally, if one spouse has been married previously there is a higher hazard of dissolution (Martin and Bumpass 1989). Unfortunately, in the case of the BCS70 we do not have details of the relationship history of the parents of the cohort members. It is, therefore, not possible to identify parents who have lived together before marriage or those who had previously married or cohabited.

Another factor that cannot be considered on this survey is the relationship history of the grandparents of the cohort members. Parental divorce has been found to be associated with divorce among the next generation (US: Amato 1996; McLanahan and Bumpass 1988); (UK: Kiernan and Cherlin 1999) although it is hypothesised to act through other determinants such as socio-economic disadvantage, preference for age at marriage and family formation patterns (Berrington and Diamond 1999).

Socio-economic circumstances

Socio-economic disadvantage, indicated by low occupational status or unemployment, has been found to be associated with divorce (US: Martin and Bumpass 1989); (UK: Haskey 1984). Alternatively, socio-economic factors are found to operate indirectly through the demographic behaviour of a couple in their preference for age at marriage and childbearing (US: Bumpass et al. 1991); (UK: Kiernan 1986). Evidence from the 1970s and 1980s indicated that women who worked after marriage were more likely to divorce than those who did not (US: Cherlin 1979; Mott and Moore 1979; Oppenheimer 1988); (UK: Ermisch 1989) either as a result of their increased economic independence or greater pool of potential alternative partners. Again there is variation in these findings with Greenstein placing emphasis on the number of hours that the woman works (Greenstein 1990) and Berrington and Diamond (1999) finding women in intermediate occupations to be slightly more likely to divorce than those in the highest or lowest status occupations. On the BCS70, the mothers of the cohort members were asked about their economic activity prior to the birth of the cohort member. Clearly, this would have been affected by whether the woman already had children.

As some women may have been out of the labour market or have changed to jobs with a lower occupational status since marriage or motherhood, the educational experience of the parents may be more informative. Couples with higher levels of education tend to have lower rates of marital dissolution often because of a later age at marriage and assortive mating (US: Bumpass

et al. 1990); (UK: Berrington and Diamond 1999). Conversely, it should not be assumed that this is a simple linear relationship as higher educated people in the 1970s may have had more liberal attitudes to divorce (Levinger 1976). Another factor is educational heterogamy. Whilst couples where the husband has slightly higher educational status than the wife have been found to be the most stable, couples where the wife has higher attainment than the husband have been found to have the highest rates of dissolution (Bumpass et al. 1991). This may operate both through the greater occupational opportunities available to a better qualified woman as well as the potential attraction to a partner with higher status than the existing husband. Using the mother's and father's age at completion of education we can examine the extent to which educational levels and differences are associated with the hazard of marital dissolution among the parents of this cohort.

Family formation patterns

The birth of the first child has been found to dramatically reduce the chances of the parents separating in the following year, but subsequent children have not been found to have the same effect (US: White and Booth 1985); (UK: Murphy 1985). Whether childbearing brings stability or, instead, couples who are likely to split up are less likely to have children cannot be established. The birth of younger siblings also suffers from the same problems of causality: if a couple does not have more children it may be because the relationship is in trouble.

The timing of the birth is also important. Pre-marital births and conceptions in the 1970s and 1980s were found to be precursors of divorce (Morgan and Rindfuss 1985). The pregnancy is suggested to restrict the search for the most suitable partner and therefore increases the chances of divorce (Becker et al. 1977), although the effects have been found to operate indirectly through other factors such as the couple's age and education level (Bumpass and Sweet 1989).

In some studies parents with sons have been found to be less likely to divorce than parents with all daughters (Morgan et al. 1988), perhaps because of greater paternal involvement in childcare of boys than girls. Finally, the number of children has been found to be associated with the hazard of dissolution. In the US, Waite and Lillard found dissolution rates to be higher among couples with fewer children (Waite and Lillard 1991) whilst in Britain, Murphy (1985) found that the lowest risk of dissolution was found in families with two children and the highest among those with four or more. From the point of view of the cohort member again, the likelihood of parental separation would be expected to be higher either if you were conceived premaritally or if you were born into a large family. We can also test whether

divorce rates are higher among families containing only daughters prior to and including the cohort member.

Region

Differences in the likelihood of marital dissolution have been found to vary at a regional level in some developed countries (Berrington and Diamond 1999; Lillard et al. 1995). In this analysis, the regions were considered very broadly, comparing England, Scotland and Wales.

Ethnicity

In the US it was well established by the 1980s that African-Caribbean parents were more likely to separate than those from white European or Hispanic backgrounds (Moore and Waite 1981; Thornton 1978). In the UK, there is less available data with sufficient size to test differences by ethnicity. In the survey at age 16, under 1% of remaining cohort members were from African-Caribbean backgrounds and nearly 2% had Asian parents. Although small, the model considers, after controlling for social and demographic circumstances, whether there are any differences in the hazard of parental separation according to ethnic origin.

Period and marriage cohort effects

Chapter 1 illustrated how the divorce rate in England and Wales rose dramatically in the 1970s through to the mid 1980s before levelling out (Haskey 1988). This follows an earlier trend in the US (Goldstein 1999; Tzeng 1992). It is contestable whether changing divorce rates reflect purely period effects of changing historical circumstances and attitudes to divorce or whether successive cohorts of married couples enter marriage with different expectations and attitudes which create cohort differentials in propensity to divorce. Looking at the period 1960 to 1979 in the US, Thornton and Rogers concluded that there were virtually no marriage cohort effects influencing divorce rates (Thornton and Rodgers 1987). However, analyses of more recent marriage cohorts have found such effects operating through, for example, women's changing career expectations and attitudes to marriage (Ono 1999; Oppenheimer 1988). The majority of parents of the BCS70 members were married in the 1960s so we might expect little effect of marriage cohort within this group of parents.

However, the 1969 Divorce Reform Act, implemented in 1971, may have had a one off effect. Although the model considers separation rather than legal divorce, some couples might have waited until the change in the law made it more straightforward to divorce on the grounds of irretrievable breakdown of the relationship rather than fault. Lower rates of separation before

the cohort members first birthday could be a result of marital duration or the impact of the birth of a first child, but also reflect couples waiting for a few more months to separate.

In all, the model examines the influence of these factors on the hazard of parental separation during the cohort member's childhood. Some circumstances may be important in determining whether the couple survive the early years whilst other influences may remain constant over time. To incorporate such matters into the analysis the next section introduces the methodology of event history analysis.

3.3 Methodology

3.3.1 Event history models

Much of the analysis in this thesis involves the study of both the occurrence and timing of critical life events, beginning here with the event of parental separation. This section introduces the methodology of event history analysis with particular reference to discrete time approaches. Event history analysis addresses two key issues of event occurrence that create difficulties with more standard methods of statistical analysis, that of censoring and time varying explanatory variables. Right censoring occurs when an individual reaches the end of the observation period and the event has not occurred. Analysis which just considers whether the event has occurred by the end of the time frame does not inform us whether the characteristics of people experiencing the event early on differ from those experiencing the event at a later time. Secondly, some factors that are hypothesised to predict the event may change over time and a dynamic model can take into account the changing nature of these time varying covariates rather than fixing the measure from one arbitrarily selected starting point.

Data used in event history analysis

Information on significant events can be collected by either prospective survey methods, repeatedly observing whether an individual has experienced an event, or by asking respondents to retrospectively recall the timing of an event. With each method there is a trade-off between fieldwork costs and record accuracy (see the discussion of recall error in Section 2.4). The BCS70 represents something of a mixture of the two methods. Current status data gives the family structure at each survey stage and we could proceed with an event history analysis based on interval censored data, where we know for sure the lower and upper bounds of when the event occurred, but not the exact time (Diamond and McDonald 1992; Diamond et al. 1986). This would restrict us to cohort members who took part in every stage of th survey. Alternatively, we can use the retrospective recall of the year that some events, such as parental separation, occurred which allows us to include respondents who are missing a stage

of the study. Chapter 2 and Appendix I described the issues of inconsistency that were overcome to create a single measure of family structure for each year from birth to 16.

Discrete-time analysis

Most event history analysis involves continuous time approaches where it is considered that the time units are small enough to be treated as a continuous variable. Many use Cox's partial likelihood model for parameter estimation. However, in other cases when there are larger gaps, such as months or years, between observations, discrete (or grouped time) methods are more appropriate (Allison 1982; Allison 1984; Kalbfleisch and Prentice 1980; Willett and Singer 1993). Discrete time analysis estimates the probability that an event will occur to the individual during a particular time interval. The risk set at the beginning of each interval is the group of people to whom the event has not yet occurred. If, and when, the event does occur then the individual is removed from the risk set before the beginning of the next time interval. Arjas and Kangas (1992) liken the process to a series of Bernoulli trials. Each person has a record (or trial) for every period of exposure to risk. For as long as the event has not occurred, the dichotomous outcome measure will be zero. In the period that it does occur the outcome measure will change to one and no further records will follow for that person.

In this application, Table 3.3 shows a section of the person-period database that was created for the model examining the hazard of parental separation in each year from birth to 16, given that it had not yet occurred. There can be up to 16 person-period records corresponding to each year from birth to age 16. Each record must contain the time indicator, the event outcome indicator and any predictor variables that are being used in the analysis. In this example the first child was born to a mother who got married at 19 or 20 after a premarital conception and experienced parental separation after six years. In the second case, the mother was aged 23 or older at the time of marriage, the cohort member was conceived within marriage and no parental separation occurred.

Table 3.3 Section of a person-period datafile for discrete time analysis

Identifier Variable	Predictor variable (Mother's age at marriage)	Predictor variable (Whether conceived premaritally)	Time Indicator (Yearly time interval since birth)	Event Indicator (Whether parental separation occurred)
1	19-20	1	1	0
1	19-20	1	2	0
1	19-20	1	3	0
1	19-20	1	4	0
1	19-20	1	5	0
1	19-20	1	6	1
2	23+	0	1	0
2	23+	0	2	0
2	23+	0	3	0
2	23+	0	4	0
2	23+	0	5	0
2	23+	0	6	0
2	23+	0	7	0
2	23+	0	8	0
2	23+	0	9	0
2	23+	0	10	0
2	23+	0	11	0
2	23+	0	12	0
2	23+	0	13	0
2	23+	0	14	0
2	23+	0	15	0
2	23+	0	16	0

The discrete time logistic hazard model

Having created the expanded database standard logistic regression techniques can then be used to regress the dichotomous event indicator on all the time dummies and selected predictor variables. The hazard function represents the level of risk of the event occurring in each time period, given that it had not already occurred. There are two underlying assumptions that must be made for any model fitted using the discrete time method (Arjas and Kangas 1992):

i) that the event occurred at integer multiples of the time unit, and:

ii) for time varying covariates, it must be clear that the condition is established at the beginning of the time interval and does not coincide with, or follow as a consequence of the event.

The logit regression model specifies for individual *i*, the hazard of experiencing parental separation at time *t*, given that it had not previously occurred, represented as:

$$\log\left(\frac{P_{it}}{1-P_{it}}\right) = \beta_0 + \beta_1 Z_{it} + \underline{\beta'}_2 \underline{X}_{it} + \underline{\beta'}_3 \underline{W}_{it}$$

where

P_{it} is the hazard of the event of the separation occurring at time *t* for individual *i* with fixed covariates $\underline{X}_i$ and time-varying covariates $\underline{W}_{it}$. Z_{it} is a function of duration (the age of the cohort member) for individual *i* at time *t*, and β_0, β_1, $\underline{\beta}_2$ and $\underline{\beta}_3$ are unknown parameters. The inclusion of Z_{it} allows age to be modelled explicitly as one of the independent variables.

Unobserved heterogeneity

In this analysis of the hazard of parental separation independent variables are selected from a range of factors measured at the birth survey that, from the literature review, are suggested to be associated with disruption. The aim is to demonstrate the extent to which the cohort members do not begin their lives with an equal chance of family disruption. The precursors that are found to be statistically significant will then, where possible, be tested in the analysis of the outcomes of family disruption to try and examine the extent to which family disruption has an association with young adult outcomes over and above these very early circumstances. In a fuller analysis of the hazard of marital disruption further time varying variables might have been added, examining the family's changing circumstances over the years. As a result, we should be particularly aware of the unobserved heterogeneity that may play an increasing part in this model as time progresses and factors at birth are perhaps decreasingly relevant to the family circumstances up to 16 years later.

However, there is also a more general problem with observing a changing hazard rate over time. Even if the hazard rate was actually constant for each cohort member as they grew older, differences across individuals which are not incorporated into the model will tend to produce evidence of a hazard rate that declines with time (Aalen 1994; Allison 1984). Rather than rates actually declining over time we may be observing the continuing stable risk of separation among the group that remains after those most likely to separate at shorter durations have done so. Methods are available to account for heterogeneity in subjects to address what has been term model "frailty" (Vaupel et al. 1979) where an unmeasured 'random' effect is incorporated into the hazard model (Klein and Moeschberger 1997). For the purposes of this

thesis it is acknowledged that a hazard rate that declines over time may reflect such model frailty rather than effects of duration itself.

3.3.2 Defining the risk set and fitting the model

This analysis selects cohort members who were present in the study at birth and age 16. It therefore excludes any cohort members who were censored at an earlier stage because they dropped out of the study. The sample is then further restricted to those who were born to married parents who were both still alive at the time of the age 16 survey and examines whether their parents separated at each age from birth to age 16. The minority of children who were born to a lone mother, cohabiting parents or experienced parental death were therefore excluded. In this analysis of the risk of parental separation, unweighted data is used. The early incidence of family disruption was a covariate used in the creation of the non-response weights for the age 16 and 26 data. When family disruption is the outcome in question it is not feasible to use weights that are already effectively controlling for that event. However, a number of other covariates used in the derivation of the weights, such as parental education, are used here as background controls. Controlling for factors known to be associated with non-response will reduce the level of bias in the results. The underlying assumption must be that the relationships observed among those followed up in the study are similar to those lost to attrition. Covariates were selected using a combination of forward selection and backward elimination techniques, tested using a –2 log likelihood statistic. The frequency distributions of all the independent variables tested in the model and further details of the selection procedure are given in Appendix II. Table 3.4 summarises the variables that were tested and the level of statistical significance that the factor achieved. Only those that improved the fit of the model at the 1% level of statistical significance were retained in the model. Once the main effects had been selected, all the parameters were tested for interactions. It was found to be more parsimonious to collapse the measure of duration (the age of the cohort member) into three time phases of early, middle and late childhood to test for general trends over time (see Appendix II).

Table 3.4 Variables tested for inclusion in model of parental separation

Variable	Level of statistical significance
Mother's age at marriage	***
Father's age at marriage (grouped)	***
Age difference between parents	***
Duration of parents' marriage at birth of cohort member	***
Premarital conception	***
Mother's age at her first birth	
Number of older siblings	***
Whether sons in family	
Social class	
Father employment status at birth of cohort member	**
Mother's occupational status prior to birth	***
Mother's age at completing full time education	**
Father's age at completing full time education	***
Difference in age parents completed full time education	*
Country	*
Ethnic group of cohort member	***

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

3.4 Results of hazard model of parental characteristics associated with separation

Table 3.5 presents the parameter estimates for the hazard model of the risk of parental separation. As described in Section 2.4.3, the results of the model are expressed in the tables as the estimated coefficient and the standard error of that coefficient. The odds derived from these coefficients are the conditional odds of separation in each year, given that separation had not already occurred (Singer and Willet 1991). For example, those born to a mother who married young were at greater risk of disruption than those with mothers who married at later ages. The parameter estimate for women aged 18 or younger at marriage was 1.09. As $e^{1.09} = 2.97$, the estimated conditional odds that a woman marrying at this age will experience separation in a given year were 2.97 times greater than a woman marrying at age 23 or older.

Alternatively, this represents a 197% increase in the conditional odds of separation in each year.

There were also two interactions in the model; between duration and some parental age differences plus duration and parental age. The hazard was even higher in the early years for those whose father was also young at marriage and, similarly, for those born to parents where the mother was older than the father or the father was six or more years older than the mother.

The selected predicted hazard probabilities based on the models illustrate scenarios which include this interaction. The predicted probabilities from the logistic regression model show the probability of parental separation in each year, conditional on separation not having yet occurred, according to parental age characteristics whilst holding all the other background variables in the model at an "average" level. This predicts if children grew up with otherwise similar backgrounds, the extent to which the hazard probability of parental separation would vary according to parental age[11]. Figure 3.6 illustrates the probability of parental separation for a mother who was 23 or older at the time of marriage, first if she married a man of the same age or slightly older and then, secondly, if she married a younger man. The chart shows how the predicted probability of parental separation is higher for this second category in the early years, it converges very slightly with the first category in the primary school years and then the hazards for both groups are the same in the later age phase. Figure 3.7 demonstrates the second interaction term in the model according to the age of the father at marriage, first, the probabilities for a woman aged 18 or younger marriage with a husband also aged 18 or younger and then second, with a husband aged up to five years older than her. The chart shows the particularly high hazard of the couple separating in the early years of the cohort member's childhood.

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[11] The predicted probability can be expressed as:

$$\hat{\pi} = \frac{e^{(\beta_0 + \beta_1 X_1 + \beta_2 X_2 .....)}}{1 + e^{(\beta_0 + \beta_1 X_1 + \beta_2 X_2 .....)}}$$

where the parameters are either set to the subgroups of choice and any remaining variables not of direct interest to the probability are set at their mean level. As with the confidence intervals, a 95% Confidence Interval could be calculated around this predicted probability using the 95% lower and upper boundaries derived from the coefficient and its standard error (See Section 2.4.3).

Family formation patterns

The hazard of parental divorce increases with the mother's number of previous births. This may be a characteristic of large families but also may be a matter of the cohort member's birth order. We only know if the child experienced parental separation by age 16. Those who are first born may be most likely to be over 16 at the time of parental divorce but we would not know about that as it is effectively right censored at the age 16 survey. Therefore, the level of parental divorce among first borns may be understated. Another aspect of the parents' family formation patterns is whether the cohort member was a pre-marital conception. Even after controlling for the age and socio-economic circumstances of the family, children who were conceived before their parents' marriage are more likely to experience disruption.

Socio-economic status

The educational and occupational covariates showed possibly opposing forces on the hazard of disruption. Firstly, cohort members with fathers who left school at the statutory leaving age had a greater hazard of disruption than those whose fathers had continued to age 18 or beyond. However, some mothers who continued to work after marriage showed an elevated hazard of separation when compared to women who were housewives prior to the birth of the cohort member. Women in social class I or II occupations prior to the birth of the cohort member were found to be about 54% more likely to separate in any given year than women who were housewives.

Ethnicity

After controlling for parental age, occupational and educational factors, children born to African-Caribbean parents had elevated hazards whilst those from an Asian background had diminished hazards of parental separation compared to white children.

Table 3.5 Parameter estimates from discrete time logistic regression model of parental marital dissolution between birth and age 16

Cohort members born to married parents

Reference categories are underlined	$\hat{\beta}$	$se(\hat{\beta})$
Age of cohort member (duration)		
0	0	-
1	-0.23	0.23
2	0.18	0.21
3	0.38*	0.20
4	0.12	0.22
5	1.60***	0.21
6	1.53***	0.21
7	1.62***	0.21
8	1.64***	0.21
9	1.35***	0.22
10	1.72***	0.21
11	1.43***	0.22
12	1.64***	0.21
13	1.38***	0.22
14	1.46***	0.22
15	1.50***	0.22
16	0.56**	0.26
Mother's age at marriage		
<=18	1.09***	0.10
19-20	0.61***	0.09
21-22	0.23**	0.11
23 or older	0	-
Number of older siblings		
0	0	-
1	0.26***	0.09
2	0.46***	012
3 or more	0.66***	0.14
Marriage duration at time of birth of cohort member (years)		
<=2	1.00***	0.15
3-5	0.67***	0.14
6-10	0.45***	0.13
11+	0	-
Mother's occupational status before the birth of the cohort member		
Housewife	0	-
Working, I or II	0.43***	0.12
Working, IIINM	-0.01	0.09
Working, IIIM	0.32**	0.14
Working, IV/V	0.05	0.09
Not known	0.12	0.12

* denotes significance at the 10% level
** denotes significance at the 5% level
*** denotes significance at the 1% level

cont/d.....

Table 3.5 Continued

	$\hat{\beta}$	$se(\hat{\beta})$
Ethnic Group		
White	0	-
African-Caribbean	0.76***	0.28
Asian	-1.07***	0.36
Father's age at completing full time education		
18 or older	0	-
16-17	0.25***	0.11
15 or younger	0.36***	0.12
Cohort member pre-marital conception		
No	0	-
Yes	0.34***	0.10
Interactions		
*Age 0-5 * Father younger than mother*	1.14***	0.19
*Age 0-5 * Father 6 or more years older than mother*	1.60***	0.16
Age 6-11 Father younger than mother*	0.41***	0.12
*Age 0-5 * Father age 18 or younger at marriage*	1.12***	0.19
Constant	-7.80***	0.27

Number of persons 7437. Number of person years 117,628
Total = cohort members born to married parents

* denotes significance at the 10% level
** denotes significance at the 5% level
*** denotes significance at the 1% level

Figure 3.6 Predicted hazard probability of parental separation by parental age difference

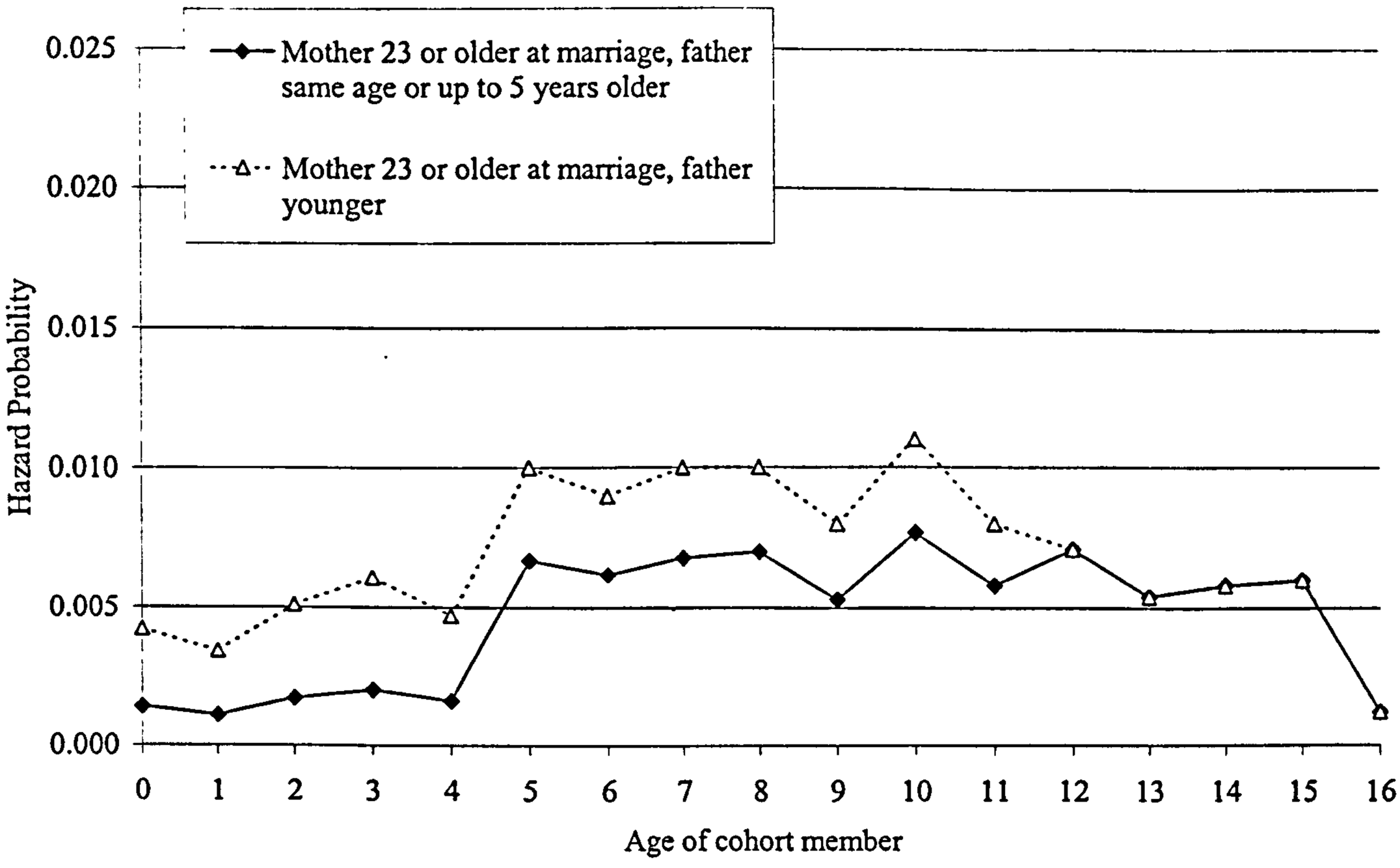
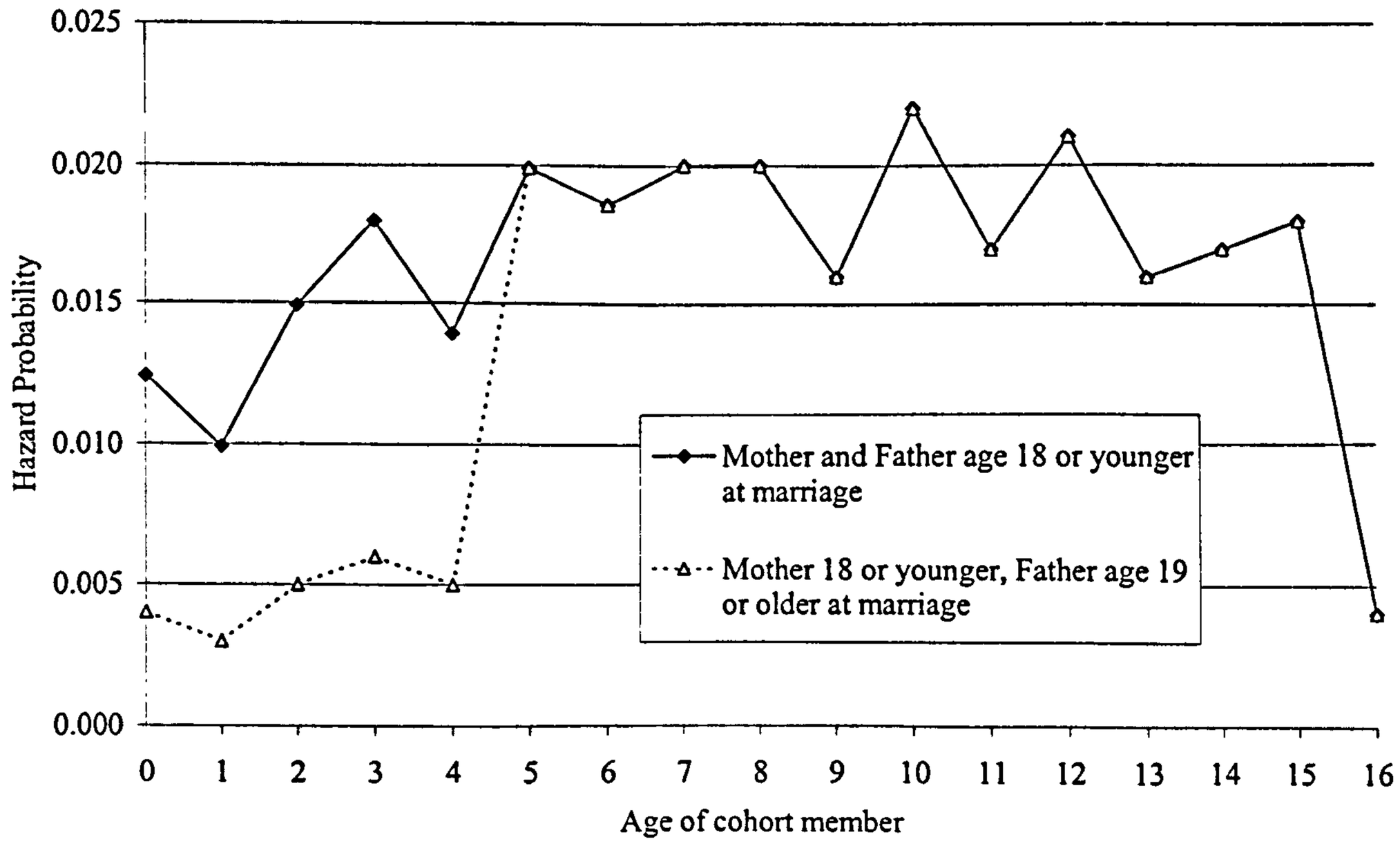


Figure 3.7 Predicted hazard probability of parental separation by parental age at marriage



3.5 Factors associated with stepfamily formation

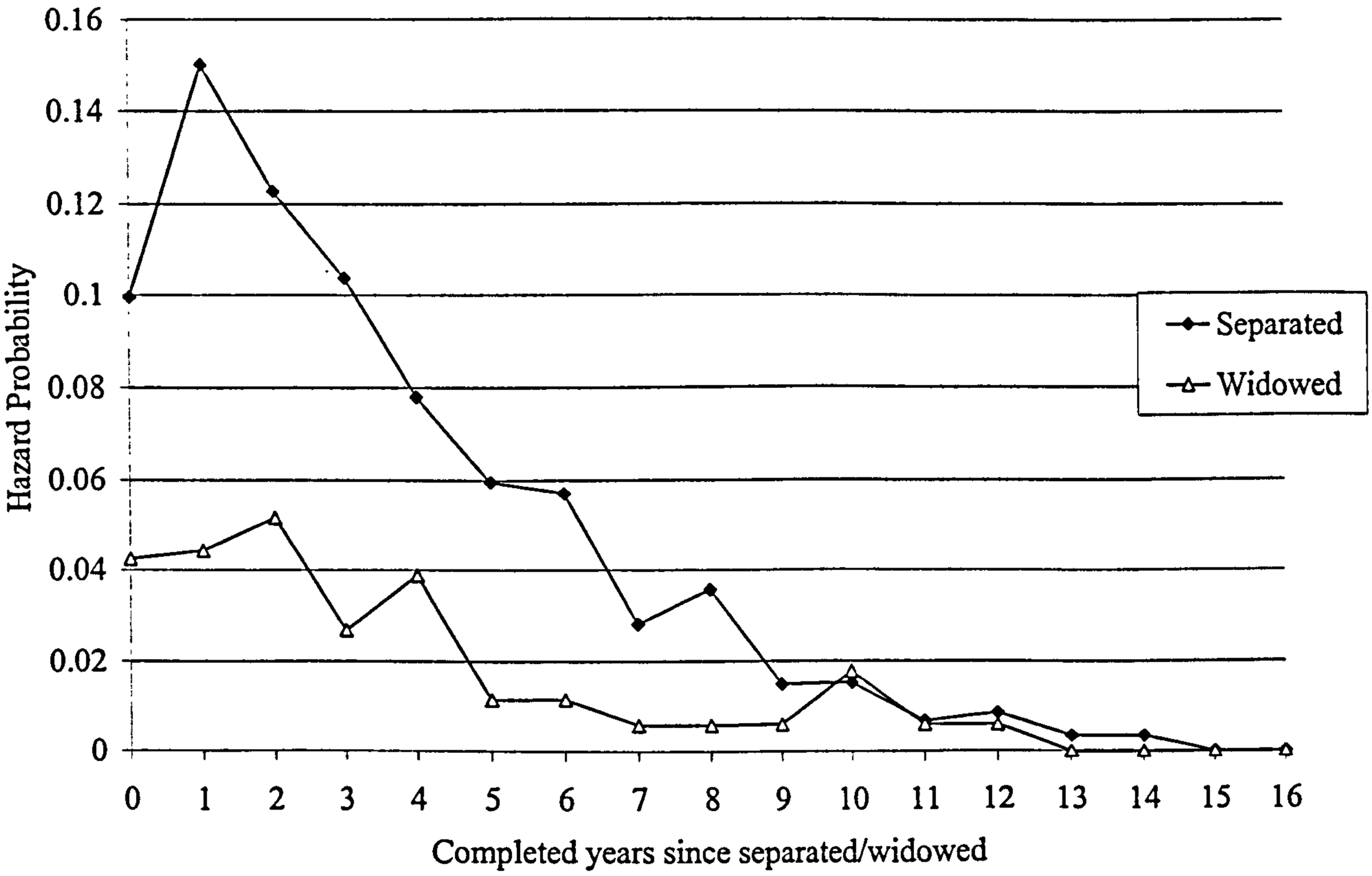
By the time of the age 16 survey nearly 14% of the cohort had ever lived in a stepfamily. As divorce rates rose in the 1970s and 1980s there were a greater number of divorcees and, given the shorter durations of marriage upon divorce, their average age was lower than in previous decades. Remarriage rates were found at this time to increase sharply, stabilising only in the 1980s when cohabitation became more common. By 1985, nearly one third of marriages included at least one divorced partner and it was estimated that nearly two thirds of divorced women would remarry within six years of divorce (Haskey 1987).

From the child's perspective, the move into a stepfamily represents another transition event requiring role adjustment and the negotiation of new parenting arrangements with the residential and non-residential parents (US: Cherlin and Furstenberg Jr 1994); (UK: Ribbens McCarthy et al. 1996). As for parental separation, the chances of moving into a stepfamily during childhood depend on more than just the amount of time that has passed since the separation of the natural parents. This section examines factors associated with the repartnering of mothers after separation[12]. The outcome of interest is duration before a new stepfather moves into the household. Here, no distinction is made between de facto or de jure partnerships.

Figure 3.8 shows the life table probabilities of repartnering separately for mothers who had been widowed or separated/divorced. As discussed previously, widows are less likely to ever repartner and those that do tend to take longer. For example, whilst over 70% of mothers who had separated from the father before the cohort member was age four had repartnered, only 38% of widows had done the same.

[12] The repartnering behaviour of lone fathers after separation is not considered because of the small numbers involved.

Figure 3.8 Hazard Probability of Maternal Repartnering by Reason for Separation from Father



Modelling the hazard of maternal repartnering

Again, a discrete-time hazard model is used to estimate the mother's hazard of re-partnering in the years after she separates from the natural father. Of those born to married parents, it selects cohort members who were still living with their natural mother, but not their natural father at age 16. This sample includes families where the father died rather than left the household. The small group born to a lone mother, who were shown previously to experience very rapid rates of maternal repartnering, are again excluded. The only difference with this model is that it must allow for the different times at which each mother becomes "exposed to the risk of re-partnering" according to the year of the transition. The first record for each case in the person period database therefore begins in the year that the child ceased to live with their natural father and there is a subsequent record for every year either until the mother re-partners or the observation is censored at the age 16 survey.

Factors associated with the hazard of repartnering

The literature on remarriage has been growing since the late 1980s when it became increasingly clear that theories and empirical evidence on the selection of first marriage partners did not always apply to the process of remarriage. As discussed previously, widows are less likely to repartner than divorced or separated women and those that do tend to take longer before moving into a new marriage or cohabitation (Coleman 1989; Ferri 1984). Here, the cause of the separation is controlled for in the analysis. Next, an age gradient in the hazard of repartnering has been found at all durations with the odds decreasing as age increases (US: Bumpass et al. 1990); (UK: Ní Bhrolcháin 1988).

There are conflicting hypotheses concerning the effect that the duration of the first marriage may have on the hazard of repartnering. Becker and colleagues (1977) argue that those who have been married longer have more marriage orientated skills and are likely to re-partner sooner because they are less orientated to being single. By contrast, Koo and colleagues point to the potentially lower levels of "mate selection" skills among those for whom it has been a long time since they last dated and, in turn, they expect these groups to take longer before they find a new partner (Koo et al. 1984).

Those who married young may have stronger preferences for marriage and hold more traditional views of family life and this group has been hypothesised to remarry sooner to return to their preferred status (Becker et al. 1977). Furthermore, those who delayed first marriage may take longer to select a new partner and Bumpass, Sweet and Martin (1990) have found that those who had married at older ages were less likely to remarry. The presence of children has been found by some to be an obstacle to remarriage (Bumpass et al. 1990; Spanier and Glick 1980), although other studies have found children to have a neutral effect (Grady 1980) or to have a varying effect according to the age of the mother (Koo et al. 1984). Of course, by definition in this study, all the marriages have at least one child, but the importance of total sibling size at the time of the separation will be considered.

Women with higher educational and occupational status have been found to be slower to re-partner than those with lower qualifications or in less skilled occupations (Bumpass et al. 1990). In Britain, although participation in the labour market has been found to be associated with a higher hazard of re-partnering, possibly because women meet a greater number of potential partners (Ermisch 1987), Ermisch and Francisconi found women in professional and managerial occupations to be less likely to re-partner than those in semi-skilled or unskilled jobs (Ermisch and Francesconi 1996b). For this analysis, the mother's occupation

immediately after separation is not always known. As an indicator of what type of work she might return to, her occupation prior to the birth of the cohort member is used in this analysis. Additionally, the housing tenure of the household in the cohort member's childhood was examined as a broad indicator of socio-economic status.

Some regional effects have been found in patterns of remarriage in the US coinciding with the levels and acceptability of cohabitation (Bumpass et al. 1990). This analysis is concerned only with the formation of a new residential family, whether it is de facto or de jure, but the model still tests whether there is any variation at country level in the hazard of repartnering to examine whether, perhaps, differences in family law between England and Wales and Scotland are reflected in behaviour. Finally, the model tests whether mothers from ethnic minorities are more or less likely to repartner than those from white European backgrounds. This comparison did present some practical problems in application. Of the 1484 mothers included in the model, only 1.5% were African Caribbean and 1% were Asian. The Asian mothers were more likely to have been widowed than separated whereas most of the African-Caribbean women had separated from their partner. Yet both groups were highly unlikely to repartner, indeed none of the Asian women had done so by the time of the age 16 survey and only one of the African-Caribbean women. To create sufficient numbers for analysis, these two categories were collapsed and compared to the reference group of white mothers.

3.6 Results of hazard model of characteristics associated with stepfamily formation

Table 3.6 shows the variables that were tested for inclusion in the model. The percentage distributions for these factors are given in Appendix II. After controlling for the mother's age at separation, the age of the youngest child was not found to be significantly associated with the mother's hazard of repartnering. The mother's age at marriage and the mother's age at separation which, in effect, takes into account the duration of the marriage were both selected for the final model as they improved the fit of the model at the 1% level of significance. The duration of the marriage was also tested as an alternative covariate, but was not found to be statistically significant in its own right. Furthermore, family size was not found to be statistically significant for this group of separated mothers.

Table 3.6 Variables tested for hazard model of maternal re-partnering

Variable	Statistical Significance
Cause of Separation	***
Mother's age at marriage (grouped)	***
Mother's age at separation (grouped)	***
Duration of parents' marriage at separation (grouped)	
Number of full biological siblings at time of separation	
Age of youngest child at time of separation	
Age of eldest child at time of separation	
Social class in 1970	**
Mother's occupational status prior to birth of cohort member	**
Mother's age at completing full time education	
Tenure	***
Region (country)	***
Ethnic group	***

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

Table 3.7 shows the results for the final fitted model after testing for interactions between independent variables revealed no statistically significant results. Firstly, widows are much less likely to repartner than women who were separated or divorced. Even after taking into account their higher average age, the odds of repartnering for widows were 62% of the odds for women who separated or divorced (95% CI 46%-85%). Figure 3.9 plots the predicted hazard probabilities of repartnering over the years for women who were either separated or divorced compared to those who were widowed. It shows that although the relative differential is maintained over the years, in absolute terms the hazard probability of repartnering is greatest in the early years.

Older women are also less likely to repartner. The hazard for women who were age 40 or over was only 24% of the hazard for women who were age 29 or under at the time of separation. The absence of a statistically significant interaction with the measure of time used indicated that this differential persisted over time. This difference is shown graphically in Figure 3.10 showing the predicted probabilities of repartnering for these two groups over time. Again the largest differences in real terms occur in the early years, varying between a hazard probability of 0.17 for the younger women and 0.05 for the older women after one completed year of separation. Interestingly though, even after controlling for mother's age at separation, her age at marriage was still found to be important. Women who married at older ages were less likely to repartner than those who married young, potentially supporting the hypothesis that women who marry early first time around will seek a new partner more quickly than those who delayed marriage.

Although there was no known evidence to suggest much difference in repartnering by region in Britain, the hazard for women in Scotland was just over half the hazard for women in England or Wales. Regarding socio-economic status, mothers who moved into council or private rented accommodation in the cohort member's childhood were less likely to repartner than those who remained in owner occupied households. The mother's occupation prior to the birth of the cohort member was not found to be statistically significant at the 1% level, but perhaps more recent occupational information would have been more pertinent. Finally, as discussed earlier, women from ethnic minorities had very low hazards of forming a stepfamily.

Table 3.7 Parameter estimates from discrete time logistic regression model of maternal repartnering among cohort members born to married parents who separated

Reference categories are underlined	$\hat{\beta}$	$se(\hat{\beta})$
Completed years since separation		
0	0	-
1	0.55***	0.13
2	0.42***	0.14
3	0.23	0.15
4	0.12	0.16
5	-0.12	0.18
6	-0.13	0.20
7	-0.67**	0.26
8	-0.22	0.23
9	-1.01***	0.35
10	-0.44	0.30
11	-1.39***	0.52
12	-0.67	0.43
13	-2.26**	1.01
14	-1.99**	1.01
15	-1.30*	0.73
Cause of separation		
Divorce/separation	0	-
Widowed	-0.47***	0.16
Mother's age at time of separation		
<=29	0	-
30-34	-0.24***	0.10
35-39	-0.28***	0.13
40 or older	-1.44***	0.20
Mother's age at marriage		
<=18	0	-
19-20	-0.18*	0.10
21-22	-0.42***	0.14
23 or older	-0.75***	0.17
Not known	0.12	0.14
Tenure		
Owner occupier	0	-
Council tenant/Private rented	-0.35***	0.08
Country		
England and Wales	0	-
Scotland	-0.53***	0.16
Ethnic Group of Mother		
White	0	-
African-Caribbean or Asian	-3.04***	1.00
Constant	-1.61***	0.16

Log likelihood 2317.76
Number of persons 1,484. Number of person years 8511

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

Figure 3.9 Predicted Hazard Probability of Maternal Repartnering By Reason for Separation

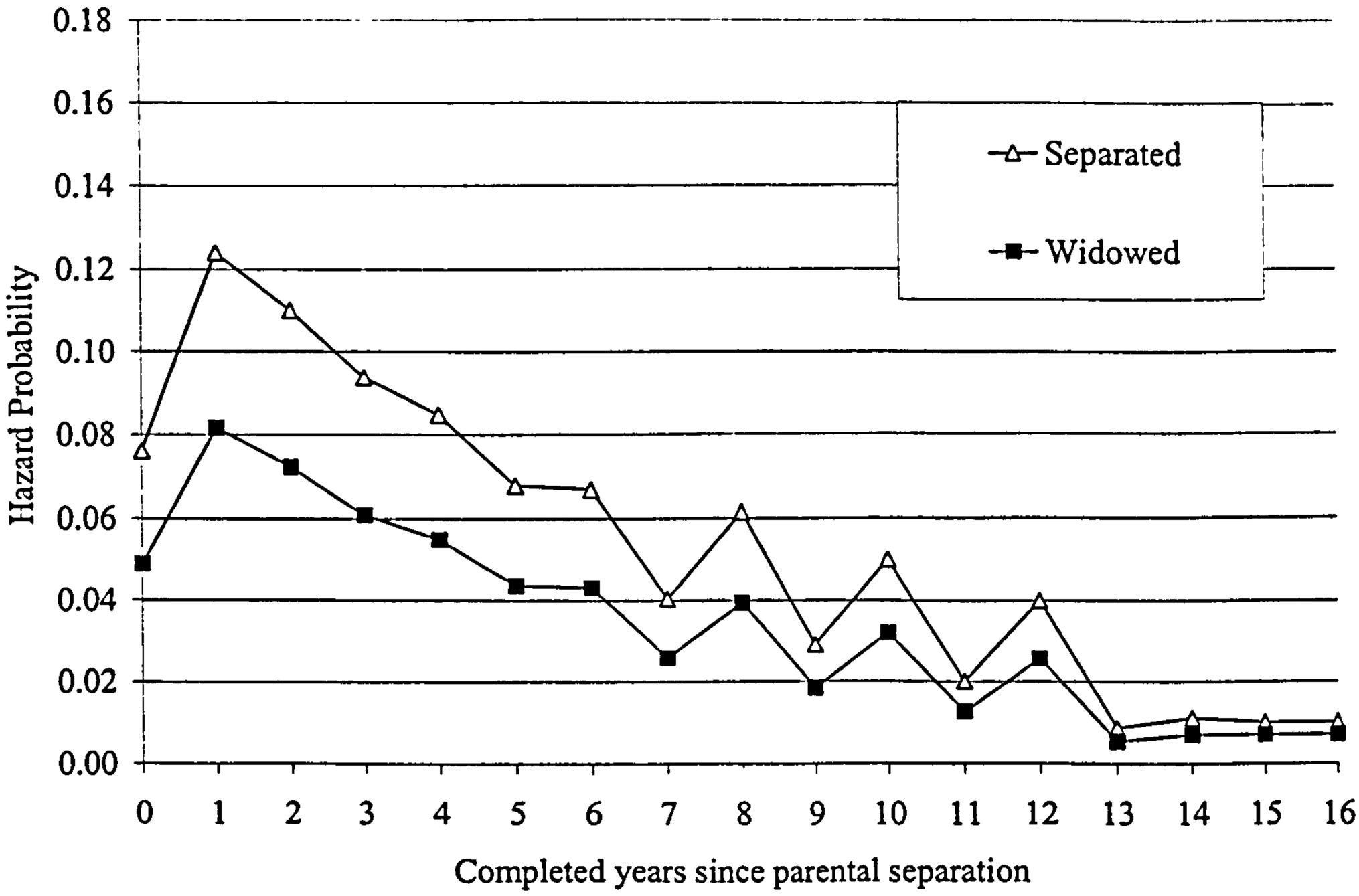
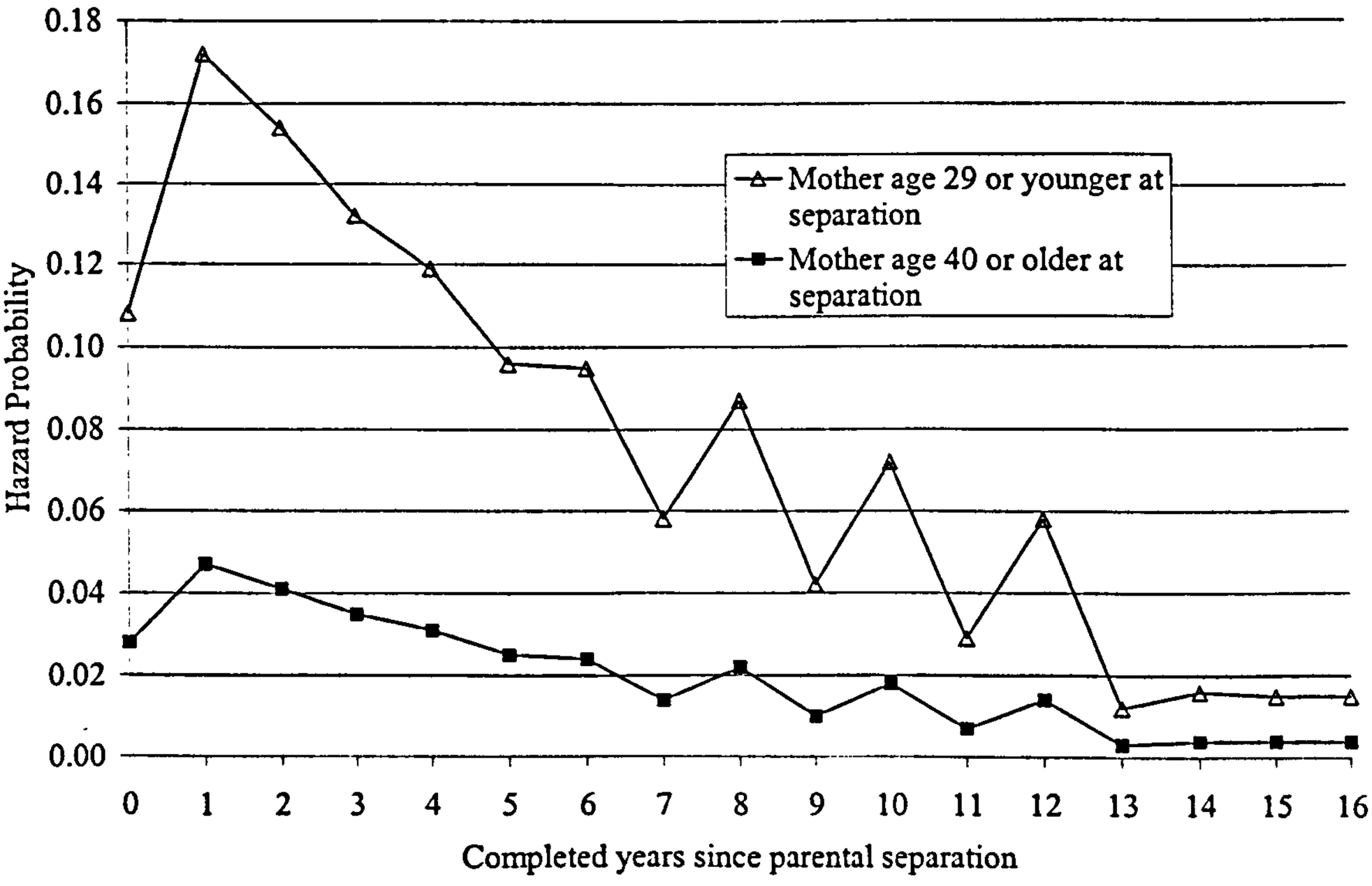


Figure 3.10 Predicted Hazard Probability of Repartnering By Selected Age of Mother at Separation

(Separated/Divorced mothers only)



3.7 Discussion

The first half of this chapter examined the patterns of family disruption experienced by the BCS70 members. In all, just over one quarter of the cohort experienced some parenting change during childhood. Not only were the cohort members more likely to experience family disruption than their predecessors in the 1958 NCDS but the process often began much earlier at pre-primary or primary school age. When comparing any outcomes of family disruption on the BCS70 with results from the NCDS we should bear in mind both the broader changing attitudes to divorce and remarriage and the fact that the BCS70 members were generally younger at parental separation. The models that control for the age of the child at the last transition will help illuminate whether there are any differences in the outcomes of those experiencing earlier or later transitions.

Next, this chapter considered who was more likely to experience disruption. First, children born to lone mothers were most likely to experience at least one transition, even if it was their natural father moving into the household. Nearly half of those born to cohabiting parents would experience their parents' separation and this was likely to be at a particularly young age. Looking in more detail at factors affecting the hazard of parental separation among those born to married parents, age at marriage was found to be clearly related to the hazard of dissolution even among a select sample that have already become parents. As discussed in Chapter 2, in the late 1960s, the average age of men and women at marriage was near its lowest in 20th Century Britain; the arguments about maturity of the couple or amount of time invested in partner search could be levelled at a considerable proportion of the parents in this cohort. The levelling of divorce rates in Britain (Haskey 1988) could either be a result of those in less stable relationships being more likely to select themselves into cohabitation, but also that as the average age of first marriage continues to rise, the investment in partner search and maturity is correspondingly rising.

Another aspect of parental age relevant to the hazard of separation was age difference. Where the age of the both parents was known, over 70% of cohort members' parents were either the same age or the father was up to five years older than the mother. In only 13% of families was the mother older than the father and a further 17% of cohort members had a father who was six or more years older than their mother. Although both of these categories were associated with an increased risk of separation in the early years, the impact diminished over time.

The role of family formation patterns presents a mixed picture. Even after controlling for the social and educational circumstances of the parents, if the cohort member was a premarital conception the hazard of parental separation was higher than for those conceived within the marriage. This would seem to support the arguments about partner search and compatability of the couples rather than their socio-economic circumstances. The second aspect of family formation is family size. There does appear to be a higher risk of dissolution for children with a higher number of older siblings. Apart from the effect of birth order rendering the youngest siblings in a family most likely to experience disruption before they were 16, this finding is probably confounded by the generally lower age at first birth among women with large families, a variable that was not significant in its own right in the model. Also, it could reflect the stresses of stretching resources around a large family.

Although some socio-economic factors were significant, these were partly mediated through the generally earlier age at marriage of women from more disadvantaged backgrounds. Although there was an association between rising education level and falling hazard of marital dissolution, the mother's economic activity had the reverse association with separation. Children with mothers who continued working in professional, managerial or manual occupations after their marriage and at least up to the birth of the cohort member were more likely to experience family disruption than mothers who became housewives. A number of possible explanations could be offered for this finding from the 1970s and early 1980s. Firstly, new home economists would argue that the employment of the mother disrupts the efficiency of the home unit of production where the wife's labours within the home support the productivity of the husband's work outside it (Becker and Murphy 1986). However, it is also clear that when contemplating a divorce at that time, a woman in work would have had some advantage in terms of economic independence or alternative partner search than those who became housewives.

Yet we cannot know the more qualitative aspects of the mother's working life. Across all social classes, families where the mother was working may have been experiencing more financial stress than those where she is not, which in turn may place a strain on the marriage. Alternatively, the mother's choice to continue working may reflect her attitudes to women's independence or even her own assessment of the chance of the marriage continuing in the long term, both of which may predispose a couple to divorce.

Finally, ethnic origin was important. Those from African-Carribean backgrounds were more likely to experience parental separation but far less likely to go on to live in a stepfamily than

those from other ethnic backgrounds. Those born to Asian parents were highly unlikely to experience disruption, if they did it was usually the death of a parent, and none of the Asian children in this sample went on to live in stepfamilies.

In terms of the subsequent analysis in this thesis, this chapter has highlighted the particular vulnerability of children born to young mothers, not only to the risk of parental separation but then the higher hazard of their mother re-partnering while they are still living at home. Those born to large families may be at higher risk of disruption but it does not appear to be particularly associated with the hazard of going on to live in a stepfamily. Those whose father died had a lower chance of multiple family transition and there was an unexpected regional variation with longer durations of lone motherhood among mothers living in Scotland.

In all, the two models have highlighted how the social and demographic family characteristics, which reflect the personality and preferences of the parents, place some cohort members at greater risk of family transitions than others. These types of surveys can only begin to tell us about the circumstances of each family and we have not considered how those circumstances may change over time. However, it does show that family transitions are part of a process that is set in motion well before the birth of the cohort member. The question for this thesis is whether the transitions have any association with later outcomes over and above the family circumstances that the cohort member was born into.

Chapter 4 Childhood Family disruption and educational attainment

4.1 Introduction

In both Britain and the US, living apart from one natural parent in childhood has been found to be associated with lower educational attainment (UK: Ely et al. 1999; Joshi et al. 1999; Kiernan 1997b); (US: Astone and McLanahan 1991; Furstenberg Jr and Teitler 1994; McLanahan and Sandefur 1994; Mclanahan and Sorensen 1985; Wojtkiewicz 1993). This chapter examines the educational outcomes of respondents to the age 26 survey, beginning with a description of the qualifications that they attained. The second half of the chapter then considers the association between childhood family trajectory and attainment. First, descriptive statistics are presented to examine the observed differences in educational attainment according to the type of family trajectory. Then the multivariate analysis uses a series of logistic regression models to test the association between four different measures of childhood family trajectory and educational outcome after taking into account selected measures of family background and childhood circumstances.

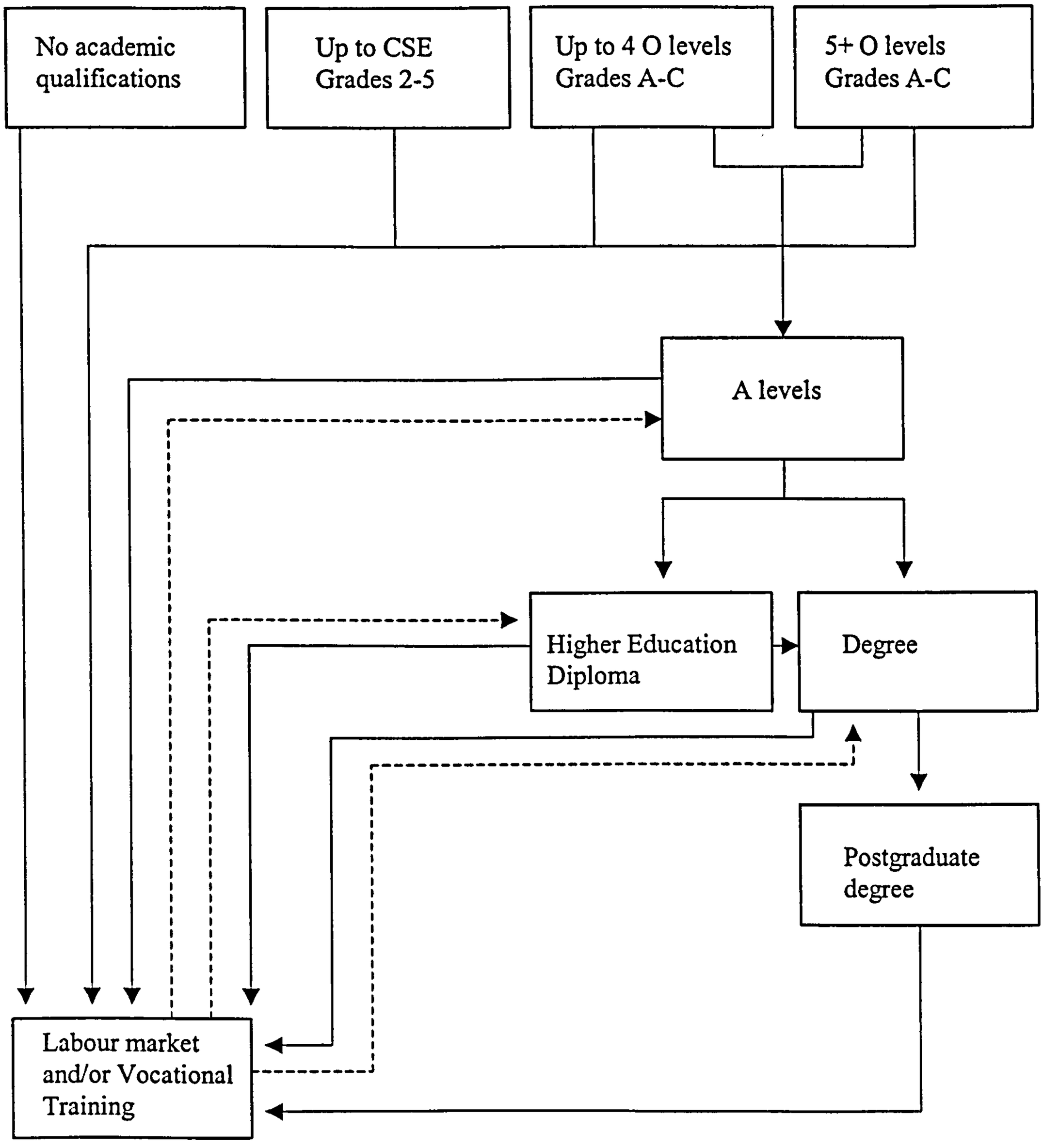
4.2 The educational attainment of the BCS70

4.2.1 Qualifications available to the cohort

The 1970 cohort was the last but one academic year group to take General Certificate of Education Ordinary (O) Level examinations or the lower standard Certificate of Secondary Education (CSE) at age 16 before their replacement by the General Certificate of Secondary Education (GCSE). Obtaining a Grade 1 CSE was considered to be the equivalent of achieving a pass at O level. In Scotland, students took Ordinary Grades at age 16 which were considered comparable to O levels (Mackinnon et al. 1995). Throughout this chapter references to a grade A to C pass at O level include all of these equivalent qualifications. The educational pathway after 16 was highly dependent on attainment. Achieving five or more passes at O level, including in Maths and English, is often the minimum qualification required by schools to begin Advanced Level courses as well as the level required to work in large firms or the public sector. Alternatively, students could pursue vocational courses available at Further Education colleges, although these had not yet been streamlined into the system of National Vocational Qualifications (NVQs) that was introduced at the end of the 1980s. Finally, they could leave education and enter the labour market for employment and/or work-based training. In Scotland, students could take Higher Grade examinations after one year, usually in a wider range of subjects than taken for A Levels. If they stayed on for a further year they could take the additional Scottish Certificate of 6th Year Studies.

Figure 4.1 presents a simplified flow chart of the most common academic routes available to the 1970 cohort in England and Wales. Students achieving no O level passes would generally be directed to vocational training or the labour market. Those with O levels could do the same or pursue A levels. After that, some may go on to take either Higher Education Diplomas or Degrees that could lead to postgraduate qualifications. Between each of these stages, people who entered the labour market may return to education.

Figure 4.1 Academic pathways available to 16 year olds in England and Wales in 1986 according to attainment



Vocational qualifications

Apart from academic qualifications, about half of cohort members gained vocational or professional qualifications after leaving school. Table 4.1 presents the main types of vocational qualifications available to the cohort against the equivalent academic qualifications and the more recent National Vocational Qualification (NVQ) level.

Table 4.1 Summary of main vocational qualifications available to the 1970 cohort

Academic/NVQ level	Examples of Equivalent Vocational Qualification
CSE Grade 2-5/ NVQ 1	Royal Society of Arts (RSA) Level 1 typing etc Pitman elementary typing etc Heavy Goods Vehicle Licence/Passenger Service Vehicle Licence
CSE Grade 1/ O level pass/ NVQ 2	RSA Level 2 and 3 typing etc Pitman intermediate and advance typing City and Guilds Operative City and Guilds Craft/Intermediate/Ordinary Part I City and Guilds Insignia Award in Technology Joint Industry Board – Craft/Technician Certificate
A level pass/ NVQ 3	City and Guilds Advanced/Final/Part II National Certificate Ordinary Level National Certificate General Diploma
Higher Qualification/ NVQ4	City and Guilds Full Technological National Certificate Higher Level Nursing Qualifications Other Professional Qualifications
Degree/ NVQ 5 and NVQ6	No equivalent vocational qualifications

4.2.2 The attainment of the BCS70 cohort

Because of attrition among those with difficulties at school, the age 26 survey is known to under-represent those with lower educational attainment (Shepherd 1997). In this analysis of educational outcome according to childhood family trajectory, the sample is further restricted to those who have both qualification information at 26 and parental interview data at 16. This further biases the sample towards those from more stable and advantaged backgrounds. The weighting adjustments, described in Chapter 2, have therefore been applied to compensate partially for this bias. This section compares the estimates of educational attainment among this restricted sample before and after reweighting to the unweighted figures for all respondents at age 26.

Data available

Question 4 of the age 26 questionnaire (Despotiduou and Shepherd 1998) asked the respondent to indicate the level of qualifications that they had gained and how many exams were obtained at that level. The question referred to qualifications gained at any time but did

not ask the age of the respondent at gaining each level of qualification. Secondly, although the number of exams passed at certain levels is recorded, the question did not ask for the subjects taken. Those who had not gained any formal qualifications could tick a response indicating 'none'.

Academic qualifications

Table 4.2 presents the highest academic qualification of men and women in the study. The first column is the raw frequency among all respondents to the age 26 survey. The proportion of people achieving no academic qualifications was half that of the NCDS (Bynner and Parsons 1997), possibly partly accounted for by lower standard CSE examinations that were not available to the 1958 cohort. The second column refers to the group who additionally have age 16 parental interview data. Without weighting, the frequencies for the group who responded to both the parental questionnaire at 16 and the survey at age 26 were biased towards those achieving higher level qualifications. The third column shows the estimates for this group after reweighting. Although the proportion achieving lower level qualifications has increased slightly, it is still similar to the unweighted frequency for all those responding to the age 26 survey, which is known to be biased. Investigations revealed that the cause was the treatment of the 7% of the age 26 survey's respondents who did not answer the academic qualifications question. The mean response probability weight for this group was most similar to those who had few or no qualifications, indicating that the two groups had similar socio-economic backgrounds. Furthermore, at 16, around 80% of these item non-respondents intended to leave school immediately or pursue a vocational rather than academic course. This is again very similar to those who reported no qualifications and very different from those who went on to achieve a degree, of whom 8% wanted to leave school at the time. If one assumed that those who skipped the questions had no academic qualifications, the weighting appears far more effective (Table 4.2, column 4) and the proportion estimated to have achieved no qualifications almost doubles.

Table 4.2 Highest academic qualification, men and women, BCS70

Men	All respondents at age 26 survey (unweighted)	Respondents at age 26 survey with parental interview at 16 (unweighted)	Respondents at age 26 survey with parental interview at 16 (weighted)	Respondents at age 26 survey with parental interview at 16 (weighted)*
				Percentage
None	6.5	5.5	6.3	10.0
CSE – Grades 2-5	18.5	17.6	18.9	19.2
"O" Level/CSE – Grade 1	38.4	38.5	39.1	38.0
"A" level	9.5	10.0	9.2	9.0
Higher	4.4	4.7	5.1	4.4
Degree +	22.6	23.6	21.4	19.3
Total	*3801*	*2439*	*Unweighted 2439 Weighted 8300*	*Unweighted 2619 Weighted 8966*

Women	All respondents at age 26 survey (unweighted)	Respondents at age 26 survey with parental interview at 16 (unweighted)	Respondents at age 26 survey with parental interview at 16 (weighted)	Respondents at age 26 survey with parental interview at 16 (weighted)*
				Percentage
None	5.2	4.2	5.0	8.1
CSE – Grades 2-5	16.5	15.8	16.9	17.4
"O" Level/CSE – Grade 1	43.2	42.6	43.2	42.5
"A" level	11.6	12.4	11.8	10.9
Higher	4.5	4.9	4.7	4.2
Degree +	19.1	20.0	18.4	16.7
Total[13]	*4598*	*3144*	*Unweighted 3144 Weighted 7800*	*Unweighted 3338 Weighted 8345*

** Assuming that item non-responders achieved no qualifications*

Although the evidence suggests that people who skipped this question had no academic qualifications, there is no proof for this hypothesis, and the analysis presented later in this chapter excludes these people. However, when the models were repeated using the assumption that item non-responders had no qualifications, there was no notable change to the coefficients produced.

Vocational Qualifications

Among men, the most common vocational courses were City and Guilds craft based whilst women were most likely to pursue RSA (Royal Society of Arts) typing and clerical qualifications. Table 4.3 shows the distribution of vocational qualifications according to their NVQ equivalent level, again presenting weighted and unweighted results. This time, nearly

[13] Note that the weighting adjustments were calculated for all respondents taking part in the age 16 and 26 surveys to weight back to the original sample of 9008 men and 8372 women. The further restriction in this chapter to those with qualification information causes the totals to fall slightly short of that original total.

16% of respondents did not answer the question. These people were slightly more likely to have higher qualifications than respondents as a whole.

Table 4.3 Highest vocational qualification attained, men and women, BCS70

Equivalent NVQ level	Men			Women		
	Respondents at 26 (unweighted)	Respondents at 26 and parental interview at 16 (unweighted)	Respondents at 26 and parental interview at 16 (weighted)	Respondents at 26 (unweighted)	Respondents at 26 and parental interview at 16 (unweighted)	Respondents at 26 and parental interview at 16 (weighted)
						Percentage
None	48.2	47.2	47.2	43.6	42.3	43.4
NVQ 1	8.9	9.1	8.7	11.3	11.6	11.4
NVQ 2	16.3	16.0	17.0	22.8	22.4	22.5
NVQ 3	14.5	14.8	15.0	10.0	10.5	10.3
NVQ4/5	12.0	13.0	12.1	12.4	13.2	12.3
Total	*3441*	*2202*	*7526*	*4130*	*2801*	*6996*

Age at completing full time education

Table 4.4 presents the distribution of respondents according to their age at leaving full time education. Compared to the NCDS, this cohort were more likely to continue their education beyond age 16; only around half of men and just over 40% of women left full time education at the statutory school leaving age of 16 compared to 62% and 55% respectively of the NCDS cohort[14] (Bynner and Parsons 1997). They were also more likely to continue in education beyond age 18. At age 33, none of the NCDS cohort members reported continuing their education up to age 26 compared to 3% of women and 4% of men in the BCS70. However, although some of these BCS70 cohort members did appear to have pursued continuous education, further examination of the data reveals that most of this group had returned to education by 26 after working for some years. These people appear to have interpreted the question as referring to their current status rather than age at completion of continuous full time education.

[14] The statutory school leaving age for the NCDS cohort was also 16.

Table 4.4 Age at completing full time education, men and women, BCS70
Unweighted figures for all respondents at age 26 and weighted estimates for respondents at 26 with parental interview data at 16

	Men			Women		
	Respondents at 26 (unweighted)	Respondents at 26 and parental interview at 16 (unweighted)	Respondents at 26 and parental interview at 16 (weighted)	Respondents at 26 (unweighted)	Respondents at 26 and parental interview at 16 (unweighted)	Respondents at 26 and parental interview at 16 (weighted)
						Percentage
Pre 16	1.9	1.2	1.4	2.0	1.6	1.9
Age 16	47.1	45.8	47.9	39.8	35.6	39.0
17-18	19.9	21.6	21.5	29.3	30.1	30.4
19-21	10.8	11.3	10.7	10.9	11.8	11.3
22 or older	16.4	16.6	14.9	15.1	15.6	14.3
Still in education	3.9	3.6	3.9	2.9	2.8	3.0
Total	*4057*	*2591*	*8865*	*4836*	*3295*	*8238*

4.3 Family disruption and educational attainment

4.3.1 Evidence of the association between family disruption and educational attainment

Among the 1958 cohort, those who experienced parental divorce were nearly twice as likely to have no formal qualifications (20%) than those who grew up with both natural parents and similarly, they were less likely to achieve higher level qualifications (Kiernan 1997b). The 1970 cohort were more likely to achieve some formal qualifications and no associations have been found between family type and achieving no qualifications after controlling for socio-economic background. However, differences remained in the proportion of those from 'intact' and 'non-intact' families who achieved at least five O level passes (Ely et al. 1999). The following review of the empirical evidence on family disruption and educational attainment is organised according to the processes by which disruption may affect later outcomes which were introduced in Chapter 1. These include financial resources, social capital and control and, finally, the impact of change, stress and conflict.

The literature on the association between family disruption and educational attainment is dominated by US research and it is important to remember some of the country specific characteristics of the American and British educational systems. Many of the US studies focus on graduating from high school, usually around the age of 17. By the mid 1990s, 73% of US school students graduated whilst a further 12% eventually received a General Equivalency Diploma (McLanahan and Teitler 1999). The most common indicator used for British

research has been leaving school at the statutory school leaving age (Ní Bhrolcháin et al. 2000), or the level of qualifications attained; whether none (Kiernan 1997b) or fewer than five O level passes (Ely et al. 2000).

There is a general consensus among US academics that compared to other factors, such as parental education, occupation level, and income, the "effects" of family disruption on educational outcomes are quite modest (Sandefur and Wells 1999; Yeung et al. 1995). Among the higher estimates of the impact of disruption on education, McLanahan and Sandefur (1994) concluded that growing up apart from one natural parent approximately doubled the risk of not graduating from high school, from 15% among two parent families to 30% after controlling for race, parental educational level, family size and place of residence. In the UK, Ní Bhrolcháin and colleagues using the NCDS concluded, after using an extensive range of controls for other family background factors, that leaving school at 16 was least strongly associated with family disruption compared to the relative differences between groups for other outcomes such as young motherhood or leaving home. Whilst, for example the probability of women leaving school at 16 ranged from 0.61 among girls living with both natural parents to 0.74 among those in a stepfather family, the probability of young motherhood ranged from 0.07 to 0.16 between the same two groups (Ní Bhrolcháin et al. 1995).

Financial circumstances

The economic precursors and consequences of family disruption are consistently found to explain much of the difference in educational attainment by family type. Financial hardship may limit the family's ability to buy items to support the child's education, the parents may experience stress from unemployment or equally working long hours to support the family. Economic pressures in the family may also encourage a young person to leave school early and seek work (Hetherington et al. 1983b). Whilst still at school, financial hardship has been found to be the single most important factor affecting school attendance during the last year of the BCS70 member's compulsory education (Gregg and Machin 2000).

In the US, differences in household income have been estimated to account for 30-50% of the difference in high school graduation according to family structure (Astone and McLanahan 1991), and almost all of the difference in college entrance rates between children from lone mother and two natural parent families (Beller and Chung 1992). After taking both pre- and post- disruption family income measures into account, Painter and Levine concluded that the increased risk of high school drop-out was reduced to 5% among children experiencing

parental divorce during high school compared to those remaining in two natural parent families and that there was no remaining increased risk of not going to college (Painter and Levine 2000). Similarly, Pong and Ju , after controlling for initial income and income change after family disruption, found that the impact of family disruption on dropping out of high school was reduced to virtually zero (Pong and Ju 2000).

As discussed in Chapter 1, children experiencing family disruption in Britain in the 1970s and 1980s were more likely than earlier cohorts to experience poverty and, in turn, poverty is linked to lower educational attainment. Controlling for financial hardship has been found to attenuate the difference in educational attainment between those from lone parent and two parent families among both the NCDS and BCS70 (Ely et al. 1999; Kiernan 1997b; Ní Bhrolcháin et al. 2000).

Children who had lived in stepfamilies do not achieve attainment comparable to two natural parent families although the household's financial situation may have improved (US: Boggess 1998; Jeynes 1999; Sandefur et al. 1992; Sandefur and Wells 1999); (UK: Ely et al,1999; Ní Bhrolcháin et al 2000). Similarly, some US studies have found that even among students who graduate from high school, the likelihood of attending and graduating from college is lower than expected, particularly among boys (Beller and Chung 1992; Sandefur et al. 1992). Where positive effects of remarriage on high school graduation have been found, they are concentrated among those previously achieving particularly low educational test scores who may have most to gain from the financial stability brought about by maternal repartnering (Beller and Chung 1992). The initial decline in family income may have consequences in terms of early educational choices or attainment, that are not compensated for by the increase in resources following the formation of the stepfamily (McLanahan and Teitler 1999).

There is a lack of conclusive evidence as to whether the timing of any experience of financial hardship in the family is pertinent to educational outcomes. Whilst low income and welfare benefit receipt have been found to have more of a negative effect on educational outcomes if it occurs when the child is a teenager (Haveman et al. 1991), family income level between birth and age five has also been found to be related to high school completion (Yeung et al. 1995).

Given the already more disadvantaged circumstances of those who experience family disruption (see Section 3.4), controlling for factors that act as joint precursors of both disruption and lower educational attainment will be important to establish the extent to which family transitions, per se, are relevant to educational outcomes.

Social Capital and Control

In Sweden, where there are relatively small net financial differences between lone parent and two parent families, family disruption between age nine and 16 has still been found to be related to a greater likelihood of leaving school early. The authors point to issues of social capital with the 'loss' of the higher economic status parent potentially affecting the occupational aspirations and networks of the child (Jonsson and Gahler 1997). Similarly, lack of closeness to parents, mother's working hours, lack of supervision and lower parental authority, all of which can disrupt the transmission of social capital to the child, have been found in the US to be related to educational outcome (Amato and Ochiltree 1987; Furstenberg Jr and Nord 1985). These processes are often found to be associated with, but certainly not exclusive to, particular family types. Children in lone parent and stepfamilies at 16 in the BCS70 reported spending less time with their family and having less positive family relationships than those living with both natural parents (Ely et al. 2000). Much of the association between family structure and attainment that remains after taking financial hardship into account is removed by adding measures of parenting practices, family communication and support for the child's education (UK: Sweeting et al. 1998); New Zealand: (Nicholson et al. 1999) although, among the BCS70 members, it did not entirely remove the association between living in a stepfamily and qualifications attained by age 16 or 17 (Ely et al. 2000). Therefore, if associations are found between family transitions and educational attainment among the cohort, we may expect that adding measures of the quality of family life will reduce the strength of these associations.

Change, stress and conflict

Sandefur and Wells (1999) found that within each family type, the number of prior transitions had a small negative effect on educational attainment although elsewhere, the number of transitions prior to living in a lone mother family was not found to be associated with high school graduation (Wojtkiewicz 1993). Often related to family transitions, an association has been found between the number of house moves between the ages of four and seven, or 12 and 15, and lower educational attainment (Haveman et al. 1991). The age of the child at family disruption has not generally been found to be associated with the educational outcome after controlling for financial hardship. In New Zealand, no statistically significant differences were found between children entering a stepfamily between age six and 10 and 10 and 16 (Nicholson et al. 1999).

The evidence regarding the duration between transitions is, again, US dominated. Children who spent longer durations in stepfamilies have been found to be at greater risk of dropping out of education (Boggess 1998; Sandefur and Wells 1999; Wojtkiewicz 1993) although this has not been replicated for children growing up in a lone mother family (Wojtkiewicz 1993). Some earlier studies found the number of years in a non-intact family at young ages to be more significant for educational outcomes than living in a non intact family at a later age (Krein 1986; Krein and Beller 1988), whilst others have found the outcomes to be unconnected to the age at transitions or duration in particular family types (Li and Wojtkiewicz 1992; McLanahan and Sandefur 1994). In total, the different effects of duration are difficult to compare when duration is confounded with the age of the child at parental separation, the number of transitions and the eventual family structure in the child's late teens.

Finally, parental separation marks the end of a process, often involving conflict in the family. Children's performance in school may dip temporarily (Hetherington et al. 1978) and older teenagers have been found to be less likely to be attending school at 17 if they have recently experienced parental separation (McLanahan 1985). Differences in attainment among members of the 1958 NCDS according to family structure at 16 have been found to be attenuated by taking into account whether they were demonstrating behaviour problems at seven that could both have pre- and post-dated disruption (Kiernan 1997b). Also, family transitions in the years immediately preceding O levels may be more pertinent to educational outcomes than earlier disruption if they have an impact on the teenager's educational progress.

Family disruption and other family characteristics

The number of siblings, birth order and sibling spacing are well established areas of research into educational outcomes (Blake 1989; Powell and Steelman 1993). Whilst the possibility of dropping out of high school has been found in the US to be associated with coming from a large family, probably because of the strain on resources (Steelman and Powell 1989), the odds also increase with the number of closely spaced siblings. Close spacing has been found to have a negative effect on the presence of education materials for the child, the level of interaction between the parents and the child and also, the mother's educational aspirations for the child (Powell and Steelman 1993).

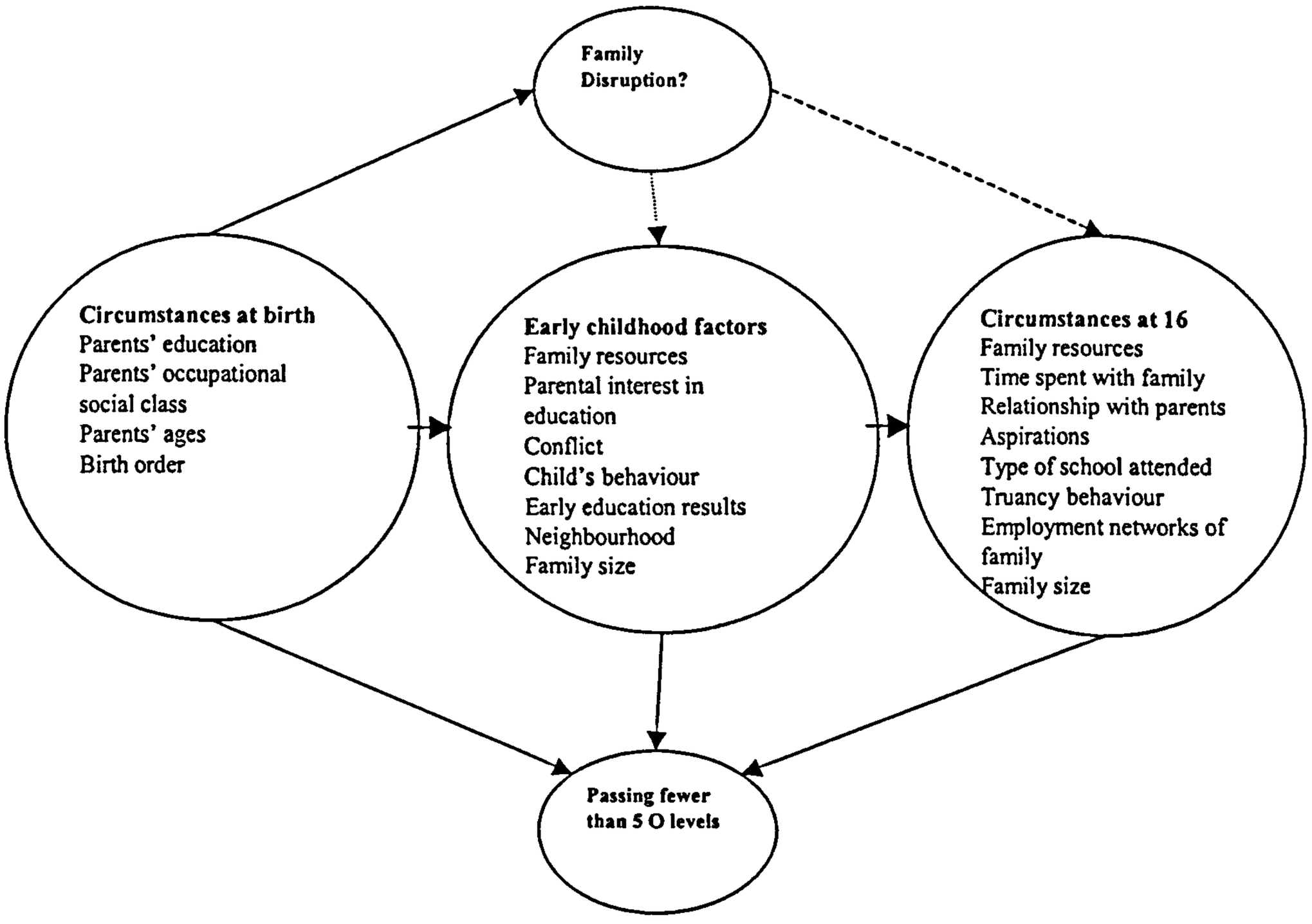
The treatment of sibling size as exogenous to family structure has been contested by Bilbarz and Rafferty (1999) arguing that the generally smaller size of lone parent families, if considered to be an advantage, would offset the magnitude of any family disruption effects. Conversely, given the larger size of stepfamilies, negative effects could be the outcome of

large family size. Therefore, taking sibling structure into account may be an important control variable. Sibling studies have also been very informative for looking at the extent that siblings with a common family structure may vary in their educational outcomes. Using this approach, family structure has still been found to have a modest, but still statistically significant effect, on educational outcomes (Sandefur and Wells 1999).

Apart from sibling variation, some studies find that the outcomes of family disruption vary according to the sex of the child, with a tendency for boys to show more negative effects than girls of parental separation on high school graduation (Krein and Beller, 1988; (Boggess 1998; Krein and Beller 1988), and a lower likelihood of entering college if they are living in a stepfamily (Beller and Chung 1992); or in the UK, leaving school at 16 (Kiernan 1992; Ní Bhrolcháin et al. 1995), and no qualifications by 33 (Kiernan 1997b).

Figure 4.2 summarises the framework by which the independent variables used in this analysis have been organised and their potential relationship to both family disruption and educational outcomes. Early childhood circumstances and characteristics may be precursors of both low attainment and family disruption but disruption can change later family circumstances, having an effect on the child's educational progress. This is represented by dotted arrows. The model building will address the pathways that children who experience family disruption could potentially follow to lower educational attainment: either coming from a more disadvantaged background in the first place, or experiencing strains on family life either before or after parental separation or repartnering.

Figure 4.2 Framework for variables used in the analysis of educational attainment at 16



4.3.2 Educational attainment by type of family transition on the BCS70

This analysis of the educational careers of the 1970 cohort begins with descriptive statistics to illustrate the variation in educational attainment according to four different measures of childhood family disruption.

Measures of family disruption

Chapter 3 presented a detailed description of the nature of family transitions among this cohort. In practice, it is necessary to aggregate information about family history into groups of sufficient size for multivariate analysis. Therefore, four measures of family history were derived for use in all the multivariate analysis of young adult outcomes among the cohort, namely:

(i) the family structure at 16;

(ii) the type of family transitions experienced to reach that family structure;

(iii) the total number and timing of parenting changes; or

(iv) both the type and timing of any transitions.

In measure (ii), if a child had experienced the death of either parent they were identified separately regardless of their family trajectory given the different circumstances and

adaptations found to ensue compared to parental separation (Cherlin et al. 1995). Also, children who had ever been placed in statutory or foster care, even if they had returned to their original family by age 16, were considered together in order to separate out what are likely to be some of the most disadvantaged family circumstances and life courses. Among the other trajectories, children who lived in a stepfather family are classified according to whether or not they ever lived with stepsiblings. Children born to a lone-mother experienced a great diversity of trajectories; including 20% who went on to live with both their natural parents. However, numbers are not sufficient to divide this group further. Measures (iii) and (iv) examine in more detail the timing of the transition, first, just by the number and timing of transitions, and then also by the type of transition, for those who have experienced the most common trajectories of parental separation followed by lone-motherhood and perhaps living in a stepfather family. These children are grouped by their age at the time of the final transition aggregated into three groups; those who had no further transitions after their sixth birthday, those experiencing the last transition between six and their 11th birthday, and finally those experiencing parental separation or the move into a stepfamily after age 11. The numbers of children experiencing particular combinations of family transition become relatively small at this stage and the results presented for this fourth classification are, therefore, tentative. The frequencies for these different types of family history among cohort members with both parental interview data at 16 and qualification information at 26 are given in Table 4.5. The second measure, showing the type of transition, is particularly important as it separates those experiencing parental death and parental separation and this measure is selected for the descriptive statistics.

Table 4.5 Frequency distributions of the measures of family transition used in the analysis of educational attainment
(weighted estimates)

	Men	Women
	%	%
Family Structure At 16		
Both natural parents	77.9	76.2
Lone mother	9.7	11.0
Mother and stepfather	8.6	9.6
Lone father/Father and stepmother	3.0	2.2
Other guardians/ in statutory or foster care	0.7	0.9
Type of transitions		
Always natural parents	74.5	73.5
Natural parents-lone mother	6.0	6.2
Natural parents-mother/stepfather, no stepsiblings	4.9	5.1
Natural parents – mother/stepfather – lived with stepsiblings	1.5	1.4
Natural parents – lone father or father/stepmother	1.5	1.4
Lone mother at birth –all sequences	4.1	4.2
Either parent died	2.8	4.4
Ever in statutory/foster care	1.3	1.5
Other sequences	2.9	2.1
Number and timing of transitions		
No transitions	75.9	74.3
1 transition, complete by age 6	5.1	5.7
2+transitions, complete by age 6	2.6	2.2
1 transition, complete by age 11	3.5	3.5
2+ transitions, complete by age 11	5.0	5.4
1 transition, age 11+	4.5	5.2
2+ transitions, last transition age 11+	3.4	3.6
Timing and type of transition (selected sequences)		
Always natural parents	74.5	73.5
Transitions complete by age 6		
Natural parents-lone mother	1.6	1.4
Natural parents-lone mother-mother/stepfather	1.7	1.7
Transitions complete by age 11		
Natural parents-lone mother	1.9	1.9
Natural parents-lone mother-mother/stepfather	2.6	2.8
Transitions complete age 11+		
Natural parents-lone mother	2.4	2.8
Natural parents-lone mother-mother/stepfather	2.1	2.0
All other sequences	13.2	13.9
Weighted Total	*2439*	*3144*
Unweighted Total	*8299*	*7800*

Total = men and women with educational information at age 26 and parental interview at 16

Achieving no academic qualifications

About 4% of the respondents to the age 16 and 26 surveys achieved no academic qualifications. Differences in attainment according to family sequence, are small. The proportion achieving no academic qualifications was somewhat higher among men who had lived in a lone mother or stepfather family after parental separation but, most notably, over one fifth of both men and women who had ever been in statutory or foster care left education with no qualifications (Figure 4.3)

Passing fewer than five O Levels

Just under half of men and women who grew up with both natural parents achieved fewer than five O level passes (Figure 4.4). Fifty-five per cent of men and 62% of women who had lived in a lone mother family after parental separation achieved fewer than five O Level passes, as did 62% of men and 69% of women who went on to live in stepfather families without stepsiblings. Men who lived in stepfather families with stepsiblings were more likely to have low attainment whilst there was less difference for women. Low educational attainment was more common among those experiencing less common transitions. Again, both men and women who had spent any time in statutory or foster care were particularly likely to achieve fewer than five O levels.

Figure 4.3 Percentage of men and women achieving no academic qualifications by age 26 by type of family transitions
(weighted estimates)

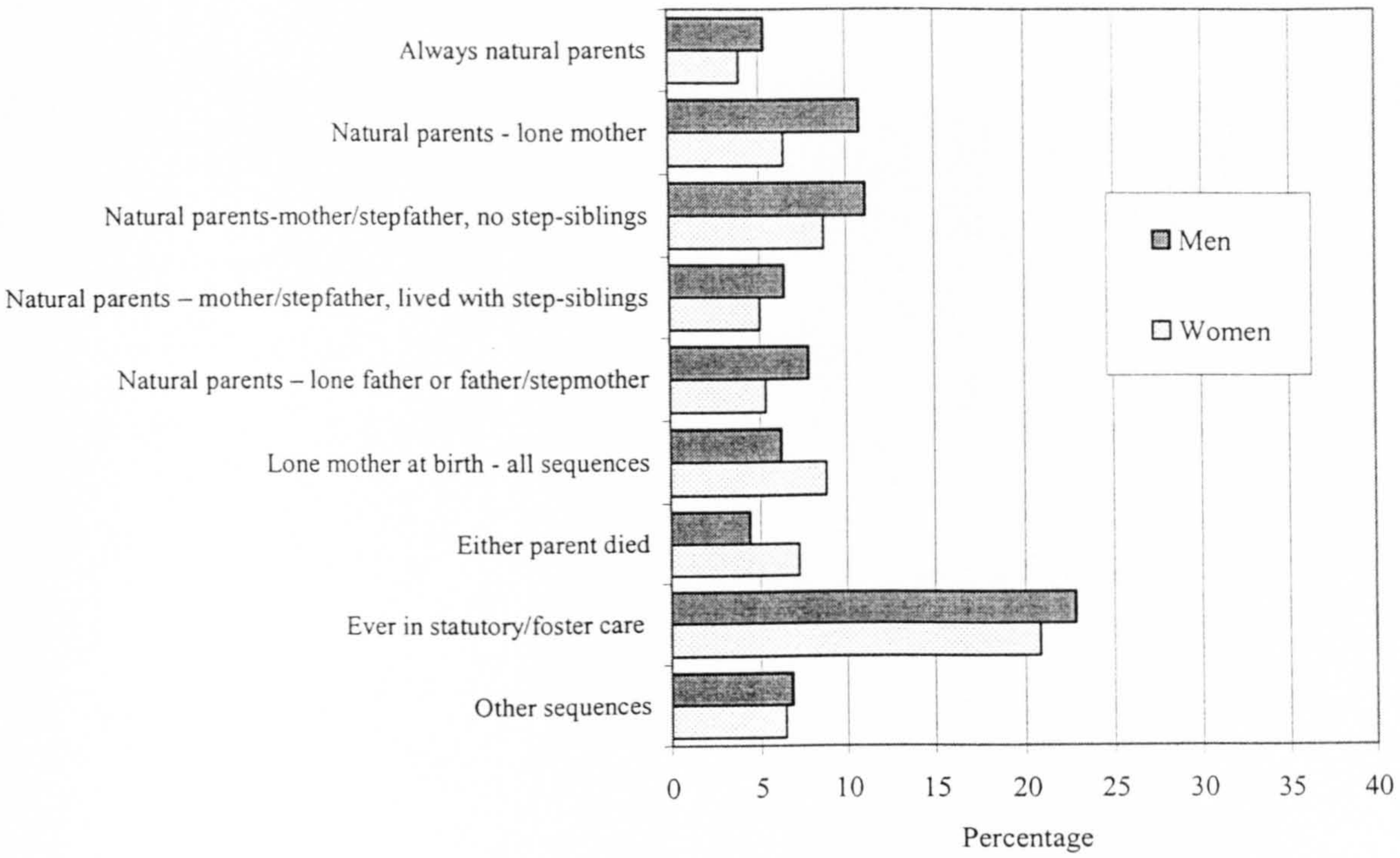
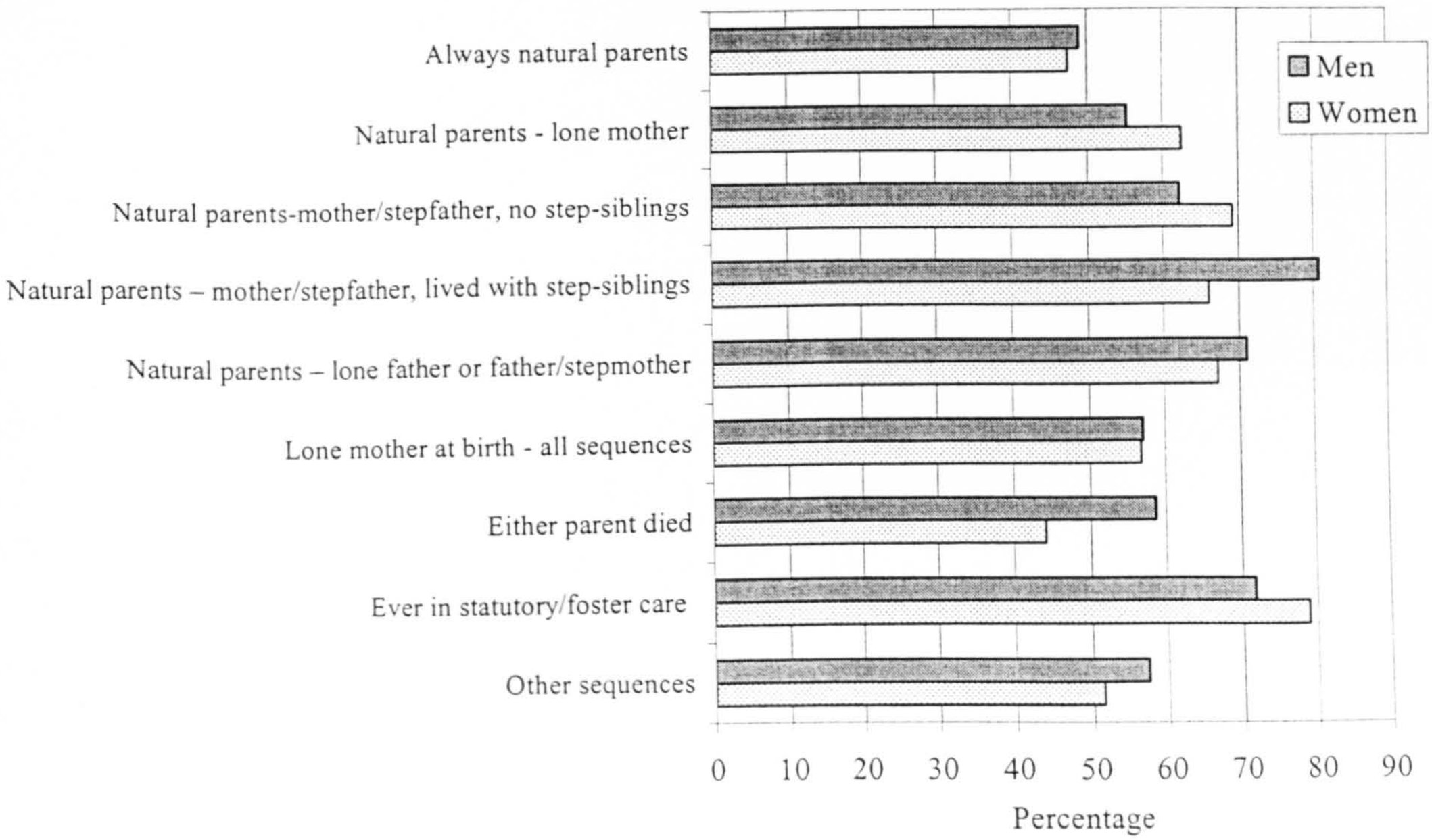


Figure 4.4 Percentage of men and women achieving fewer than five O level passes by age 26 by type of family transitions
(weighted estimates)



4.4 Methodology

The multivariate analysis uses logistic regression models to examine the association between the four measures of family disruption and whether the cohort member achieved fewer than five O level passes. As described in Section 4.2, there have been two trends in educational attainment since the time of the 1958 cohort. First, there has been an increase in the proportion of young people achieving higher qualifications and second, after the introduction of the CSE examination, fewer students achieved no qualifications. When we begin to consider sub-categories of the group achieving no qualifications, for example by social class and parental education level, a number of categories have zero incidence of no qualifications. Given the rising levels of qualification attainment, it was therefore judged that achieving fewer than five O level passes is of growing significance as a pathway to exclusion from many opportunities.

The logistic regression models the probability of an individual i, p_i, achieving fewer than five O level passes, given a vector of independent variables $\underline{X_i}$ so that:

$$\log\left(\frac{p_i}{1-p_i}\right) = \beta_0 + \underline{\beta_1' X_i}$$

where β_0 and β_1 are unknown parameters.

The models were built in four chronological stages, each with specific aims:

1) The first model shows the associations between the different measures of family transition and low attainment before adding any background controls.

2) The second model uses only selected birth circumstances. Measures were limited by the range of data available from the birth survey to factors such as social class, parental education, ethnicity and birth order. This is the most stringent model where all the background covariates unambiguously predate any family transitions. Here, we are observing whether, after accounting for the characteristics of the family of origin, those who experience family transitions appear to have a life course that, for whatever reason, is associated with lower attainment. Although the exam systems are technically comparable, students in Scotland had much higher rates of attaining at least five passes in their Ordinary examinations. There is therefore a dummy variable from Model 2 onwards that controls for the country of residence at 16.

3) The third model retains the factors selected for the second model and tests measures from the age five or 10 surveys that were discussed in the literature review as

predictors of low attainment. These include household resources, early educational test scores, parental interest in education and some other parenting characteristics. As indicated in the literature review, given that parental separation is very much a process rather than an event, for many children we are now looking at the mediating factors through which disruption, especially in early childhood, may translate into low attainment. This model is used to calculate the predicted probabilities of low attainment according to family background characteristics presented later in the chapter.

4) An additional fourth model uses measures from the age 16 survey which reflect the characteristics of the post transition family. Using the BCS70 age 16 data, Ely et al (2000) found using measures of the family environment, such as time spent with parents and the teenager's perception of the quality of the relationship, removed any previously found association between family structure at 16 and passing fewer than five O levels, except for boys in stepfather families. For this analysis, measures similar to those used by Ely and colleagues have been constructed based on their description of the variables selected and methods used. Also, a further measure of the level of communication with, and supervision of, the teenager was added. Full details of how the measures were derived are contained in Appendix III. Also, rather than discard a further 2000 cases where the teenager did not take part in the personal interview, this study uses an extra dummy variable indicating whether the teenager completed the questionnaire on family environment. Teenagers who did not co-operate with this questionnaire at 16 were particularly likely to have low attainment. In summary, this fourth model examines whether differences that remain in outcomes between family types can be 'explained' by the quality of relationships in post-transition families.

The measures tested for the fourth model focussed on the family circumstances in the months prior to the interview in April 1986. A number of other questions were asked about future aspirations such as getting a job or going to college but these were not included in the models. They were certainly very strong predictors of O level attainment but mainly because the cohort had already taken their "mock" O level exams and had often received feedback from their schools about their future choices. These questions reflected the consequences rather than immediate precursors of low attainment and it was decided to exclude these factors.

Table 4.6 lists the independent variables tested from Model 2 onwards and their statistical significance. Consistent with previous British analysis, models were built separately for men and women (Ely et al. 2000; Kiernan 1992). A single model for men and women was tested, with a variable controlling for sex. It required a number of interaction terms between sex and the other independent variables which can confuse interpretation.

Factors from the birth survey were tested first and then fixed in the model before testing the later covariates. Similarly early childhood factors, once selected, were fixed in the model before the testing of the age 16 factors. Model building with weighted data in Stata required backward elimination techniques, using a Wald test statistic to eliminate covariates from the initial group. Full details of the model selection procedure and frequency distributions of the independent variables are contained in Appendix III. In general, a 1% statistical significance threshold was selected to keep independent variables to a manageable number. However, given the relevance of the result to later educational performance, the results of the English Picture Vocabulary Test Score was retained for men, even though it just failed to reach the 1% level. The measure of family structure at 16 was used as the family transition covariate when selecting the other background factors and then the same covariates were used for the subsequent models using the three other measures of family disruption.

Table 4.6 Factors tested for their association with passing fewer than five O levels

Factor	M	F
Model 1 No background controls		
Type of family transition	***	***
Model 2 Adding family background factors at birth		
Parents' education and occupation		
Mother's and Father's age at completing full time education	***	***
Mother achieved a degree		***
Father achieved a degree	***	***
Family social class	***	***
Mother's occupational status		**
Parental age		
Mother's age		
Father's age		**
Mother's age at first birth	***	***
Birth order		
Position in birth order	***	***
Older sibling born in 1968 or 1969?	*	*
Ethnic group		
Ethnic group	***	
Country (England and Wales or Scotland)	***	***
Model 3 Early childhood factors		
Socio-economic circumstances		
Father figure unemployed in 12 months before age 5 interview		
Reason for mother working (if applicable)		
Receipt of free school meals at age 10		
Housing conditions		
Ever lived in council accommodation	***	**
Density of persons occupying household		
Type of neighbourhood (rated by interviewer at age 5)		
Sibling structure		
Total sibling size		
Whether siblings include brothers		
Whether younger sibling born in 1970/1		
Educational test scores at age 5		
Copying ability	***	***
Picture Vocabulary Test	**	***
Parental attitudes to the child's education (age 10)		
Mother's and Father's interest in child's education (rated by teacher)	***	***
Parents' expectation of when child will leave school	***	***
Child's behaviour and attitudes		
In top 10% of anti-social behaviour rating (at age 5)		*
Whether child believes useless to try hard in school (at age 10)	***	***
Whether child believes in planning ahead (at age 10)		
Parenting characteristics		
Level of authoritarian parenting		**
Father's involvement in childcare		
Mother's attitudes to gender equality		
Other disruptions		
Number of house moves by age 10		

M – Male, F-Female

* denotes significance at the 10% level

** denotes significance at the 5% level

*** denotes significance at the 1% level

cont/d....

Table 4.6 continued

Factor	M	F
Model 4 Circumstances at 16		
Socio-economic circumstances		
Equivalised household weekly income (£)[15]		***
Family in receipt of means tested social security benefits in previous 12 months		
Financial hardship in family last 12 months (parent self-reported)		*
Type of school attended at 16		*
Parental support for teenager's education		
Parental assistance or support for doing homework		
Whether parent always expects teenager to do homework	***	***
Family environment		
Very little time spent with family		
Relationship with parents		
Very low level of parental supervision and communication between teenager and parents	***	***
Missing family environment information at 16	***	
Teenager's attitude to education		
Considers truancy acceptable among people the same age		***
Other disruption		
Number of secondary schools attended from 11 to 16		**
Number of house moves by age 16		

M – Male, F-Female

* denotes significance at the 10% level
** denotes significance at the 5% level
*** denotes significance at the 1% level

[15] Direct questions on family income were asked for the first time on the age 16 survey and are recorded in the dataset as banded gross income per week or month. However, it does not take into account family size. Given the importance of family size in this analysis the income data has been equivalised to take account of the number of adults and children in the household. Full details of this method and its impact on the estimates of family income according to structure are given in Appendix III.

4.5 Results

Tables 4.7 and 4.11 present the parameter estimates for men and women respectively from each of the four models using family structure at 16 as the measure of disruption. For the following three models in Tables 4.8 –4.10 and 4.12-4.14, using the different measures of family transition, the coefficients for the other background covariates did not change and, to avoid excessive repetition, the full tables are not repeated.

Model 1 – No background controls

All boys living in a "non-intact" family at 16 have higher odds of achieving fewer than five O level passes compared to those living with natural parents, although the odds ratios for those living in a lone mother family were low and only achieved significance at the 10% level of (OR 1.3, 95% CI 1.0-1.8) . The odds for those living in a stepfather family, however, were over twice those living with both natural parents. (OR 2.2, 95% CI 1.6-3.1) (Table 4.7). Considering the pathway to that family structure revealed more variation (Table 4.8). Boys in a stepfather family who had ever lived with stepsiblings were at a particularly high risk of low attainment (Odds Ratio 4.4, 95% CI 1.9-9.9). Among the other categories, the odds for boys who had spent any time in statutory or foster care or were living with their father or father and stepmother after parental separation, were about 2.5 times higher than those who grew up living with both natural parents. Tables 4.9 and 4.10, which consider the timing of the transition, indicate that when no background factors are taken into account some late transitions may be associated with poorer educational outcomes.

Model 1 in Tables 4.11-4.14 repeats the models for women in the survey. Again, all girls living in "non-intact" families at 16 had higher odds of lower educational attainment but there are some differences from boys. First, the odds of lower attainment among girls living in a lone mother family after parental separation were 1.4 times higher than those living with both natural parents and the difference was statistically significant at the 1% level (95% CI 1.1-1.8). Although those who had lived in stepfamilies had higher odds ratios, there did not appear to be the same difference between those who had lived with stepsiblings and the majority who had not. Women who experienced the death of a parent had similar odds of low attainment than those who lived with both natural parents. Later transitions, either into a lone mother family between ages 11 and 16 or into a stepfather family after age six appear to be associated with low attainment.

Model 2 – Controlling for circumstances at birth

For boys, circumstances established at the birth of the child, such as parental education and social class were strong predictors of attainment. Not surprisingly, those with parents who both left school at 15 had odds of achieving fewer than five O levels that were 3.1 times higher than boys whose parents both continued beyond this age (95% CI 2.4-4.2). Socio-economic status may also be reflected in the age at which the mother began childbearing, with those born to teenage mothers more likely to be disadvantaged. Otherwise, boys who had three or more older siblings were disadvantaged compared to first born, whilst boys from Asian backgrounds did substantially better than white boys after taking their socio-economic circumstances into account.

In general, adding these original family characteristics attenuated the differences in the probability of low attainment according to family structure or trajectory. After introducing the selected birth circumstances, only boys living in a stepfather family at 16 appeared more likely to have low attainment (OR 1.6 95% CI 1.1-2.4), (Model 2, Table 4.7). It appears that, for boys, much of the association between family structure at 16 and low attainment reflects pre-existing social and demographic factors. Turning to the type of family transition (Model 2, Table 4.8), although the size of the estimate is reduced by controlling for family circumstances at the birth, boys who had lived in stepfather families that ever contained stepsiblings still had odds of low attainment that were 3.1 times those who grew up with their natural parents (95% CI 1.3-6.9). The coefficients for those who went into care were reduced substantially by the addition of these background circumstances, highlighting the disadvantaged origins of many who are taken into local authority care. Controlling for the initial birth circumstances particularly reduced the size of the coefficients for those who experienced one transition before age six (Model 2, Table 4.9) or more specifically, those moving into a lone mother family that was subsequently stable (Model 2, Table 4.10).

Socio-economic disadvantage was similarly associated with lower attainment among women. Additionally, the positive influence of the small group with mothers who had a degree on educational outcome was greater for girls than boys. The odds ratios for women living in a lone mother or stepfather family at 16 are both reduced after adding the initial family circumstances. By contrast, women in a lone father or stepmother family were actually found to have very slightly increased odds ratios after adding these factors (OR 1.8, 95% CI 1.0-3.3). Although women living with their father after separation were just as likely to come from disadvantaged families and, in fact, more likely to have a mother who began childbearing as a teenager than those in lone mother families after separation (but not stepfather families).

Controlling for these factors did not have the same attenuating effects as found among the mother custody households. The explanation could well lie in the unobserved reasons why the daughter lived with her father after parental separation, as well as the higher likelihood that the girl will live with stepsiblings in a stepmother household (See Section 3.1.3).

Looking at the type of transition reveals further differences (Table 4.12). Girls who were living with a lone mother after parental separation actually showed higher odds, after controlling for birth socio-economic circumstances (OR 1.6, 95% CI 1.1-2.4) than all girls in lone mother families at 16 (Table 4.11). This indicates that the original family circumstances explain less of the association for those whose parents separated than for those who were born to a lone mother or experienced multiple transitions. The odds ratios for the other family circumstances were generally reduced by the addition of these factors although women in stepfather families or those who had entered care still had higher odds.

In Table 4.14, the coefficient for the transition to a lone mother family between ages 11 and 16 is reduced considerably by the addition of background factors as well as for earlier transitions to a stepfather family. The exception is girls who experienced the formation of a stepfather family between ages 11 and 16 for whom the odds ratio actually increases slightly to 2.8 (95% CI 1.2-3.4).

Model 3 – Early childhood factors

Model 3 adds more family and child characteristics collected at either the age five or 10 surveys. Clearly this is now picking up the characteristics of a family that has experienced, or is about to experience transitions. A further socio-economic variable was selected indicating if the family lived in council accommodation at either of these surveys. Otherwise, parental support for education and expectations of the child were strongly associated with the eventual outcome. Although children who lived in a lone parent or stepfamily were most likely to be rated by their teacher as having neither parent interested in their education, many separated natural parents or the parents and step-parents maintained high levels of interest in their daughter's education.

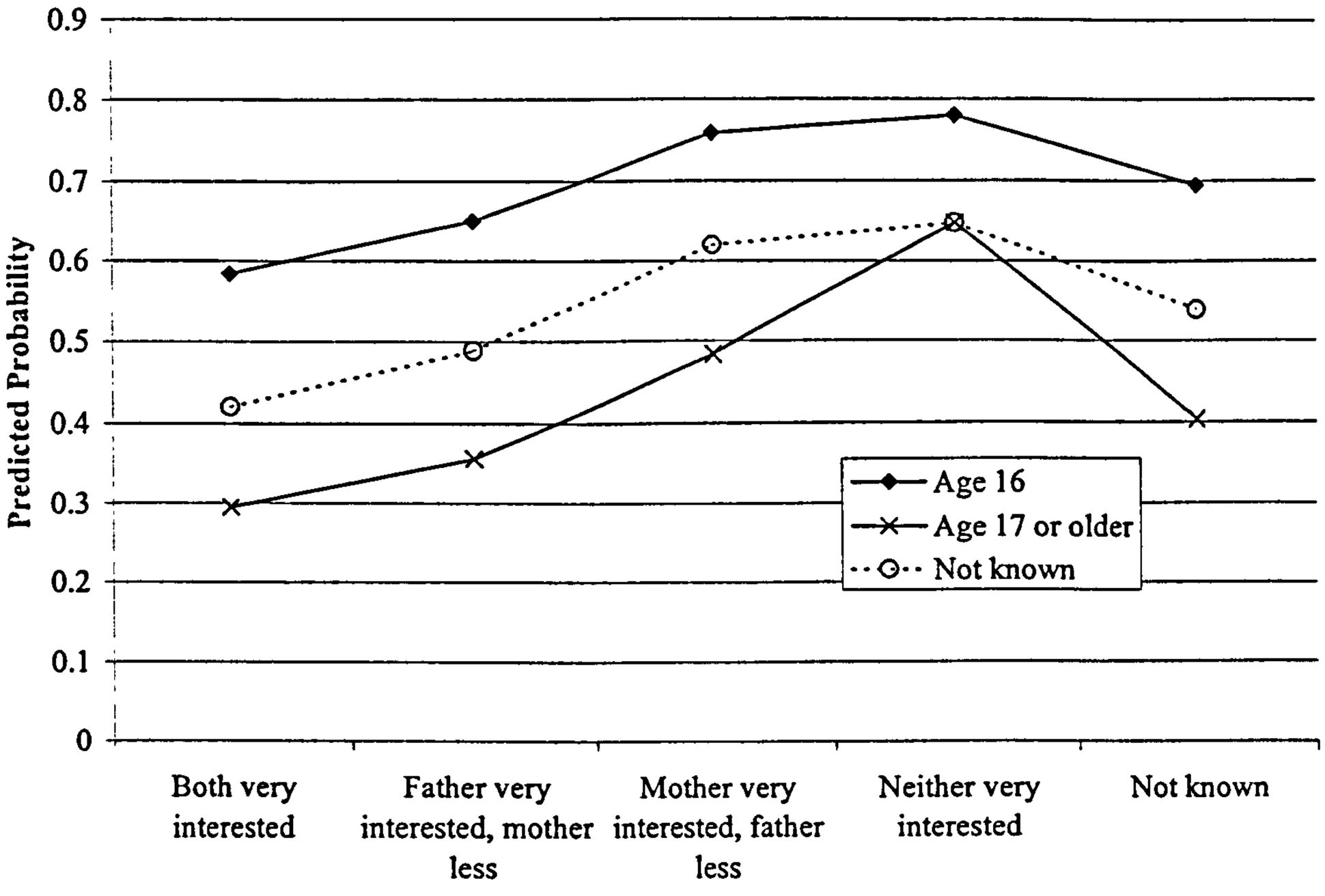
The vocabulary and copying tests would have been conducted in the Easter term of the children's first year at primary school. These were clear predictors of attainment at 16 for both boys and girls. By age 10, boys who were already thought there was little reason to try at school were most likely to go on to achieve few O levels, and, interestingly, boys with the lowest educational test scores at age five were only slightly more likely to be demotivated than

boys with higher attainment. After adding these early childhood factors, there were no statistically significant associations between family structure at 16 and low attainment among boys. Whatever the life course of those who experience disruption, it appears that most of the educational disadvantage is rooted in the early life experiences and educational progress of the child (Table 4.7, Model 3). However, in Table 4.8 the odds ratio for boys who lived in a stepfather family with stepsiblings is unchanged by the addition of these childhood factors and is still the highest estimate at 3.0 (95% CI 1.1-8.2).

The addition of the early childhood factors has the most powerful effect on the estimates for boys experiencing the earliest transitions. After taking their early experiences into account, boys experiencing a single transition before age six are found to be slightly less likely to have lower attainment, if other circumstances had been the same, than their counterparts who grew up with their natural parents. The early disadvantage that such families experience appears to explain all of the observed differences between these groups. However, this convergence of the predicted probabilities does not occur for those experiencing multiple transitions, or the formation of a stepfather family at the same age.

Girls who at age 10 thought there was little point trying at school were far more likely than boys to have been low achievers at age five. Also, there was an interaction between the effect of parental interest in their daughter's education and their expectation of when she would leave school. Figure 4.5 plots the predicted probabilities for this interaction (from Model 3, Table 4.11) whilst holding all other variables at an 'average' level (See Section 3.4). Although girls whose parents expected them to stay on at school had lower probabilities of achieving fewer than five O levels, when neither of the parents were rated to be very interested in the daughter's education the expectation that she will stay on in education had a much weaker effect.

Figure 4.5 Plot of predicted probabilities of passing fewer than five O levels, showing interaction between parental interest in daughter's education and expectation of when she will leave school



Adding these early childhood factors did not reduce the associations between family structure at 16 and low attainment to the same degree as among boys. Although girls in lone mother families at 16 showed no increased probability of low attainment after taking these factors into account, girls in stepfather or lone father/stepmother families still had relatively high odds ratios. Looking at the sequence of transitions, girls in lone mother families after parental separation continue to have slightly higher odds of low attainment (OR 1.5, 95% CI 1.0-2.2), as did those in their father's custody or stepfather families after parental separation and those who had spent any time in care (Model 3, Table 4.12).

Model 3 in Tables 4.13 and 4.14 does not reveal any particular pattern of educational attainment according to the number and timing of transitions alone. Only those who experienced multiple transitions before age 11 have higher odds ratios, for reasons that are not clear. However, when looking in more detail at transitions to a lone mother or stepfather family, the coefficients increase with the age of the girl at the last transition.

Model 4 – Age 16 Characteristics

Model 4 asks a slightly different question. Here, factors at age 16 found to be associated with low attainment are added to examine which characteristics of post transition families might explain the remaining differences in attainment according to family structure. For example, did boys and girls in stepfather families with stepsiblings, which are considerably larger than other families, have particularly low levels of parental supervision?

For boys, few factors tested from the age 16 survey improved the fit of the model. Although only a proxy measure in itself, perhaps for school non-attendance or attitudes to education, teenagers who did not complete the personal questionnaire were less likely to have achieved five O level passes. Otherwise, boys reporting very low levels of communication with their parents and those who reported that their parents did not expect them to do their homework were more likely to have low attainment.

Adding these factors did little to change the estimates for the measures of family disruption. The estimates for family structure at 16 remain virtually unchanged as did those reflecting the sequence of family structures. Boys who had lived in stepfather families with stepsiblings still had odds ratios of 2.9 compared to boys who grew up with their natural parents, even after taking the whole sweep of childhood factors into account (95% CI 1.1-8.1). There were no clear differences in educational attainment for boys according to the timing of family transitions apart from the rather lower odds among those experiencing a single transition before age six.

For women, poor communication, lack of homework supervision, the girl's attitudes to truancy and equivalised gross family income at 16 were all associated with low attainment. Girls in families with very low equivalised incomes (less than £50 per week) had odds over 2.6 higher than those in families with equivalised weekly incomes over £300. The model was tested both with and without family income to explore its effects on the estimates for those experiencing family disruption. Women in lone mother families, particularly those formed when the cohort member was young, were most likely to be in low income families, even after equivalisation. However, the addition of income at 16 to the model did not actually change any of the estimates of the association between family trajetory and educational outcome to any degree. Boys outcomes did not show such a strong association with family income at 16.

Adding all of the selected age 16 characteristics attenuated some of the differences in the coefficients between women living in lone mother families after parental separation and those

who grew up with both natural parents. Clearly, some of the family and teenager's characteristics in the post-transition family were of importance. However, this was not the case for women living in their father's custody after parental separation, or those who experienced transitions in adolescence. The coefficients for these groups remain largely unaffected by the addition of further controls, indicating that unobserved factors may explain their higher likelihood of low attainment (Model 4, Tables 4.11-4.14).

Table 4.7 Parameter estimates for logistic regression of achieving fewer than five O levels by family structure at 16, men
(weighted estimates)

Reference categories are underlined	Model 1 (no background controls)		Model 2 (controlling for family circumstances at birth)		Model 3 (adding early childhood factors)		Model 4 (adding factors at age 16)	
	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$
Family Structure At 16								
Both natural parents	0	-	0	-	0	-	0	
Lone mother	0.28*	0.16	0.10	0.18	-0.11	0.20	-0.15	0.20
Mother and stepfather	0.80***	0.17	0.48**	0.19	0.25	0.21	0.23	0.21
Lone father/Father and stepmother	0.44*	0.26	0.20	0.30	-0.20	0.32	-0.17	0.32
Other guardians/ in statutory or foster care	0.65	0.57	0.36	0.60	0.21	0.61	0.15	0.65
I) Circumstances at birth								
Parents' age at completion of full time education								0.17
Both at 15			1.15***	0.14	0.70***	0.16	0.67***	0.19
Mother 16+, Father 15			0.54***	0.18	0.44**	0.19	0.45**	0.20
Mother 15, Father 16+			0.88***	0.18	0.78***	0.20	0.81***	-
Both 16+			0	-	0	-	0	0.30
Not known			0.59**	0.25	0.16	0.29	0.23	
Father has degree								
No			0		0	-	0	-
Yes			-1.00***	0.21	-0.74***	0.21	-0.76***	0.21
Social Class at birth								
I/II			0	-	0	-	0	-
IIINM			-0.05	0.17	-0.09	0.18	-0.08	0.19
IIIM			0.58***	0.14	0.39**	0.16	0.38***	0.16
IV/V			0.97***	0.18	0.68***	0.20	0.64***	0.20
Mother's age at first birth								
<=19			0.66***	0.14	0.35***	0.16	0.27	0.16
20-21			0.42***	0.14	0.27*	0.15	0.19	0.15
22-23			0.47***	0.13	0.48***	0.14	0.51***	0.14
24+			0	-	0	-	0	-
Number of older siblings at birth								
0			0	-	0	-	0	-
1/2			0.26**	0.10	0.27**	0.11	0.27**	0.11
3+			0.77***	0.19	0.61***	0.21	0.51	0.22
Ethnic Group								
White/other			0	-	0	-	0	-
African – Caribbean			-0.88	0.58	-1.09**	0.54	-1.13**	0.54
Asian			-1.90***	0.40	-1.96***	0.43	-1.90***	0.44
Country								
England and Wales			0		0	-	0	-
Scotland			-0.93***	0.17	-1.30***	0.20	-1.24***	0.21

* denotes significance at the 10% level
** denotes significance at the 5% level
*** denotes significance at the 1% level

cont/d.....

Table 4.7 Continued

	Model 1 (no background controls)		Model 2 (controlling for circumstances at birth)		Model 3 (adding early childhood factors)		Model 4 (adding factors at age 16)	
	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta}$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$
II) Early childhood factors								
Ever in council accommodation								
No					0	-	0	-
Yes					0.58***	0.14	0.53***	0.14
Age 5 – English Picture Vocabulary Test Score								
Top quartile					0	-	0	-
Second quartile					0.26*	0.15	0.29*	0.15
Third quartile					0.41**	0.16	0.43***	0.16
Fourth quartile					0.36**	0.18	0.40*	0.19
No test score					0.41*	0.21	0.36*	0.22
Age 5 – Copying Test Score								
High					0	-	0	-
Medium					0.76***	0.13	0.79***	0.13
Low					1.13***	0.15	1.13***	0.15
No test score					0.51**	0.25	0.54**	0.25
Age 10 - Parental interest in child's education (teacher rated)								
Both very interested					0	-	0	-
Father very interested, mother less					1.23***	0.35	1.19***	0.36
Mother very interested, father less					0.46***	0.17	0.45**	0.18
Neither very interested					0.78***	0.15	0.76***	0.15
Not known					0.69***	0.14	0.66***	0.15
Age 10 – Parents' expectation of when child will leave school								
At 16					0	-	0	-
17 or older					-0.92***	0.13	-0.87***	0.14
Not known					-0.44**	0.18	-0.42**	0.18
Age 10 – whether child believes it is useless to try in school								
No/Don't Know					0	-	0	-
Yes					0.81***	0.22	0.84***	0.23
III) Circumstances at 16								
Age 16 – Whether parents always expect teenager to do homework								
Yes							0	-
No							1.22***	0.34
Age 16 – Level of parental supervision								
Low							0.49***	0.16
Other levels							0	-
Missing family environment information								
No							0	-
Yes							0.88***	0.12
Constant	-0.03	0.05	-1.51***	0.17	-1.85***	0.25	-2.45***	0.26

Number of persons: unweighted 2439; weighted 8299

Total =men with educational information at age 26 and parental interview at 16

* denotes significance at the 10% level,

** denotes significance at the 5% level

*** denotes significance at the 1% level

Table 4.8 Parameter estimates from logistic regression achieving fewer than five O levels by type of family transition, men
(weighted estimates)

Reference categories are underlined	Model 1 (no background controls)		Model 2 (controlling for family circumstances at birth)		Model 3 (adding early childhood factors)		Model 4 (adding factors at age 16)	
	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$
Type of transitions								
Always natural parents	0	-	0	-	0	-	0	-
Natural parents-lone mother	0.25	0.20	0.08	0.23	-0.18	0.25	-0.23	0.25
Natural parents-mother/stepfather, no stepsiblings	0.54**	0.22	0.20	0.23	0.07	0.25	0.02	0.25
Natural parents – mother/stepfather – lived with stepsiblings	1.47***	0.41	1.12***	0.42	1.11**	0.51	1.07**	0.53
Natural parents – lone father or father/stepmother	0.93***	0.35	0.64	0.39	0.15	0.41	0.10	0.43
Lone mother at birth –all sequences	0.32	0.27	0.15	0.31	-0.44	0.35	-0.44	0.34
Either parent died	0.39	0.26	0.48	0.27	0.44	0.33	0.43	0.31
Any time in statutory/foster care	0.97**	0.46	0.55	0.53	0.28	0.53	0.30	0.55
Other sequences	0.34	0.24	0.35	0.31	0.25	0.33	0.27	0.33

Number of persons: unweighted 2439; weighted 8299
Total =men with educational information at age 26 and parental interview at 16
* denotes significance at the 10% level
** denotes significance at the 5% level
*** denotes significance at the 1% level`

Table 4.9 Parameter estimates from logistic regression achieving fewer than five O levels, by number and timing of transitions, men
(weighted estimates)

Reference categories are underlined	Model 1 (no background controls)		Model 2 (controlling for circumstances at birth)		Model 3 (adding early childhood factors)		Model 4 (adding factors at age 16)	
	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$
Number and timing of transitions								
No transitions	0	-	0	-	0	-	0	-
1 transition, complete by age 6	0.14	0.24	-0.17	0.28	-0.61*	0.32	-0.67**	0.31
2+transitions, complete by age 6	0.46	0.32	0.34	0.31	0.35	0.35	0.36	0.35
1 transition, complete by age 11	0.77***	0.24	0.51**	0.28	0.25	0.30	0.24	0.29
2+ transitions, complete by age 11	0.65***	0.21	0.52**	0.24	0.25	0.26	0.23	0.26
1 transition, age 11+	0.53**	0.22	0.49**	0.24	0.30	0.27	0.24	0.28
2+ transitions, last transition age 11+	0.59**	0.26	0.39	0.26	0.19	0.28	-0.17	0.28

Number of persons: unweighted 2439; weighted 8299
Total =men with educational information at age 26 and parental interview at 16

* denotes significance at the 10% level
** denotes significance at the 5% level
*** denotes significance at the 1% level

Table 4.10 Parameter estimates from logistic regression of achieving fewer than five O levels, by timing and type of transition, men
(weighted estimates)

Reference categories are underlined	Model 1 (no background controls)		Model 2 (controlling for circumstances at birth)		Model 3 (adding early childhood factors)		Model 4 (adding factors at age 16)	
	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$
Timing and type of transition (selected sequences)								
Always natural parents	0	-	0	-	0	-	0	-
Transitions complete by age 6								
Natural parents-lone mother	-0.10	0.42	-0.59	0.45	-0.84	0.51	-0.88	0.52
Natural parents-lone mother-mother/stepfather	0.65*	0.39	0.32	0.41	0.46	0.48	0.40	0.49
Transitions complete by age 11								
Natural parents-lone mother	0.34	0.33	0.17	0.39	-0.06	0.44	-0.05	0.44
Natural parents-lone mother-mother/stepfather	0.95***	0.29	0.58*	0.32	0.34	0.33	0.29	0.34
Transitions complete age 11+								
Natural parents-lone mother	0.41	0.31	0.44	0.33	0.17	0.35	0.05	0.38
Natural parents-lone mother-mother/stepfather	0.54*	0.32	0.22	0.32	0.04	0.36	0.03	0.38

Number of persons: unweighted 2439; weighted 8299
Total =men with educational information at age 26 and parental interview at 16

* denotes significance at the 10% level
** denotes significance at the 5% level
*** denotes significance at the 1% level

Table 4.11 Parameter estimates for logistic regression model of achieving fewer than five O levels by family structure at 16, women
(weighted estimates)

	Model 1 (no background controls)		Model 2 (controlling for circumstances at birth)		Model 3 (adding early chilldhood factors)		Model 4 (adding factors at age 16)	
	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$
Family Structure At 16								
Both natural parents	0	-	0	-	0	-	0	-
Lone mother	0.35***	0.13	0.24	0.14	0.14	0.16	0.06	0.16
Mother and stepfather	0.80***	0.14	0.54***	0.16	0.43***	0.17	0.36**	0.18
Lone father/Father and stepmother	0.47*	0.26	0.60**	0.30	0.60*	0.32	0.55	0.33
Other guardians/in care	0.63	0.43	0.59	0.46	0.04	0.55	-0.13	0.61
I) Circumstances at birth								
Parents' age at completing education								
Both at 15			1.25***	0.13	0.80***	0.14	0.74***	0.14
Mother 16+, Father 15			0.60***	0.15	0.30**	0.16	0.37***	0.17
Mother 15, Father 16+			0.66***	0.15	0.53***	0.16	0.50***	0.17
Both 16+			0	-	0	-	0	-
Not known			0.73***	0.23	0.55*	0.26	0.49*	0.26
Father has degree								
No			0	-	0	-	0	-
Yes			-0.72***	0.18	-0.39**	0.19	-0.33**	0.19
Mother has degree								
No			0	-	0	-	0	-
Yes			-1.83***	0.56	-1.71***	0.59	-1.75***	0.61
Social Class at birth								
I/II			0	-	0	-	0	-
IIINM			0.27*	0.15	0.37**	0.16	0.31**	0.16
IIIM			0.52***	0.13	0.38**	0.14	0.32**	0.14
IV/V			0.76***	0.15	0.51***	0.16	0.40***	0.17
Mother's age at first birth								
<=19			0.59***	0.12	0.33**	0.15	0.23*	0.14
20-21			0.62***	0.12	0.39***	0.14	0.34***	0.13
22-23			0.31***	0.11	0.32***	0.12	0.25**	0.12
24+			0	-	0	-	0	-
Country								
England and Wales			0	-	0	-	0	-
Scotland			-0.96***	0.14	-1.20***	0.16	-1.26***	0.17
II) Early childhood factors								
Ever lived in council accommodation					0	-	0	-
No					0.44***	0.11	0.37***	0.12
Yes								
Age 5 – English Picture Vocabulary Test Score								
Top quartile					0	-	0	-
Second quartile					0.29*	0.14	0.29*	0.14
Third quartile					0.60***	0.14	0.62***	0.15
Fourth quartile					0.60***	0.15	0.57***	0.16
No test score					-0.02	0.19	-0.00	0.19

* denotes significance at the 10% level
** denotes significance at the 5% level
*** denotes significance at the 1% level

cont/d.....

Table 4.11 (continued)

	Model 1 (no background controls)		Model 2 (controlling for circumstances at birth)		Model 3 (adding early chilldhood factors)		Model 4 (adding factors at age 16)	
	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$
Age 5 – Copying Test Score								
High					0	-	0	-
Medium					0.51***	0.11	0.84***	0.11
Low					0.88***	0.13	0.47***	0.13
No test score					0.76***	0.21	0.69***	0.21
Age 10 - Parental interest in child's education								
Both very interested					0		0	
Father very interested, mother less					.0.22	0.32	0.09	0.35
Mother very interested, father less					0.45***	0.14	0.44***	0.14
Neither very interested					0.40**	0.16	0.35**	0.17
Not known					0.51***	0.13	0.45***	0.13
Age 10 – Parents' expectation of when child will leave school								
At 16					0	-	0	-
17 or older					-1.21***	0.13	-1.18***	0.13
Not known					-0.66***	0.14	-0.65***	0.14
Age 10 – whether child believes it is useless to try in school								
No/Don't know					0	-	0	-
Yes					0.48***	0.18	0.48***	0.18
Interaction								
Neither parent very interested in child's education*Parents' expect child to leave school age 17+					0.55***	0.20	0.52***	0.21
III) Age 16 factors								
Age 16 – Whether parents always expect teenager to do homework								
Yes							0	-
No							0.87***	0.26
Level of parental supervision								
Low							0.79***	0.16
Other levels							0	-
Weekly equivalised household income at 16 (£)								
<=49							0.97***	0.27
50-149							0.64***	0.21
150-249							0.75***	0.22
250+							0	-
Missing/refused							0.75***	0.21
Attitude to truancy among peers								
Acceptable							0.39***	0.15
Not acceptable							0	-
Missing family environment information								
No							0	-
Yes							0.77***	0.10
Constant	-0.09**	0.04	-1.45***	0.14	-1.50***	0.21	-2.45***	0.28

Number of persons: unweighted 3144 weighted 7800
Total =women with educational information at age 26 and parental interview at 16
* *denotes significance at the 10% level*
** *denotes significance at the 5% level* *** *denotes significance at the 1% level*

Table 4.12 Parameter estimates from logistic regression of achieving fewer than five O levels by type of family transition, women
(weighted estimates)

Reference categories are underlined	Model 1 (no background controls)		Model 2 (controlling for circumstances at birth)		Model 3 (adding early chilldhood factors)		Model 4 (adding factors at age 16)	
	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$
Type of transitions								
Always natural parents	0	-	0	-	0	-	0	-
Natural parents-lone mother	0.61***	0.17	0.50**	0.19	0.42**	0.20	0.28	0.20
Natural parents-mother/stepfather, no stepsiblings	0.91***	0.19	0.66***	0.20	0.55***	0.22	0.48**	0.22
Natural parents – mother/stepfather – lived with stepsiblings	0.77**	0.35	0.71**	0.41	0.52	0.52	0.38	0.53
Natural parents – lone father or father/stepmother	0.81**	0.34	0.81*	0.42	0.79**	0.40	0.82**	0.41
Lone mother at birth –all sequences	0.37*	0.22	0.03	0.24	0.01	0.27	-0.01	0.28
Either parent died	-0.19	0.20	-0.19	0.21	-0.30	0.24	-0.35	0.23
Any time in statutory/foster care	1.41***	0.40	1.18**	0.46	0.90**	0.45	0.85*	0.49
Other sequences	0.15	0.28	0.03	0.34	0.04	0.37	-0.13	0.37

Total = women with educational information at age 26 and parental interview at 16
Number of persons: unweighted 3144; weighted 7800

Table 4.13 Parameter estimates from logistic regression of achieving fewer than five O levels by number and timing of transitions, women
(weighted estimates)

Reference categories are underlined	Model 1 (no background controls)		Model 2 (controlling for circumstances at birth)		Model 3 (adding early chilldhood factors)		Model 4 (adding factors at age 16)	
	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$
Number and timing of transitions								
No transitions	0	-	0	-	0	-	0	-
1 transition, complete by age 6	0.33*	0.18	0.14	0.20	-0.03	0.22	-0.06	0.22
2+transitions, complete by age 6	0.82***	0.31	0.47*	0.35	0.30	0.37	0.24	0.37
1 transition, complete by age 11	0.43**	0.22	0.33	0.25	0.26	0.26	0.19	0.26
2+ transitions, complete by age 11	0.87***	0.18	0.77***	0.21	0.71***	0.23	0.60***	0.23
1 transition, age 11+	0.43**	0.18	0.25	0.19	0.24	0.22	0.15	0.22
2+ transitions, last transition age 11+	0.38**	0.20	0.28	0.23	0.20	0.25	0.16	0.26

Total =women with educational information at age 26 and parental interview at 16
Number of persons: unweighted 3144; weighted 7800

* denotes significance at the 10% level
** denotes significance at the 5% level
*** denotes significance at the 1% level

Table 4.14 Parameter estimates from logistic regression of achieving fewer than five O levels, women

(weighted estimates)

Reference categories are underlined	Model 1 (no background controls)		Model 2 (controlling for circumstances at birth)		Model 3 (adding early childhood factors)		Model 4 (adding factors at age 16)	
	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$
Timing and type of transition (selected sequences)								
Always natural parents	0	-	0	-	0	-	0	-
Transitions complete by age 6								
Natural parents-lone mother	0.43	0.35	0.48	0.39	0.17	0.42	0.01	0.38
Natural parents-lone mother-mother/stepfather	0.72**	0.33	0.28	0.35	-0.01	0.42	-0.10	0.40
Transitions complete by age 11								
Natural parents-lone mother	0.40	0.29	0.42	0.30	0.23	0.33	0.17	0.34
Natural parents-lone mother-mother/stepfather	0.96***	0.26	0.68**	0.27	0.64**	0.30	0.53*	0.30
Transitions complete age 11+								
Natural parents-lone mother	0.80***	0.24	0.57*	0.27	0.67**	0.31	0.61**	0.30
Natural parents-lone mother-mother/stepfather	0.91***	0.27	1.01***	0.30	0.90***	0.36	0.88**	0.36

Number of persons: unweighted 3144, weighted 7800
Total =women with educational information at age 26 and parental interview at 16

* denotes significance at the 10% level
** denotes significance at the 5% level
*** denotes significance at the 1% level

4.5.1 Differences between groups experiencing family disruption

All of the previous models used the most stable family trajectories as the reference category. A further question is whether the transition trajectories are found to differ from each other. For example, were those experiencing the transition into a stepfamily more likely to have low educational attainment than those moving into a lone mother family? A series of Wald tests[16] were performed to test the difference between the individual dummies within each categorical variable of family type using the results from the third model in Tables 4.7 to 4.14. The coefficients from the relevant model are reproduced and differences which achieved the 1%, 5% or 10% level of significance are highlighted in Tables 4.15 (men) and 4.16 (women).

The tests reveal that boys in stepfather families who had ever lived with stepsiblings were at higher risk of low attainment than those in a lone mother or stepfather family without stepsiblings or those born to a lone mother. Those who experienced the death of a parent were at higher risk than those who were born to a lone mother even after the full range of covariates were taken into account. It seems that this model has controlled for the more disadvantaged socio-economic circumstances that explain the low attainment among those born to lone mothers.

Finally, boys experiencing the transition to a lone mother family before age six, without any further changes, were at a statistically significantly lower risk of passing fewer than five O levels, after controlling for family circumstances, than those who moved into a stepfather family either by age six or by age 11. Among girls, those who experienced parental death were less likely than those who experienced most other transitions to have low attainment. Looking at the timing of the transition, those moving into either a lone mother or stepfather family by age six, with no further transitions, were at a significantly lower risk of low attainment than girls who moved into a stepfather family between ages 11 and 16.

[16] See Appendix III for details of the use of the Wald test with weighted data

Table 4.15 Tests for differences between categories of family disruption in logistic regression of achieving fewer than five O levels, men

(weighted estimates)

Original reference categories are underlined
Coefficients are reproduced from Model 3 in Tables 4.7 to 4.10

	$\hat{\beta}$	$se(\hat{\beta})$	Other statistically significant differences
Family Structure At 16			
Both natural parents			No significant differences at the 10% level.
Lone mother	0	-	
Mother and stepfather	-0.11	0.20	
Lone father/Father and stepmother	0.25	0.21	
Other guardians/in care	-0.20	0.32	
	0.21	0.61	
Type of transitions			Natural parents-lone mother &
Always natural parents	0	-	Natural parents – mother/stepfather – lived with
Natural parents-lone mother	-0.18	0.25	stepsiblings **
Natural parents-mother/stepfather, no stepsiblings	0.07	0.25	Natural parents-mother/stepfather, no stepsiblings
Natural parents – mother/stepfather – lived with stepsiblings	1.11**	0.51	& Natural parents – mother/stepfather – lived with stepsiblings*
Natural parents – lone father or father/stepmother	0.15	0.41	Natural parents – mother/stepfather – lived with
Lone mother at birth –all sequences	-0.44	0.35	stepsiblings & Lone mother at birth –all
Either parent died	0.44	0.33	sequences **
Any time in statutory/foster care	0.28	0.53	
Other sequences	0.25	0.33	Lone mother at birth –all sequences & Either parent died**
Number and timing of transitions			
No transitions	0	-	No other differences statistically significant at the
1 transition, complete by age 6	-0.61*	0.32	10% level
2+transitions, complete by age 6	0.35	0.35	
1 transition, complete by age 11	0.25	0.30	
2+ transitions, complete by age 11	0.25	0.26	
1 transition, age 11+	0.30	0.27	
2+ transitions, last transition age 11+	0.19	0.28	
Timing and type of transition (selected sequences)			Natural parents-lone mother (by age 6) & Natural
Always natural parents	0	-	parents-lone mother-mther/stepfather (by age 6) *
Transitions complete by age 6			
Natural parents-lone mother	-0.84	0.51	Natural parents-lone mother (by age 6) & Natural
Natural parents-lone mother-mother/stepfather	0.46	0.48	parents-lone mother- mother/stepfather (by age 11)*
Transitions complete by age 11			
Natural parents-lone mother	-0.06	0.44	
Natural parents-lone mother-mother/stepfather	0.34	0.33	
Transitions complete age 11+			
Natural parents-lone mother	0.17	0.35	
Natural parents-lone mother-mother/stepfather	0.04	0.36	

* denotes significance difference at the 10% level
** denotes significance difference at the 5% level
*** denotes significance difference at the 1% level

Table 4.16 Tests for differences between categories of family disruption in logistic regression of achieving fewer than five O levels, women

(weighted estimates)

Original reference categories are underlined
Coefficients are reproduced from Model 3 in Tables 4.11 to 4.14

	$\hat{\beta}$	$se(\hat{\beta})$	Other statistically significant differences
Family Structure At 16			
Both natural parents	0	-	
Lone mother	0.14	0.16	
Mother and stepfather	0.43**	0.17	No other differences statistically significant at the
Lone father/Father and stepmother	0.60*	0.32	10% level
Other guardians/in care	0.04	0.55	
Type of transitions			Natural parents-lone mother & Either parent
Always natural parents	0	-	died**
Natural parents-lone mother	0.42**	0.20	
Natural parents-mother/stepfather, no stepsiblings	0.55***	0.22	Natural parents-mother/stepfather, no stepsiblings & Either parent died ***
Natural parents – mother/stepfather – lived with stepsiblings	0.52	0.52	
Natural parents – lone father or father/stepmother	0.79**	0.40	Natural parents – lone father or father/stepmother & Either parent died & **
Lone mother at birth –all sequences	0.01	0.27	Either parent died & Any time in statutory/foster
Either parent died	-0.30	0.24	care **
Any time in statutory/foster care	0.90**	0.45	
Other sequences	0.04	0.37	Lone mother at birth & Any time in statutory/foster care*
Number and timing of transitions			
No transitions	0	-	2+ transitions, complete by age 11 & 2+
1 transition, complete by age 6	-0.03	0.22	transition, last age 11+
2+transitions, complete by age 6	0.30	0.37	
1 transition, complete by age 11	0.26	0.26	
2+ transitions, complete by age 11	0.71***	0.23	
1 transition, age 11+	0.24	0.22	
2+ transitions, last transition age 11+	0.20	0.25	
Timing and type of transition (selected sequences)			
Always natural parents	0	-	Natural parents-lone mother-mother/stepfather
Transitions complete by age 6			(by age 6) & Natural parents-lone mother-
Natural parents-lone mother	0.17	0.42	mother/stepfather (by age 16) *
Natural parents-lone mother-mother/stepfather	-0.01	0.42	
Transitions complete by age 11			
Natural parents-lone mother	0.23	0.33	
Natural parents-lone mother-mother/stepfather	0.64**	0.30	
Transitions complete age 11+			
Natural parents-lone mother	0.67**	0.31	
Natural parents-lone mother-mother/stepfather	0.90***	0.36	

* denotes significance at the 10% level
** denotes significance at the 5% level
*** denotes significance at the 1% level

4.5.2 Predicted probabilities of passing fewer than five O levels

Figures 4.6 and 4.7 shows the predicted probabilities of passing fewer than five O levels according to the four measures of family transition for men and women. As described in Section 3.4 these are probabilities based on holding all the other background variables in the model at an average level. This predicts if children grew up with otherwise similar backgrounds, the extent to which the likelihood of low educational attainment might vary according to the type or timing of family transition. The probabilities are based on the parameter estimates from the third models for each measure in Tables 4.7 to 4.14.

The first set of probabilities show that if we had just used family structure at 16 in this analysis, the probability of low attainment among men would only have ranged from 0.48 to 0.58 (Figure 4.6). Women, however, show a greater difference in predicted probability, ranging from 0.50 among women living with natural parents to 0.65 among those in their father's custody (Figure 4.7).

The other model probabilities have a greater range. Seventy seven per cent of boys who had lived in a stepfather family with stepsiblings are predicted to have low attainment compared to 56% of those without stepsiblings. The highest percentage among girls of 0.71 is found among those who have ever been in statutory or foster care. For boys, differences are less pronounced according to the timing of the transition whereas among women, the predicted probabilities appear to rise in steps to a peak of 0.71 among girls moving into a stepfather family at age 11 or older.

Figure 4.6 Predicted probabilities of achieving fewer than five O level passes according to family structure or trajectory – men

Using results from Model 3, Tables 4.7-4.10

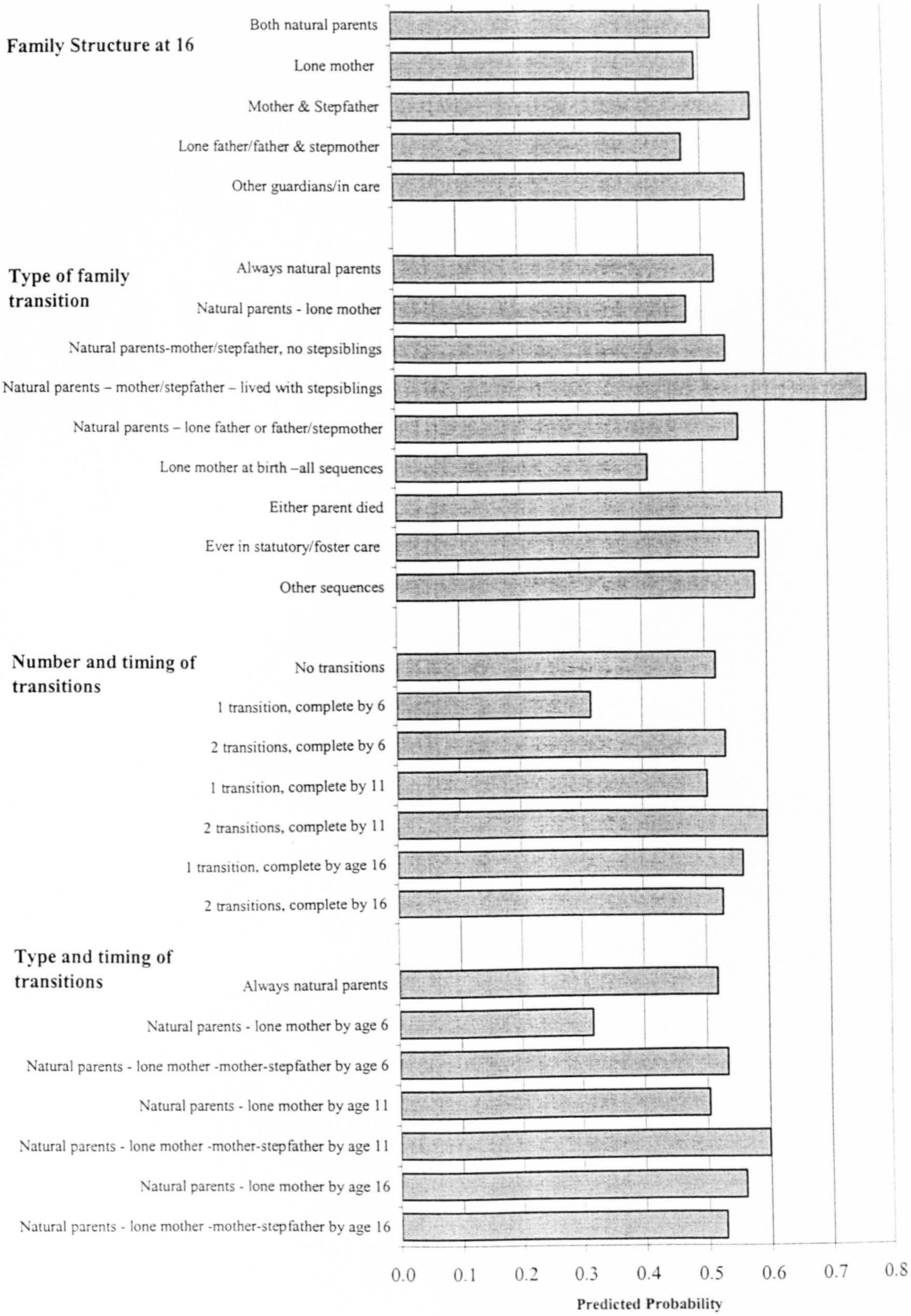
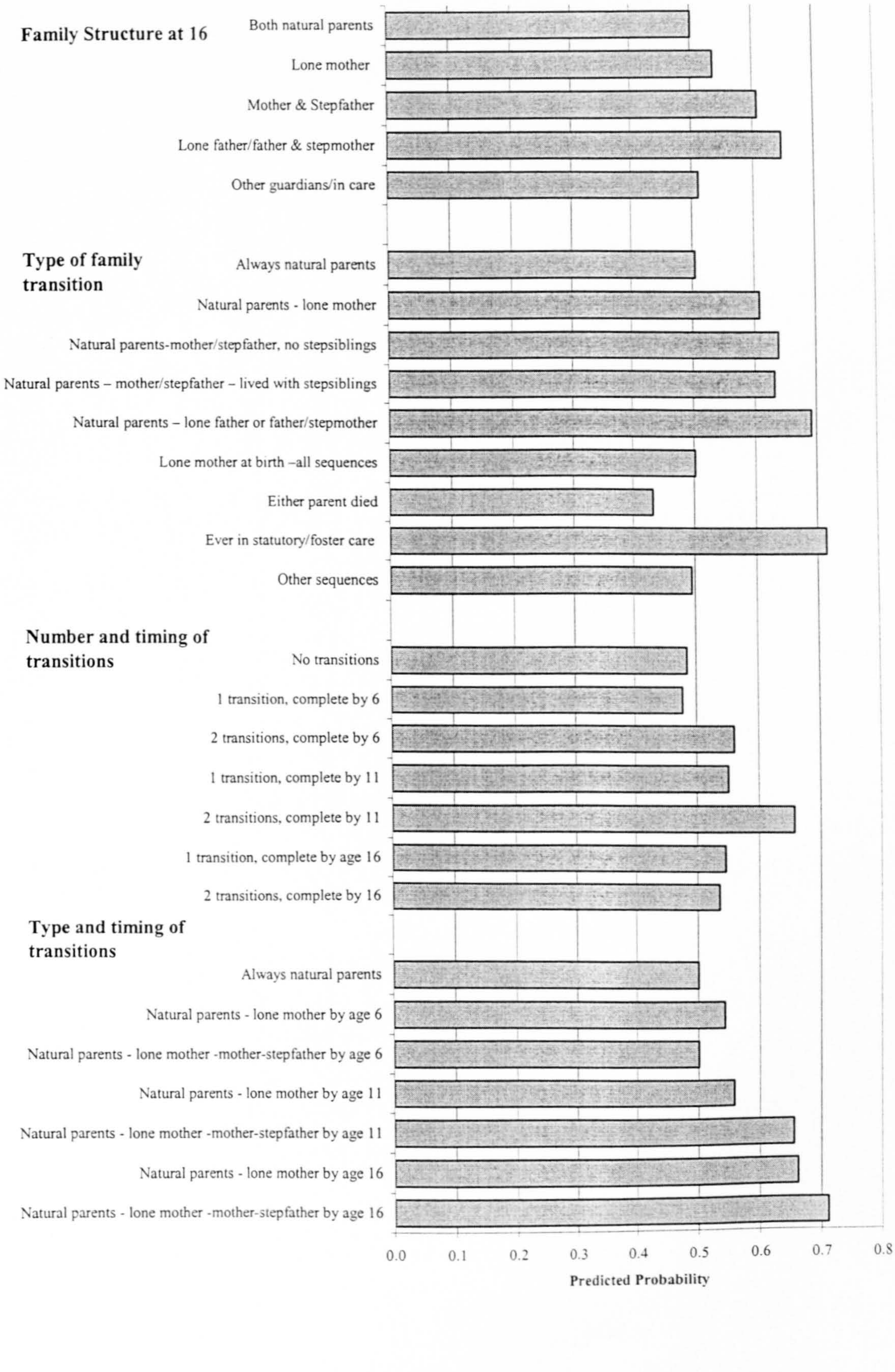


Figure 4.7 Predicted probabilities of achieving fewer than five O level passes according to family structure or trajectory – women

Using results from Model 3, Tables 4.11-4.14



4.6 Family transitions and later education transitions

The focus of this chapter has been on the first formal examinations that would have been undertaken by nearly all of the cohort. Further analysis was conducted to examine whether childhood family disruption continued to be associated with leaving school or, among those who stayed on at school, passing A levels. The results are summarised in this section without presenting further parameter estimates.

Leaving school at 16

The next chapter will focus on the particular historical context of transitions to the labour market in the later 1980s and early 1990s. Here, after controlling for the number of CSEs and O levels that the young person obtained, boys who had been in stepfather families with stepsiblings or those born to a lone mother were still found to be more likely to leave school at 16. Looking at the timing of transitions, boys who experienced the transition to a stepfamily between 11 and 16 were more likely to leave school than those who grew up with both natural parents even though stepfamilies formed at this stage were no more likely to contain stepsiblings than those formed earlier. Boys whose parents separated before they were six and had continued to live in a lone mother family through to 16 were actually found to be less likely to leave education, after controlling for their educational attainment, than those who grew up with their natural parents.

The results for women showed virtually no increased odds of leaving school among those in "non-intact" families after taking into account attainment at 16. No positive coefficients achieved statistical significance at even the 10% level and many coefficients were close to zero or even negative. Indeed, girls who lived in a lone father or father and stepmother family after parental separation were less likely to leave school than those who grew up with both natural parents. In summary, the decision to leave school was highly path dependent on O level attainment for women and, to a lesser degree, for men.

Achieving at least one A level pass

Here, the sample was restricted to those who passed at least one O level and stayed on in education. The questionnaire only asks if the respondent achieved a pass at A level. People who embarked on A level courses but either dropped out or failed the examination cannot be identified. Therefore, the model examined whether there was any association between family trajectory and both the decision to pursue, and then achievement on, A level courses.

Because of the lower response rate among men at 26 and consequent small cell sizes, it was necessary to collapse the family trajectory categories concerning stepfather families back into one group. Similarly, cell sizes were too small to test the fourth measure of family transition using both the type and timing of transitions.

Not surprisingly, there was a steep gradient among men in the achievement of at least one A level according to the number of O levels attained. However, boys in stepfather families at 16 were still less likely to achieve at least one A level pass than those living with their natural parents after taking their number of O levels into account. Also, later family transitions are associated with a lower likelihood of A level attainment. Among women, family structure appeared largely unrelated to A level achievement after controlling for attainment at O level.

In summary, later outcomes such as leaving school or gaining A level qualifications were very much dependent on earlier attainment. After controlling for this, childhood family disruption showed hardly any associations with later attainment among women and very few among men. These included men who had lived in a stepfather family with stepsiblings or experienced later transitions who were still more likely to leave school and less likely to achieve A levels. The pathways by which these outcomes may occur is not pursued here but could be a subject for further investigation with the data.

Vocational qualifications

The main analysis looked at academic qualifications. However, those who did not achieve academic success may have gained vocational qualifications by age 26 that are equivalent to O level standard[17]. If some types of family disruption were associated with lower educational attainment, do young people from these family backgrounds "catch-up" after leaving full time education?

Tables 4.17 and 4.18 compare the proportion achieving lower than O-level or equivalent academic qualifications according to family structure at 16 with the proportion that have still not attained the equivalent standard after taking into account vocational qualifications. Overall, there was about a one third reduction in the proportion of men and women not achieving O level standard after taking these qualifications into account. However, those who were in lone mother or stepfather families at 16 were slightly less likely to do so than those in two natural parent families. Only men in lone father or stepmother families were more likely

[17] See Section 4.2.1 for a description of the type of vocational qualifications which are equivalent to O-level.

to achieve a vocational qualifications by aged 26 although the small numbers in the unweighted group mean that the these figures should be treated with caution. In total, there is no finding that young people who experienced childhood family disruption were any more likely to attain vocational qualifications.

Table 4.17 Percentage of cohort members achieving below O level or equivalent qualifications, academic only qualifications and all equivalent qualifications by family structure at 16, men
(weighted estimates)

Family Structure at 16	Academic %	Academic and vocational %	% reduction	Bases (weighted)	Bases (unweighted)
Both natural parents	23.7	14.4	39.2	6464	1964
Lone mother	27.7	18.7	32.4	802	210
Mother and stepfather	36.4	23.3	36.2	710	179
Lone father/Father and stepmother	34.4	18.1	48.9	241	70
Other guardians/in care	39.3	34.2	10.4	60	16

Table 4.18 Percentage of cohort members achieving below O level or equivalent qualifications, academic only qualifications and all equivalent qualifications by family structure at 16, women
(weighted estimates)

Family Structure at 16	Academic %	Academic and vocational %	% reduction	Bases (weighted)	Bases (unweighted)
Both natural parents	20.1	12.7	36.8	4941	2497
Lone mother	24.1	16.8	30.3	863	296
Mother and stepfather	32.6	23.9	26.7	740	261
Lone father/Father and stepmother	23.8	18.2	23.4	173	66
Other guardians/in care	31.2	19.3	38.1	73	24

4.7 Discussion

The chapter has added to previous work on family disruption and educational outcomes in Britain by considering not only the incidence of disruption, reflected in the family structure at 16, but also the importance of the type and timing of childhood transitions. The analysis used four nested models to address the following questions:

1. What were the differences in educational attainment according to different measures of childhood family trajectory?

2. To what degree were these differences "explained" by the original social, economic and demographic background characteristics of the child's family?

3. If differences persisted after adding these factors, how were they attenuated by adding measures of early childhood attainment, behaviour and family environment, such as parental interest in education?

4. Finally, measures of family life at 16 were added in the fourth model, including measures of parental supervision and the quality of relationships. Also, for women, household income was selected as a background covariate. For family types that were still found to have a higher likelihood of low attainment after the third model, this stage examined whether this could be attributed to the characteristics of family life in the post transition family.

Before taking any background controls into account, as suggested from evidence from the NCDS, the association between many types of family transition and educational outcomes was quite weak, particularly for boys (Ní Bhrolcháin et al. 2000). The outcomes from the models that added progressively more background factors are discussed in the context of the existing evidence reviewed in Section 4.2.

Financial hardship

Ely and colleagues' (2000) analysis of the BCS70 data up to age 16 found that economic disadvantage explained lower attainment among teenagers in lone parent families at 16 but not among those living in stepfamilies. The present study confirmed the well established association between the social and economic status of a child's family and his or her educational outcomes. Boys living in a lone mother family after parental separation or those

born to a lone mother were no more likely to have low attainment than those who grew up with both natural parents after allowing for these original circumstances. Consistent with Ely and colleagues, an association persisted at this stage among boys living in a stepfather family at 16 but here it was removed by the addition of measures of early childhood circumstances, such as household tenure, as well as the boy's educational test scores at age five. This appears to indicate early life disadvantage among those who are living in stepfather families by age 16.

However, considering the type of transition revealed that the commonly found outcomes for boys in stepfamilies appears to reflect the outcomes of those who lived with stepsiblings, whilst outcomes for those who did not live with stepsiblings are closer to those in lone mother households. Further investigation would be required, with larger numbers of children experiencing this family structure, to investigate the potential explanations for this outcome including a higher likelihood of conflict (Hetherington et al. 1999) as well as the larger average size of these families and potential competition for resources between siblings.

Similarly, looking at the type and timing of transition among women allows us to draw conclusions that differ from those that depend on the measure of family structure at 16. From this cross sectional measure we would conclude that socio-economic factors entirely explain any lower attainment among girls living in lone mother families at 16. However, unpacking the pathway to the family structure revealed that although the coefficient for girls experiencing the most common transition to a lone mother family after parental separation was reduced by adding measures of family background circumstances, there were still (statistically) significant higher odds for this group.

These results differ from those of Ely and colleagues for a number of reasons. First, the frequency distribution of family structure at 16 used here differs because of the editing corrections undergone in this thesis on the basis of evidence from previous waves (See Appendix I). Secondly, the analysis considered attainment by age 26 rather than immediately after taking O levels at 16 and some respondents may have taken resits or further courses. Finally, although the Ely study also used family income at 16, it was not equivalised and would have had different distributions according to family type.

Social Capital

Parental support for education, expectations of the child and level of supervision were all highly relevant to educational attainment. For boys, adding these measures together with early educational test scores attenuate the differences between those experiencing transitions at age

six or older and low attainment. As discussed in the literature review, evidence of disruption will usually predate the event of parental separation and taking these factors into account elucidates the mediating processes by which some disruption may translate into low attainment. The odds for those born to lone mothers fell quite substantially after adding these types of factors.

However, the pattern was not always observed among girls. Although girls' outcomes were even more associated with parental expectations and supervision, adding these factors into the analysis did not eliminate the association between later transitions, particularly into a stepfather family and low attainment. Also, adding characteristics of the post transition family at 16 did not attenuate these differences by family trajectory.

Stress, change and conflict

Overall, the educational outcomes of women seem to be more sensitive to both the number and timing of family transitions, even after taking into account circumstances along the way. This ties in with the suggestion that both parents and children may go through a period of two or three years adjustment after transitions and, if this is at a time that is important for the choice of courses or studying for exams it could have a greater impact on the child's life course.

In sum, the variety of measures of childhood family disruption showed the range of potential conclusions about the association between disruption and educational outcomes according to the measures used. For boys, socio-economic circumstances explained almost all of the associations between disruption and low attainment with the exception of those living in stepfather families with stepsiblings. For girls, using the family structure at 16 as the measure of disruption was potentially misleading. It appears that experiencing change and particularly changes in later childhood are more important than family structure itself at 16. The analysis did not support the conclusion from the NCDS that the attainment among boys was more associated with family disruption than girls (Kiernan 1997b; Ní Bhrolcháin et al. 2000) although the increasing level of female education between the two cohorts makes them difficult to compare. The overall qualification level of women rose considerably between the two cohorts but women's educational outcomes on the BCS70 appeared to depend more on the family's ability to support her education.

Chapter 5 Childhood family disruption and unemployment in young adulthood

5.1 Introduction

Among the 1946 and 1958 cohorts, men who experienced parental divorce in childhood were more likely to experience unemployment in young adulthood than those who experienced no disruption (Kiernan 1997b; Maclean and Wadsworth 1988). Less variation has been found among women in the 1958 cohort, although the picture is complicated by the higher likelihood of early childbearing among lower qualified women who would be most likely to experience unemployment (Kiernan 1997b). This chapter considers whether family disruption among the 1970 cohort was a precursor of experiencing medium to long term unemployment by age 26 after taking into account the educational attainment of the young person and, amongst other factors, the changing nature of the labour market from the late 1980s to the early 1990s. Some regions were emerging from long-term recession but then other more prosperous regions, such as the South East, saw boom turn to bust by the early 1990s.

5.1.1 Trends in unemployment

In 1986, around 11% of the working age population in the UK were unemployed and rates had been consistently high since the peak of the decade's recession in 1982. The level then fell steadily to below 7% in 1990. The economy was growing due to policies that concentrated on expanding money markets and financial services and trade was benefiting from an international boom and earlier fall in commodity prices. But the boom caused inflation and, in turn, interest rates rose. Policies introduced to control inflation slowed down the economy, contracted the jobs market and caused many of the newer jobs in the financial and service industries to disappear. Inflation fell, but a recession began in 1991 that affected sectors of the economy and regions of the country that had previously avoided the worst of recession. At the same time the demands of the labour market were changing. Although men without qualifications were historically vulnerable to unemployment, the risk increased in the late 1980s when the gap between the skills of the workforce and the requirements of the new high tech industries and Information Technology widened. People without skills were not only more likely to become unemployed but they stayed unemployed for longer. In 1980 around 18% of the unemployed had been so for more than a year, by 1987, this proportion had risen to 40% (Nickell 1999).

Young people have always been in a more insecure position in the labour market than their older, more experienced, counterparts, and young male unemployment rates are particularly

hypercyclical: i.e. if unemployment rates rise, they rise even faster among young men. Unemployment among young women differs less from the overall rates and is less sensitive to economic shocks. Also, some young women with lower qualifications, who might have been most vulnerable to fluctuations in labour market demand, would have begun families at young ages and may be caring for children or working part-time. Although long term unemployment was a growing problem in the late 1980s it was not a feature of the youth labour market. Young people were at highest risk of losing their job, but were also more likely than older workers to find a new job in less than a year.

The 1970 cohort predated the major expansion in higher education. Rates of enrolment in post-compulsory education rose slightly in the early 1980s but actually fell back before beginning to rise slowly again in 1987/8 (Robinson 1999). However, the cohort were still much less likely to enter employment directly from school than their predecessors on the NCDS due to the rise in the number of government schemes, such as the Youth Training Scheme, which were designed to address the fall in the number of youth jobs or apprenticeships. The streamlining and expansion of vocational qualifications into a system of National Vocational Qualifications began in the late 1980s, but were not generally available to this cohort immediately after they left school in 1986 (Mackinnon et al. 1995).

Figures 5.1 and 5.2 show the rates of unemployment in the UK from 1985 to 1996 among men and women respectively. The rates for young people (aged 16-24) are compared to the total rates for the economically active population over age 16. Youth unemployment was consistently higher than general rates of unemployment but rose particularly sharply in the early 1990s.

Figure 5.1 Unemployment as percentage of economically active by age group, men, UK 1985-1996

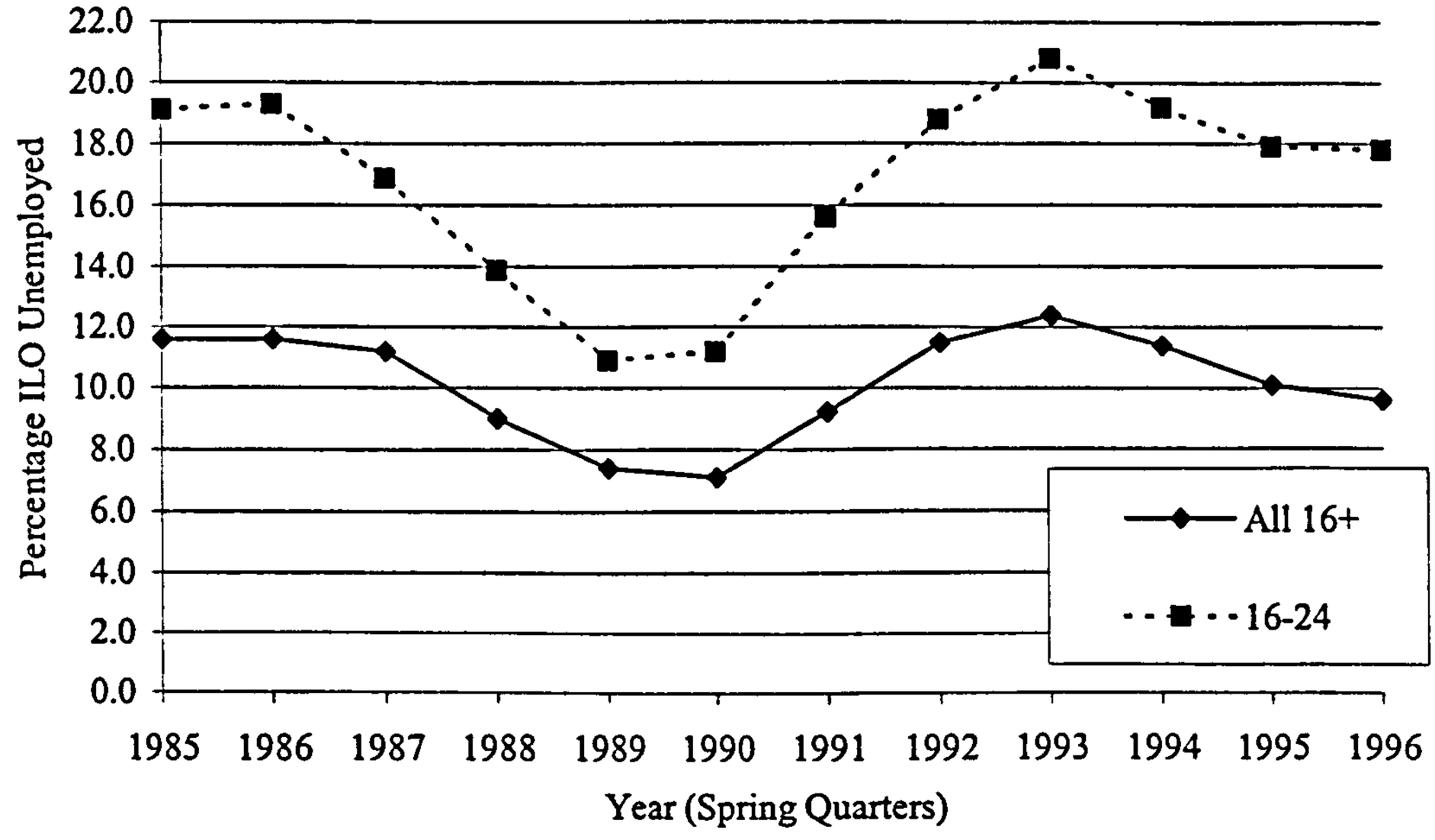
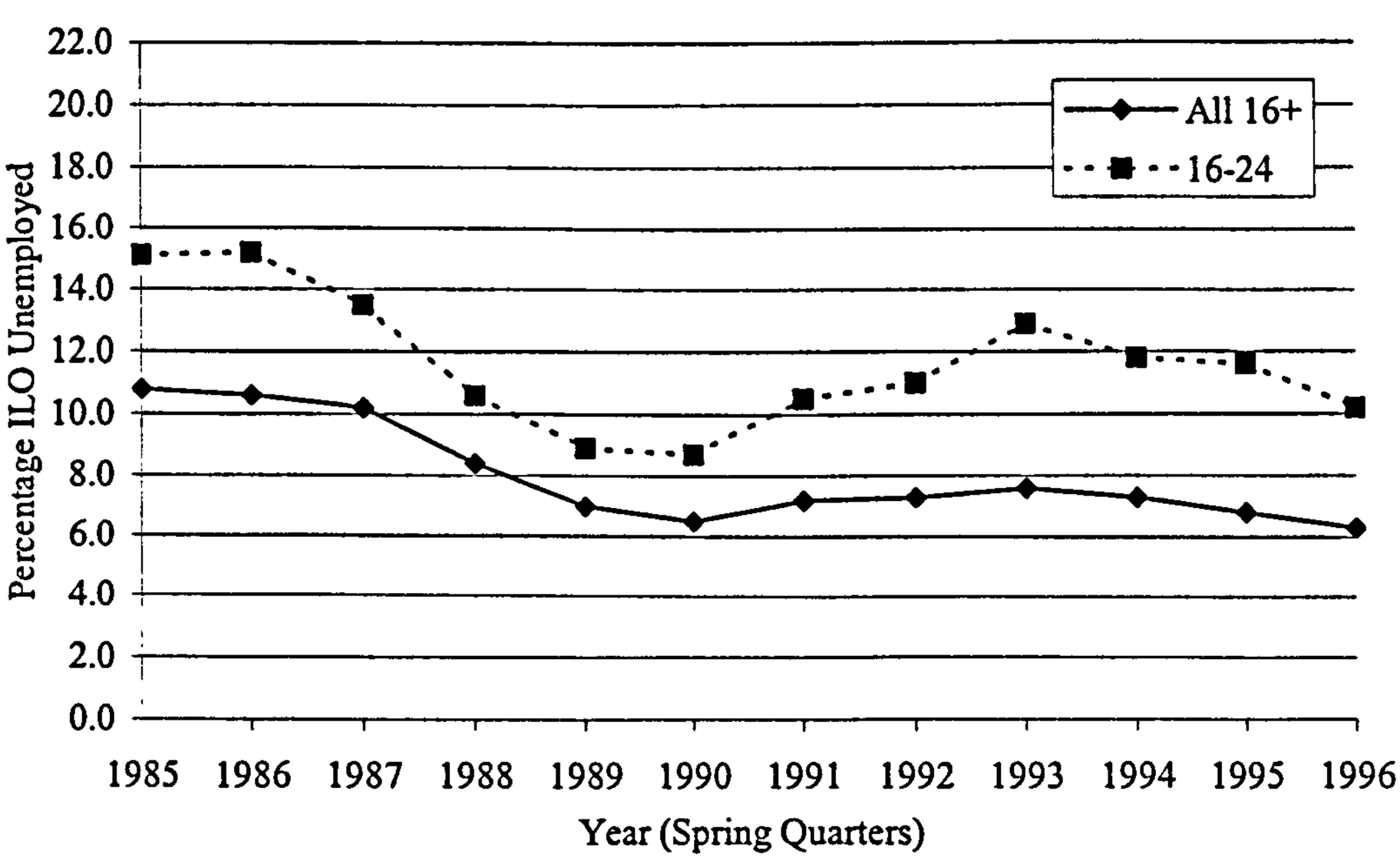


Figure 5.2 Unemployment as percentage of economically active by age group, women, UK 1985-1996



Source: Office for National Statistics (1999b)

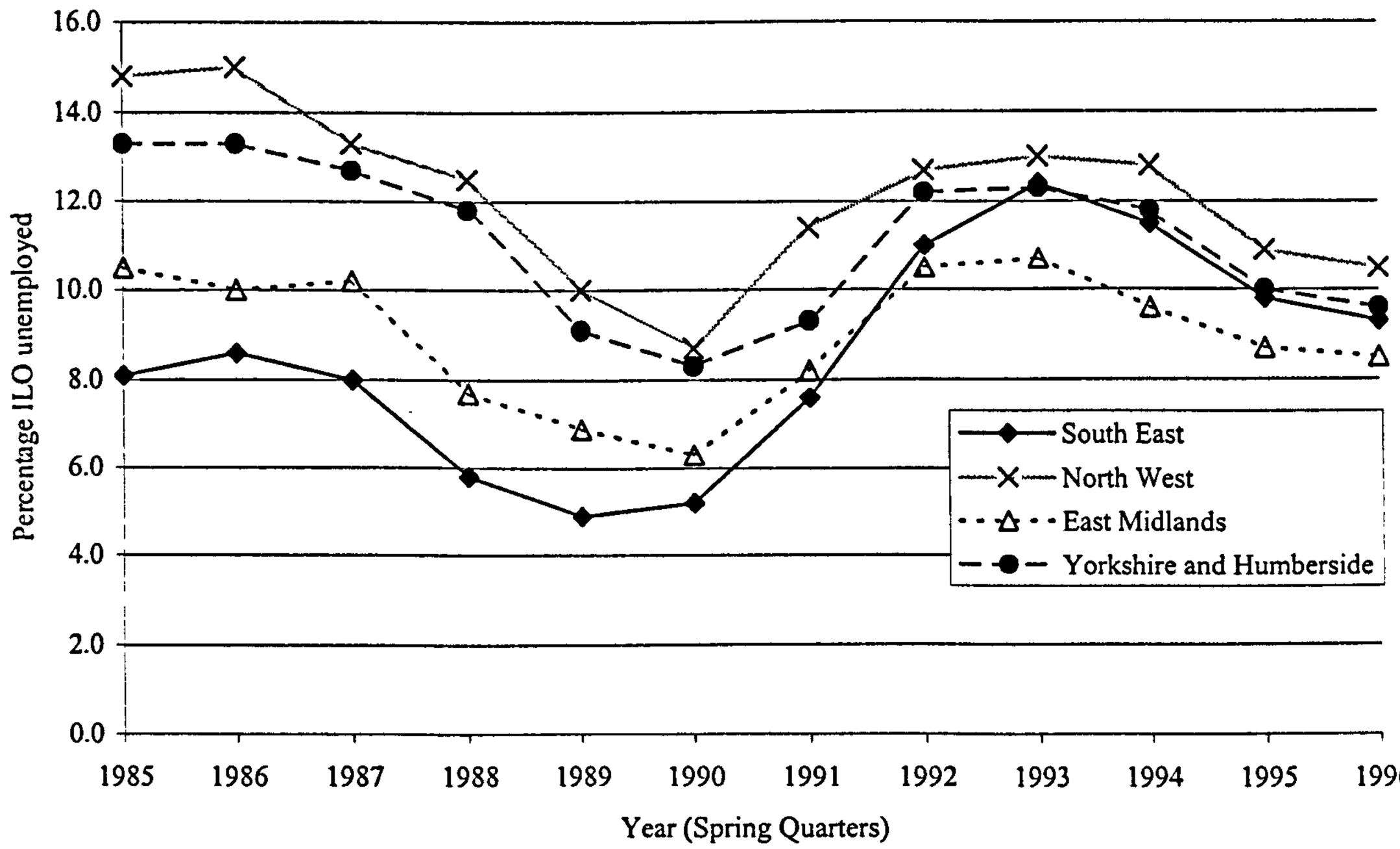
Notes:
The International Labour Organisation measure of unemployment used in the Labour Force Survey refers to people without a job who were available to start work in the two weeks following their Labour Force Survey interview and who had either looked for work in the four weeks prior to interview or were waiting to start a job they had already obtained.

This rate is not sensitive to changes in unemployment benefit claimant regulations over the years and therefore includes those who, for whatever reason, are seeking work but not claiming benefit. This definition most closely mirrors the questions on the age 26 survey of the BCS70 where the respondents were asked whether they had ever been unemployed and seeking work.

Regional variation in unemployment

The recession of the early 1980s hit the heavy industries of mining and manufacturing, traditionally concentrated in the North of England. Regional disparities in unemployment rates grew and then worsened when the boom of the late 1980s disproportionately benefited the South East. However, this North-South divide in unemployment began to change after the crash of the early 1990s brought the unemployment rate in the South East closer to other regions. Secondly, although Britain is known for its wage inflexibility in the face of economic shocks (Layard et al. 1994), the proportion of British workers prepared to migrate to areas with better employment prospects increased, again reducing regional disparities. Figure 5.3 shows trends in male unemployment in selected regions from the mid 1980s to the 1990s. In 1985 male unemployment in the North West was nearly double that of the South East, but by 1993 it had converged across the regions. Unemployment among women varied less by region, although a similar convergence did occur in unemployment rates over the same period.

Figure 5.3 Male unemployed as percentage of economically active, age 16+, selected regions, 1985-1996



Source: Office for National Statistics (1999b)

Ethnicity

An enduring feature of the risk of unemployment has been ethnicity. Those from White European backgrounds consistently have the lowest rates of unemployment, followed closely by those of Indian origin. Black African-Caribbean people, particularly men, have higher rates of unemployment (at all qualification levels), and the highest levels are found among those of Pakistani or Bangladeshi origin (Social Exclusion Unit 2000).

Implications for the 1970 Cohort

The boom and crash of the late 1980s to early 1990s, the expansion and then contraction of regional disparities in unemployment and fall in demand for unskilled workers creates a complex background against which to consider individual probabilities of unemployment. Although qualification attainment will always be a strong predictor of employment patterns, members of the BCS70 who left education early (in 1986/7) entered an expanding job market and had time to gain experience before the contraction. Those who stayed on in education, particularly to do degrees, entered the labour market in 1991/2, when unemployment was peaking and regional variations in rates were falling. The analysis, therefore, will need to consider carefully the combined impact of qualification, time of entering the labour market and region. The large regional differences in the risk of unemployment at age 23 found among men in the 1958 cohort (Payne et al. 1996) may be replicated among those leaving education at 16, but not at those leaving at a later stage.

5.1.2 Evidence of the association between family disruption and unemployment

Before embarking on the analysis of the outcomes among the BCS70, this section reviews the empirical evidence of the association between childhood family disruption and young people's occupational careers according to the themes introduced in Chapter 1.

Financial Circumstances

The more disadvantaged occupational positions and financial hardship of many lone mothers have been found to explain much of the difference in occupational outcomes among their children. Limited resources may restrict financial support for education, training or housing in the transition to adulthood. After controlling for these factors, differences in earnings or occupational status in young adulthood according to family type in late childhood become small and sometimes statistically insignificant for men, although the picture is less clear for women (US: Biblarz et al. 1997; Powell and Parcel 1997), (UK: Feinstein 2000; Kiernan 1997b), (New Zealand: Caspi et al. 1998).

In fact, in the US, children from higher status backgrounds who experience family disruption have been found to have the highest likelihood of inter-generational downward mobility (Biblarz and Raftery 1999). Arguably, young people from lower social class backgrounds may have "less to lose" whereas the high costs of supporting offspring into professional occupations may be difficult for many post-disruption families.

Although educational attainment can counteract the effect of coming from a disadvantaged background, occupational mobility across the generations has actually been found to have fallen between the 1958 and 1970 cohorts. Men earning higher incomes at age 26 in the BCS70 were more likely to have come from rich backgrounds than their high earning counterparts at age 33 in the NCDS (Gregg and Machin 2000). In all, as with education, the transmission of the parents' 'human capital' can affect the labour market outcomes of their offspring and controlling for the socio-economic background factors of the family may well attenuate the differences in predicted outcome according to family structure.

Social Capital

This approach is concerned with the personal relationships that a person may draw on for resources and support. Young people in conflict with their parents may suffer poorer outcomes because they are less likely to receive help (Parcel and Menaghan 1994) and those in post-transition families are found to be more likely to be in conflict with their residential parent than those in original families (Biblarz and Raftery 1993). Secondly, children in post-transition families may be disadvantaged if they have lost contact with a parent or other relatives who could have helped them through informal contacts in the labour market (Coleman 1988; Mclanahan and Sorensen 1985) or, equally, children living with a lone mother may be at a potential disadvantage in their connection to the labour market if their mother does not have a good occupational position (McLanahan and Sandefur 1994). However, social capital can also be gained from a good relationship with a school or involvement in the community (Caspi et al. 1998), both of which can buffer potentially negative effects of family conflict.

Change, stress and conflict

The impact of family disruption on a child's self-esteem has been suggested as one factor explaining why children from disrupted families can have lower than expected returns to education (Biblarz and Raftery 1999; Duncan and Duncan 1969). Among the BCS70, young men who had more confidence in their abilities in childhood reaped higher returns to education, in terms of earnings at 26, than those with lower self-esteem (Feinstein 2000).

Among women, the predictive factor was perceived locus of control. If family transitions are stressful and impact on a young person's confidence, this may eventually translate into lower occupational status. Furthermore, in the US, children who experienced the extra transition to a stepfamily have been found to do worse than those who remained in stable lone mother families after separation (Biblarz and Raftery 1999). As with education, the increase in resources does not seem to outweigh either the long term effects of disadvantage or impact of conflict at the time of stepfamily formation.

Causality

More general studies of the individual precursors of unemployment often point to personal characteristics, such as behavioural or mental health problems, which 'pre-select' some people into long term unemployment. In the UK (Maughan et al. 1985; Rutter 1994), and recently in Finland (Kokko et al. 2000), early disruptive behaviour has been suggested to reduce the accumulation of social capital through conflict with parents, detachment from school and eventually poor job search skills. Early disruptive behaviour and low attainment could be a consequence of early family disruption (Elliot and Richards, 1991) but could equally reflect innate characteristics of the child that are independent of the family structure or could even place a strain on the parents and contribute to their separation (Rutter 1979).

5.2 Unemployment among the BCS70 members

The age 26 questionnaire asked two questions on unemployment; first the number of times the respondent had been unemployed and then the longest period of unemployment (in banded time periods). The respondents were asked if they had been "unemployed and seeking work" but were not given a more detailed definition of unemployment that might have been possible in a face to face interview. Furthermore, the question asked respondents to think back over the previous 10 years, and the accuracy of the recall of the duration of unemployment many years ago may be questionable (Bradburn et al. 1987).

The variable indicating if the respondent was ever unemployed, derived by the Centre for Longitudinal Studies includes those who mentioned a period of unemployment in their response to either of these questions. By this measure, 60% of men and 54% of women had ever been unemployed. At first consideration, rates of unemployment appear to have risen dramatically since the 1958 cohort where less than 40% of men and 30% of women had experienced unemployment by age 33 (Kiernan, 1997). However, trends in the duration of unemployment account for much of the difference between the cohorts as well as the variation according to educational attainment among the BCS70 members. Short-term unemployment

(up to three months) accounts for around one quarter of reported unemployment among the cohort and up to one third of unemployment among graduates. It appears to be part of a transition period from education to employment and, indeed, possibly reflects more confidence in employment prospects among higher educated groups who are more prepared to hold out for a more rewarding job after graduating. This short term unemployment potentially distorts the analysis. Therefore this chapter adopts the same approaches of previous analyses of unemployment among the BCS70, looking only at unemployment lasting at least four months. (Feinstein 2000; Joshi and Paci 1997).

Table 5.1 presents three different frequency distributions of the levels of unemployment among men and women in the cohort. The first column presents the unweighted frequency distribution for all respondents at 26. The second then shows unweighted figures among those who were in the survey at both age 16 and age 26. Finally, the third column presents the same distribution after reweighting for non-response. In contrast to the figures for educational attainment, unemployment rates among the restricted sample of those responding to the survey at age 16 and 26 do not differ markedly for all respondents at 26. Weighting does increase the proportion estimated to have experienced unemployment of longer than one year, but otherwise the average weights for each category of unemployment did not differ very much. In contrast to the question on educational attainment, those who did not answer the questions on unemployment did not appear to have characteristics that distinguished them from those that did complete the section. The average weight for this group was also similar to the other categories.

Table 5.1 Experience of unemployment by age 26, men and women, BCS70

Experience of unemployment	Men			Women		
	All in survey at 26 - UW	All in survey at 26 and parental interview at 16 - UW	All in survey at 26 and parental interview at 16 - W	All in survey at 26 - UW	All in survey at 26 and parental interview at 16 - UW	All in survey at 26 and parental interview at 16 - W
	%	%	%	%	%	%
Continuous employment / intermittent unemployment (up to 3 months)	65.8	66.5	64.8	73.6	74.6	72.8
Unemployed 4-11 months	20.5	20.0	20.3	15.6	15.5	16.1
Unemployed 12+ months	13.6	13.5	14.9	10.6	9.9	11.1
Total	*3994*	*2499*	*8544*	*4702*	*3171*	*7898*

Key
UW Unweighted data W Weighted data

Unemployment according to highest qualification

Figures 5.4 and 5.5 show graphically the distribution of unemployment according to highest qualification attained. The proportion of graduates who had been unemployed for more than three months did not differ greatly from the proportion of those with A levels or higher qualifications, and was only slightly lower than the proportion who left education with O levels. These graduates entered the labour market in 1991/2 during the recession and many had difficulties securing their first job. On the other hand, graduates were over-represented in the group experiencing between four and 11 months unemployment and under-represented among the group who were long term unemployed. Although a substantial proportion of graduates experienced unemployment, most found jobs within a year.

Overall, 15% of men and 11% of women were unemployed for more than one year but those with no qualifications had by far the highest rates. Nearly 37% of women and 39% of men with no qualifications were without a job for a year or more. Despite entering the labour market in the more prosperous late 1980s they did not have the skills required for greater job security. Among those people with qualifications, the overall incidence of any unemployment did not vary as much as might be expected. Only the rates of long term unemployment clearly declined as qualification level rose. For example, about 30% of both men with degrees and men with A levels were ever unemployed, but only one fifth of ever unemployed graduates were unemployed for a year or more, compared to one third of those who achieved A levels.

Family transitions and the experience of unemployment

Figures 5.6 and 5.7 present the same type of distribution, this time according to the type of family transition experienced in childhood. Rates of unemployment were higher among men who were born to a lone mother or lived with a lone mother after parental separation and among women who had ever been in care, or were born to a lone mother.

Figure 5.4 Longest period of unemployment by highest qualification, men

Weighted estimates for men at 26 with parental interview data at 16

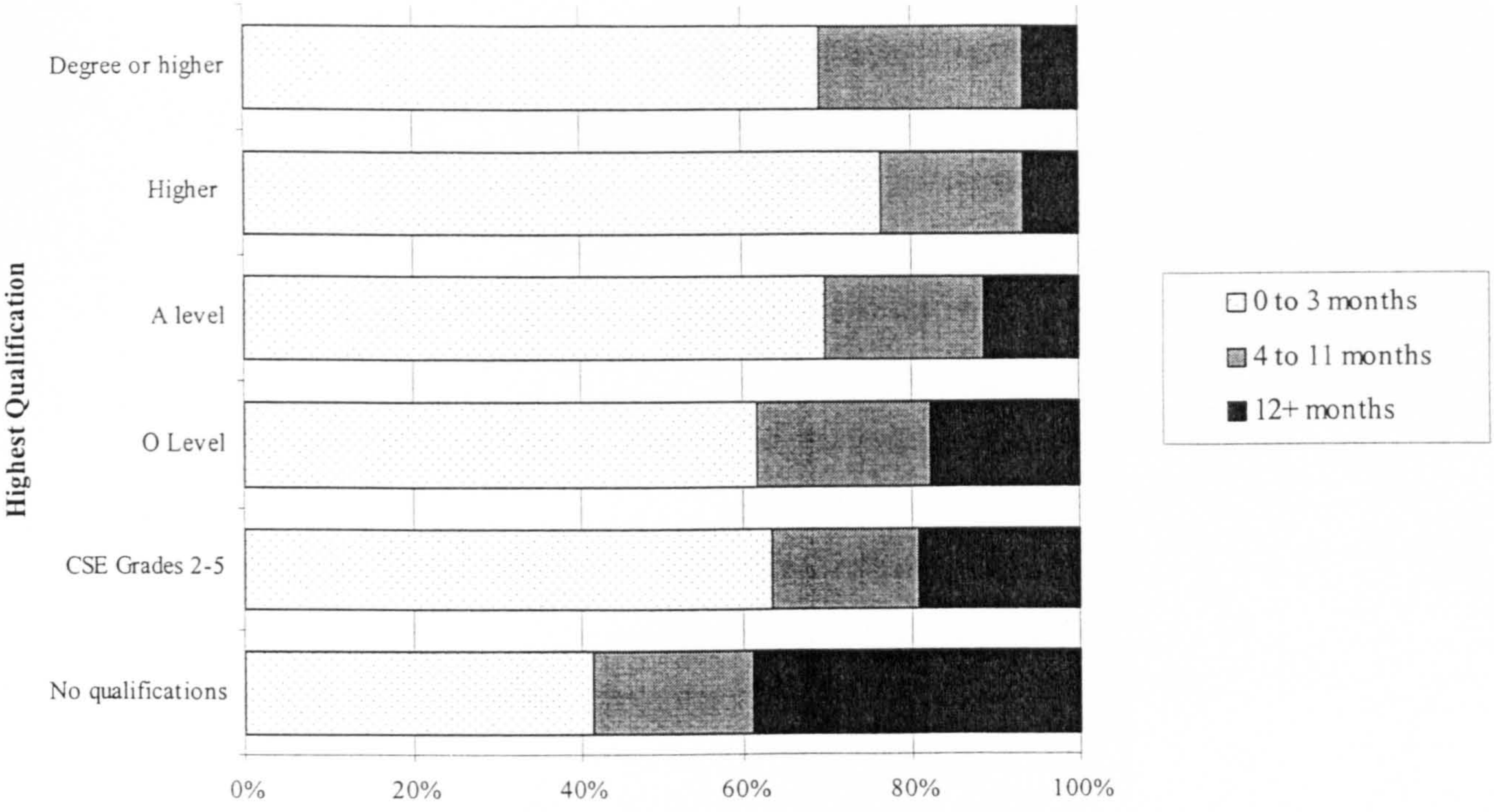
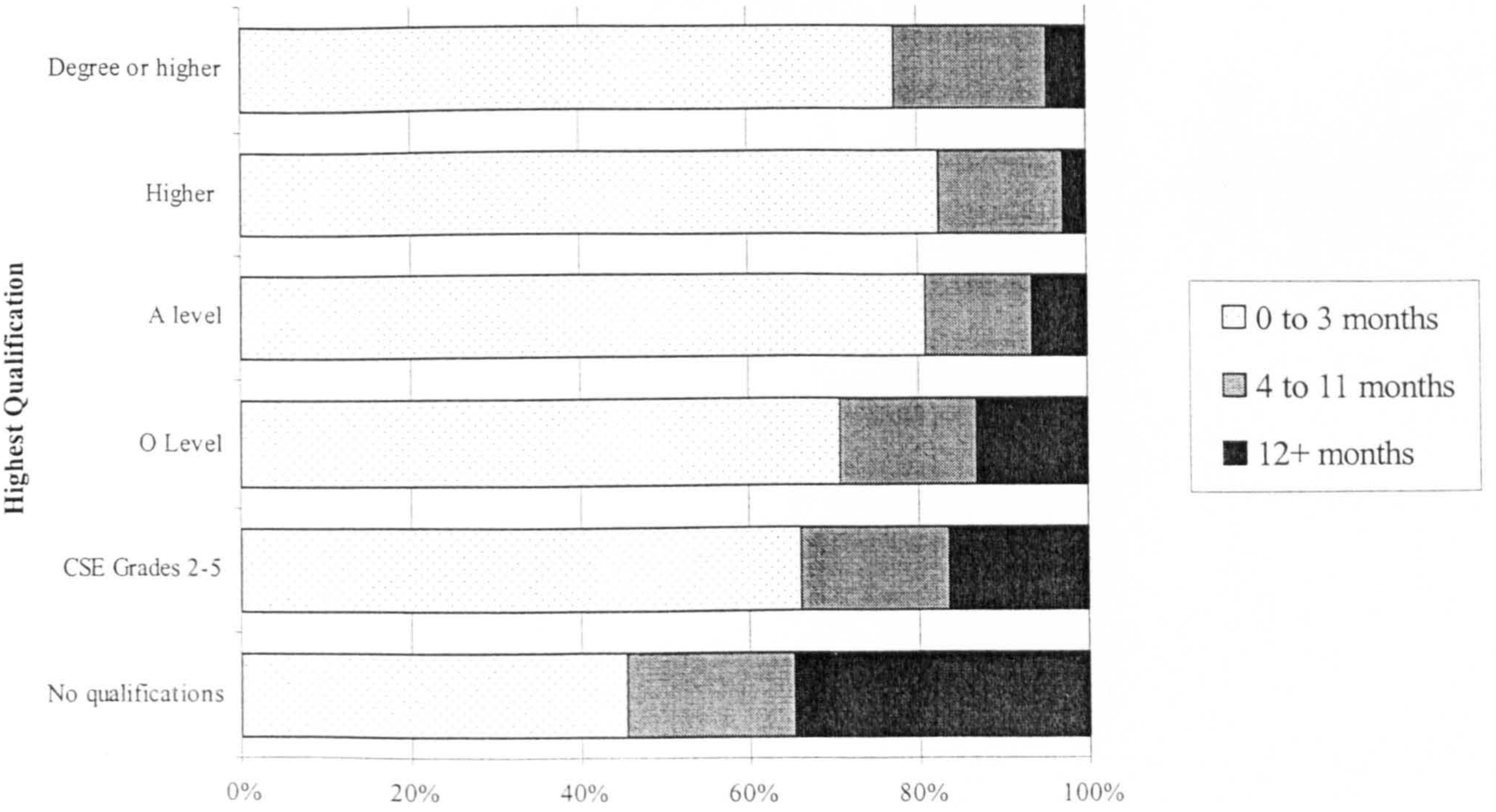


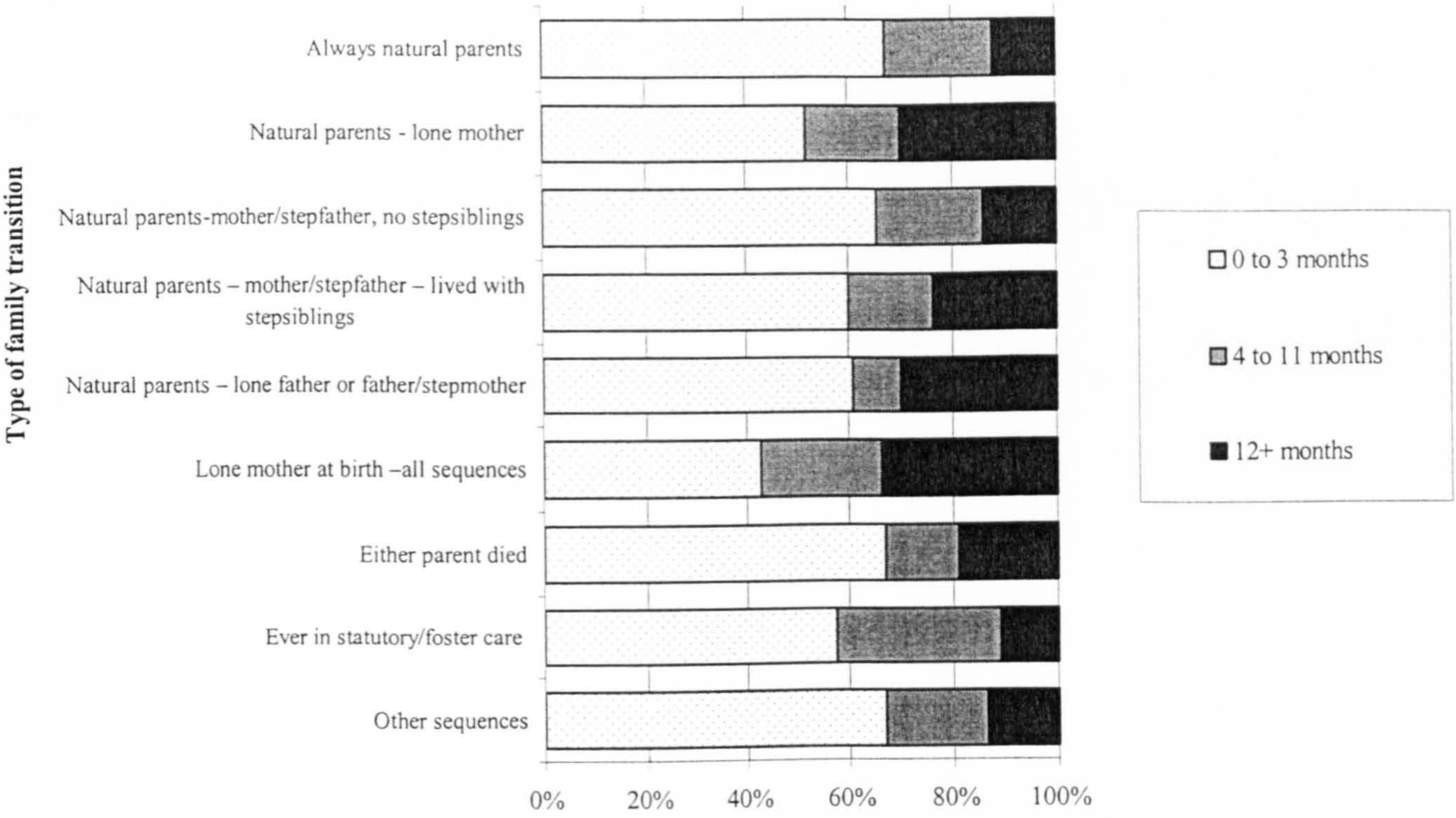
Figure 5.5 Longest period of unemployment by highest qualification, women

Weighted estimates for women at 26 with parental interview data at 16



The bases for these percentages are presented in Appendix IV.

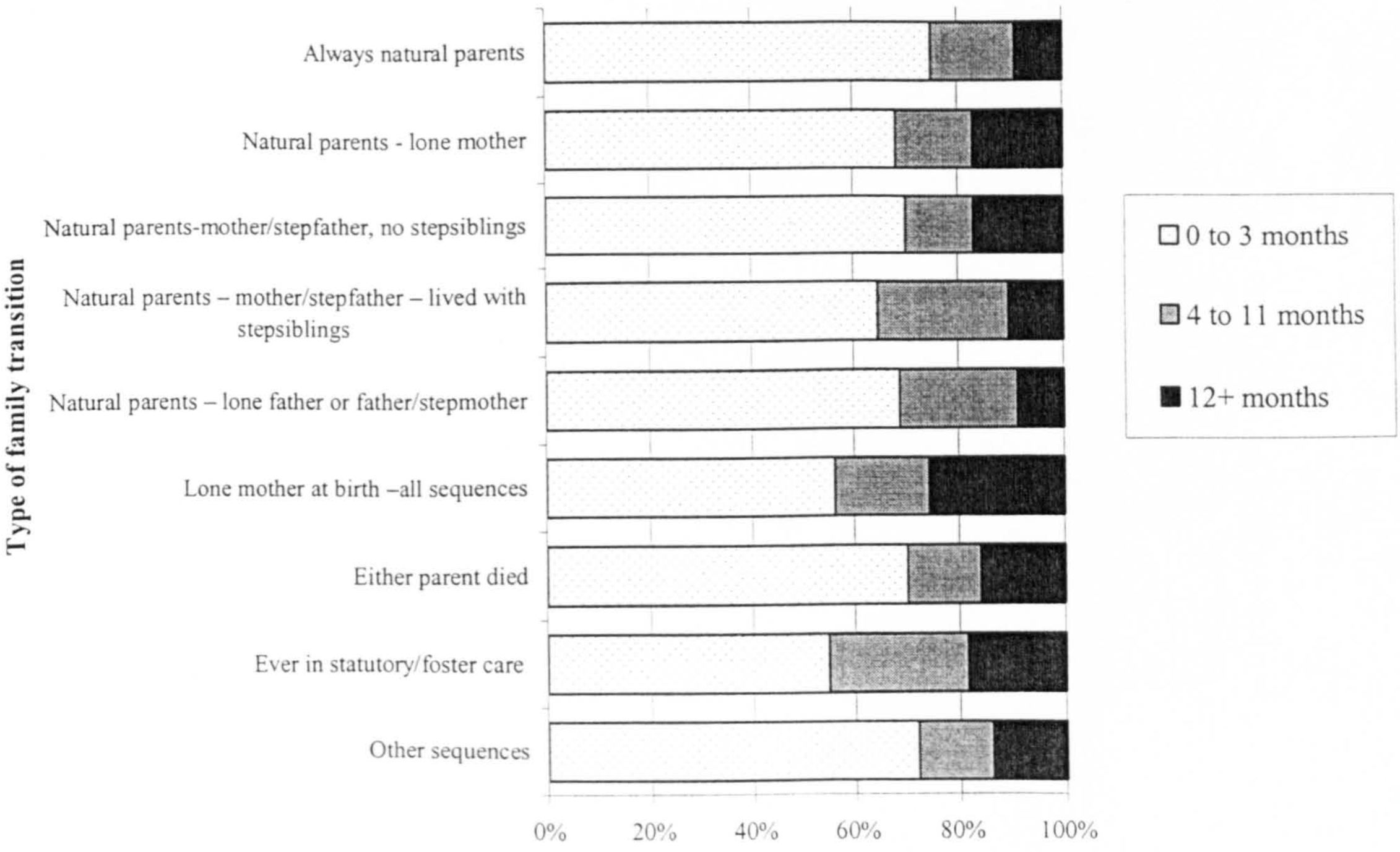
Figure 5.6 Longest period of unemployment by type of family transitions, men



Weighted estimates for men at 26 with parental interview data at 16

Figure 5.7 Longest period of unemployment by type of family transitions, women

Weighted estimates for women at 26 with parental interview data at 16



The bases for these percentages are presented in Appendix IV.

Family formation and employment status

Both men and women's labour market participation are related to their childbearing patterns. Women with children by age 26 had lower participation rates in the labour market and were more likely to be working part time than women without children. Women who began childbearing early and left the full time labour market may have otherwise been at risk of long term unemployment because of their often lower qualification attainment. Although men's employment was far less related to their families, men with dependent children in the household had the highest employment rates of the cohort at 26. It is not possible to untangle whether men experiencing unemployment are less likely to become fathers or whether men who become fathers will then be more committed to the labour market (Joshi and Paci 1997).

5.2 Methodology

The dependent variable in this analysis is a categorical indicator of whether the respondent had experienced short term (up to three months) or no unemployment, medium term (4-11 months) unemployment, or long term unemployment (12 or more months). Two possible methodologies were considered: either a multinomial or ordered logit model.

In the multinomial model no assumption is made about the ordinal relationship between these three categories. The associations of covariates with these outcomes are tested in paired comparisons with an arbitrarily selected baseline category. The logit model described in Chapter 4 is expanded to form as many log odds as there are there are categories of the variable, minus 1. If J is the last and baseline category then $J-1$ logit equations are estimated with separate parameters for each. A multinomial logit model using the baseline category J with predictor vector X has the form:

$$\log\left(\frac{\pi_j}{\pi_J}\right) = \alpha_j + \beta_j x, \qquad j = 1,\ldots,J-1.$$

(Agresti 1996, p206)

In this analysis the predictor set of covariates affect the log odds of a) experiencing 4-11 months unemployment compared to the baseline of no, or short term, unemployment and then b) 12 or more months of unemployment compared to the same baseline.

Alternatively, it could be more efficient to use an ordered logit model which takes into account the ordinal nature of the three categories. The dependent variable can be thought of as an

unobserved continuous variable which has cut points denoting the transition from one of the categories to another (Winship and Mare 1984). Stata then uses a Proportional Odds model (Stata Corporation 1999) where for a predictor X, the model is:

$$\text{logit}\left[P(Y \leq j)\right] = \alpha_j + \beta x, \quad j=1,\ldots..,J\text{-}1.$$

(Agresti 1996, p212)

where the parameter β describes the effect of X on the log odds of a response in category j or below. The key difference from the multinomial model is that there is no subscript j with the beta, i.e. the model assumes an identical effect of the predictor variable all the way through the categories. This can be much more efficient as only one parameter is needed for each predictor variable rather than $J-1$ parameters. This approach could provide a more parsimonious model of the relationship between the predictor variables and the likelihood of unemployment. However, the parameter estimates could be misleading if some covariates were strong predictors of long term unemployment but did not predict the different odds of medium term unemployment. Both approaches were tested and the reasons for selecting a multinomial model are discussed in Section 5.4.

Selecting covariates

This chapter looks at the experiences of the cohort in young adulthood, taking into account the young person's educational attainment. The first model considers the association between family disruption and unemployment after taking into account only region, ethnicity, qualifications and year of completing full time education. Normally this last factor would be unnecessary after controlling for educational attainment. However, it is used here to partly control for the changing economic environment from the late 1980s and 1990s. When this covariate was not included in the model, those with degree level qualifications appeared to be most at risk of medium term unemployment. Similarly, the chances of long term unemployment were the same among graduates as those with A level qualifications. Adding the covariate of the year of finishing education restored the gradient in differences in odds of unemployment according to educational attainment and made it explicit that unemployment among the higher educated had more to do with the economic cycle than a dramatic a reduction in returns to education. The two covariates were not correlated at a level that created problems of multicollinearity in the model. Table 5.2 shows the covariates tested for the model and their level of statistical significance attained. All of the "baseline" factors (region, ethnic group, qualifications and year completed full time education) were significant at the 1% level.

After fixing these factors in the model, groups of covariates reflecting family circumstances at 16 were tested for inclusion in Model 2 (Table 5.2). As described in Chapter 4 and Appendix III, the Wald test statistic was used to select covariates using a backward elimination technique with weighted data. Full details of the predictor variables are given in Appendix IV. Factors were tested in conjunction with the measure of family structure at 16 and those found to be statistically significant at the 1% level were retained in the model.

Following the evidence regarding the transmission of human capital, measures of the socio-economic circumstances of the family at 16 were tested first. Secondly, to consider ideas about social capital and self-esteem, measures of the quality of family relationships and the teenager's attitude to education and career aspirations were tested. For both men and women only measures of the socio-economic circumstances of the family were found to improve the fit of the model at the 1% level of statistical significance. Thus, it appears that the human capital arguments are most pertinent to employment outcomes. For men, the two new covariates that were added to the model were social class in 1986 and whether the family was in receipt of means tested benefits in the year before the 1986 interview. For women, financial hardship was the only covariate found to improve the fit of the model at the required level of significance. Having said that, a number of measures of the family environment and teenager's attitudes were found to be significant at the 5% level among women. Although these factors are not used in the main analysis, the impact of incorporating them into the model is considered later.

Once the main effects model had been fitted, all possible two-way interactions were tested and, for women, an interaction between family structure and financial hardship at 16 was found to improve the fit of the model. The same independent variables where then used again in conjunction with the three other measures of childhood family disruption.

Table 5.2 Factors tested for inclusion in model of unemployment among men and women

Factor	M	F
Model 1 factors		
Educational background		
Highest academic or vocational qualification	***	***
Year completed full time education	***	***
Region	***	***
Ethnic Group	***	***
Family Structure at 16	***	**
Additional factors tested for Model 2		
Socio-economic circumstances at 16		
Equivalised family weekly income (£)		
Family in receipt of means tested social security benefits in previous 12 months	***	
Financial hardship in family last 12 months (parent self-reported)	**	***
Social Class by father figure's occupation (or mother's social class if father absent)	***	*
Family environment at 16		
Very little time spent with family		
Relationship with parents		
Very low level of parental supervision and communication with teenager		**
Teenager wants to leave home soon		
Total sibling size (including stepsibs)	*	**
Teenager's attitudes at 16		
Considers truancy acceptable		**
Wants to leave school immediately		
Teenager believes qualifications are important to get the job that they want	*	
Teenager pessimistic about chances of getting a job after leaving education		**
Interaction Family Structure at 16*Financial Hardship		***

Key

M	Male	*** Significant at the 1% level (retained in model)
F	Female	** Significant at the 5% level (dropped from model)
		* Significant at the 10% level (dropped from model)

5.3 Results

Both the multinomial and ordered logit models were fitted using the factors selected for Model 1. Strictly speaking the multinomial and ordered logit models are not nested within each other but the difference in the –2 log likelihoods can be examined to give an indication of the goodness of fit of the ordered logit model compared to the multinomial model (Stata Corporation 1999), taking into account the additional parameters calculated in the multinomial model. As this test is not appropriate with weighted survey data commands, the models were run using unweighted data. Here, the difference in the –2 log likelihoods was large and was statistically significant at $p<0.001$ level for the number of degrees of freedom. This indicated that the multinomial model was an improvement on the ordered logit model.

Looking at the coefficients produced, the strength of the association between some covariates and unemployment did differ according to the outcome of either medium or long term unemployment. For example, region was a clear predictor of long term unemployment for men, but showed a weak association with medium term unemployment. The single coefficient produced for each dummy variable in the order logit model was obscuring these differences. Once a multinomial model had been chosen, the analysis returned to weighted data.

The model was initially constructed for both men and women together with sex as a covariate. However, the large number of interactions between sex and the other covariates makes the model difficult to interpret. Similar analysis of unemployment among members of the NCDS encountered this problem and the solution of fitting models separately for men and women has been followed here (Payne et al. 1996).

Tables 5.3 to 5.12 report the results for the two multinomial models of unemployment among men and women using the four different measures of family transition. As in Chapter 4, to limit duplication the complete set of parameter estimates are only presented with the first measure of family structure, after which only those for the family disruption covariate are presented. None of the coefficients for the other independent variables were affected by changing the measure of disruption. Model 1 presents the parameter estimates for the model using the restricted set of background covariates and Model 2 presents the estimates after adding measures of the family circumstances at 16.

Odds ratios can be calculated by exponentiating the parameter estimates but with a multinomial model these are potentially misleading. In a multinomial model, the odds ratios relate to the odds of being in either of the response categories (medium or long term

unemployment) relative to the odds for the baseline category of little or no unemployment. However, the numerator and denominator of the probabilities for these odds ratios will not sum to one because the odds of no unemployment among each category will vary. So, the effect of any of the covariates on the probability of, for example, medium term unemployment depends upon the effect of the same covariate on the probability of little or no unemployment. For ease of interpretation, the predicted probabilities for the full set of covariates from Model 2 in Tables 5.3 and 5.8 are given in Tables 5.4 and 5.9. The probabilities for the four different measures of family structure or trajectory are summarised graphically in Figures 5.9 to 5.17.

5.3.1 Factors associated with unemployment

Educational background

The estimated probability of both medium and long term unemployment declined sharply with increased qualification level. The differences were greatest in the predicted probabilities of long term unemployment, for example ranging from 0.05 among men with degrees to 0.34 among those with no formal qualifications (Table 5.4). However, this gradient is counteracted by the positive parameter estimates for those who left education in 1991 or later, compared to 1987 or before. For both men and women, these parameters were either unchanged, or even increased, after the addition of socio-economic circumstances at 16, indicating that the timing of entry to the labour market was important, independent of family social background. Therefore, the predicted probabilities for these two covariates must be considered together (Tables 5.4 and 5.9). In reality, the extremely low predicted probability of no unemployment among men with no formal qualifications (0.33) would be tempered by the advantage of leaving education before 1987, for which, when holding all other characteristics at an average level, the predicted probability is 0.74. Similarly, the advantages of having a degree or higher qualifications would be balanced by the disadvantage of late entry into the labour market.

Region

Overall, region was more closely associated with the probability of long term unemployment for men (Table 5.3). Although adding the family's socio-economic circumstances did reduce the size of all the parameter estimates, men in the North still had a 0.20 predicted probability of 12 or more months unemployment, compared to 0.05 in East Anglia (Table 5.4). Differences among women were less pronounced, apart from the lower predicted probabilities of both medium and long term unemployment among women in the South East (Table 5.9).

Ethnicity

The cell sizes for ethnic minorities were small (see Appendix V and note to Table 5.3), so the coefficients should be interpreted with caution. That said, the unemployment patterns among men in the cohort according to ethnic group reflected the national differences discussed earlier. Men of Indian origin had very low predicted probabilities of any unemployment, whilst those from other Asian backgrounds had high probabilities. Men from African-Caribbean backgrounds were highly likely to experience both medium (0.39) and long term unemployment (0.38) (Table 5.4). Similarly, women from non-Indian Asian backgrounds had particularly high predicted probabilities of unemployment, as did those of African-Caribbean origin.

Socio-economic circumstances

Men from social class IV/V backgrounds were at a disadvantage in the labour market, even after controlling for their qualifications, as were those from families who had received means tested benefits in the year preceding the 1986 interview. Among women, the only socio-economic covariate that improved the fit of the model was the experience of financial hardship. Again, disadvantage at 16 did appear to translate into a higher predicted probability of both medium and long term unemployment.

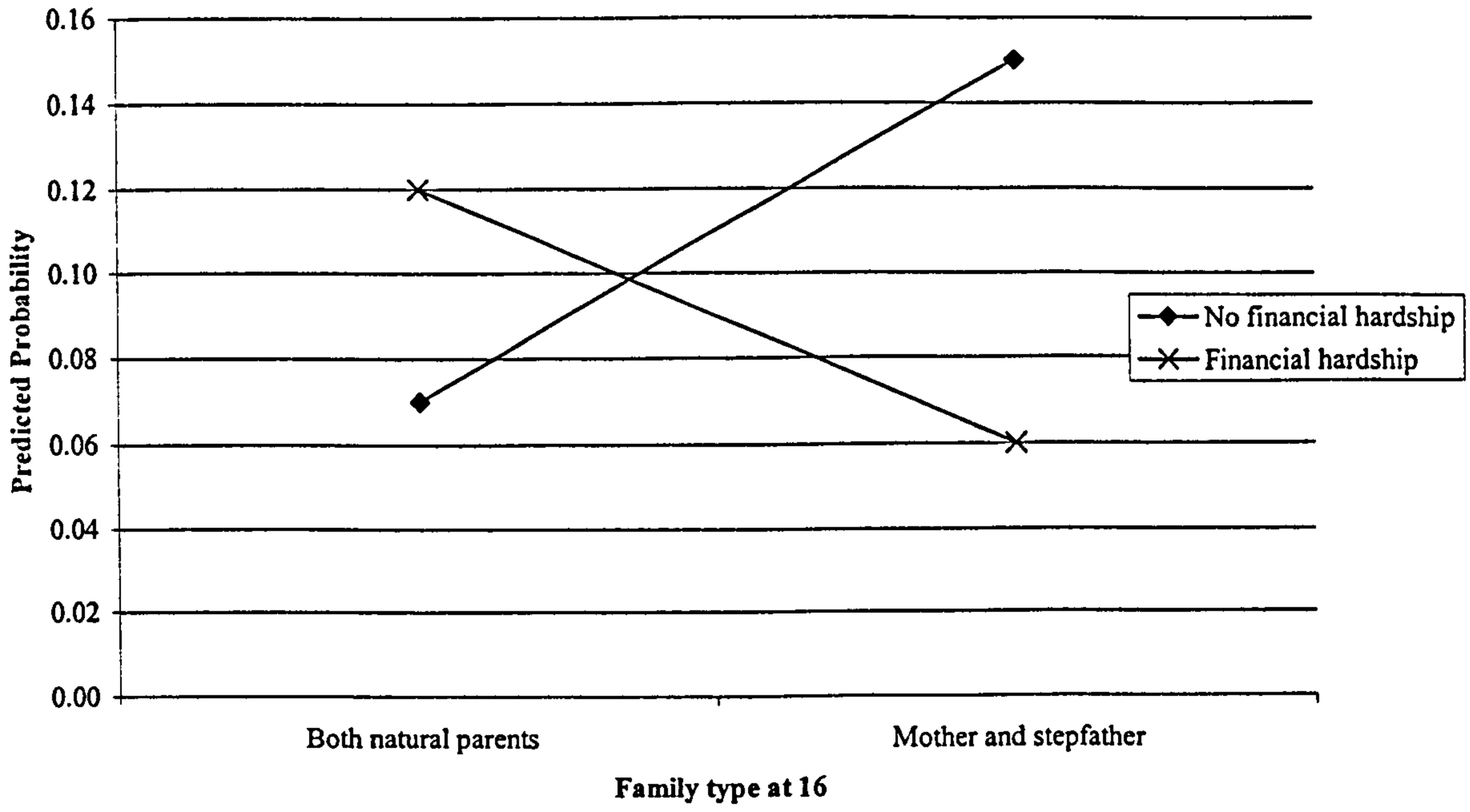
5.3.2 Family disruption and unemployment

Family Structure at 16

The addition of socio-economic measures reduced the parameter estimate for men living in lone mother families more than other family types (Table 5.3). After controlling for these factors, those in lone mother or stepfather families had predicted probabilities of medium term unemployment that were similar to those living with their natural parents (Figure 5.9). Those who were living with their father had particularly low predicted probabilities of medium term unemployment. The standard errors for the coefficients for men who were in care or living with other guardians are very large and then results cannot be considered reliable.

Among women, differences were not very pronounced between those living with a lone mother at 16 and those with their natural parents. For those in a stepfather family, there was an interaction with the experience of financial hardship (Table 5.8). In essence, the effect of living in a stepfather family is eliminated if that family experienced financial hardship. The interaction is illustrated, using the predicted probabilities for each group, in Figure 5.8.

Figure 5.8 Plot of predicted probabilities of long term unemployment showing interaction between stepfather family at 16 and experience of financial hardship



The type of transitions

Socio-economic circumstances are particularly important in explaining the probability of unemployment among men and women who lived in a lone mother family after parental separation (Tables 5.5 and 5.10). However, this was not found to be true among those born to a lone mother. Men from these backgrounds had a 0.28 predicted probability of long term unemployment compared to 0.09 among those who grew up with both natural parents (Figure 5.9). Whilst the predicted probability of unemployment after controlling for background circumstances was not noticeably higher for men who had ever been in care, women from this background had slightly higher predicted levels (Figure 5.10). Again, there was an interaction between either of the stepfather trajectories, or being born to a lone mother, and financial hardship with lower net effects of these family types where there had been hardship in the family.

The type and timing of the transition

Looking at just the timing, or the timing and type, of the transition reveals different patterns for men and women. Men who experienced very early transitions, particularly to a lone mother family by age six, appear to be more disadvantaged in the labour market with a predicted 0.21 probability of long term unemployment compared to 0.09 among those who grew up with their natural parents (Figure 5.11). The timing of the transition seems less

important for women with quite similar predicted probabilities of unemployment for those living in a lone mother family after parental separation from any age (Figure 5.15). Instead, those who lived in stepfather families at any age had higher predicted probabilities of unemployment.

Social Capital

A number of covariates were excluded from the models because they did not achieve the 1% level of statistical significance which was adopted in this thesis to maintain a manageable number of independent variables in the models. However, as discussed earlier, it was notable that a handful of factors relating to a woman's family relationships and future aspirations, including the level of communication with her parents, sibling size, attitude to truancy and confidence in getting a job after finishing education, were significant at the 5% level. These factors could be the pathways through which certain types of family disruption lead to unemployment in young adulthood. To test this proposition, the models for women were rerun using these additional factors. Adding these covariates did slightly reduce the size of the coefficients for the types of family disruption that were found to be associated with long term unemployment, especially among women born to a lone mother. It seems that women born to a lone mother may have lower aspirations and expectations that may affect their employment trajectories.

Table 5.3 Parameter estimates from multinomial logistic models of experience of unemployment by family structure at 16, men

Reference categories are underlined	Model 1 4-11 months		Model 2 4-11 months		Model 1 12+ months		Model 2 12+ months	
	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$
Family Structure At 16								
Both natural parents	0	-	0	-	0	-	0	-
Lone mother	0.32	0.20	-0.16	0.23	0.82***	0.21	0.40*	0.24
Mother and stepfather	0.03	0.22	-0.02	0.23	0.41*	0.25	0.34	0.25
Lone father/Father and stepmother	-1.03**	0.42	-1.26***	0.42	0.58*	0.32	0.35	0.31
Other guardians/ in statutory or foster care	-0.01	0.67	-0.20	0.64	-1.33	1.06	-1.42	1.06
Highest academic or vocational qualification								
None	0	-	0	-	0	-	0	-
CSE Grade 2-5	-0.55*	0.30	-0.45	0.31	-1.20***	0.27	-1.11***	0.28
O Level (or equivalent)	-0.38	0.26	-0.22	0.27	-1.27***	0.23	-1.10***	0.23
A Level	-0.73**	0.28	-0.57**	0.30	-1.85***	0.29	-1.67***	0.29
Higher	-1.09***	0.32	-0.89***	0.32	-2.58***	0.40	-2.35***	0.40
Degree+	-1.16***	0.33	-0.93*	0.34	-2.60***	0.48	-2.29***	0.47
Year left education								
By 1987	0	-	0	-	0	-	0	-
1988-1990	0.24	0.18	0.30*	0.18	0.05	0.22	0.15	0.22
1991 or later	1.03***	0.23	1.16***	0.24	0.39	0.41	0.59	0.39
Not known	0.48**	0.29	0.50**	0.22	0.58**	0.25	0.60**	0.26
Region at 16								
North	0	-	0	-	0	-	0	-
Yorkshire and Humberside	-0.42	0.29	-0.38	0.29	-1.10***	0.32	-1.00***	0.32
North West	-0.19	0.26	-0.14	0.26	-0.63**	0.27	-0.55**	0.27
East Midlands	-0.21	0.27	-0.11	0.27	-0.94***	0.30	-0.85***	0.30
West Midlands	-0.39	0.26	-0.31	0.26	-0.85***	0.28	-0.73**	0.29
East Anglia	-0.56*	0.33	-0.47	0.33	-1.75***	0.44	-1.61***	0.42
South West	-0.40	0.26	-0.28	0.26	-0.93***	0.28	-0.76***	0.28
Wales	-0.52*	0.29	-0.48	0.29	-1.10***	0.33	-1.02***	0.34
South East (inc London)	-0.54**	0.24	-0.42*	0.24	-1.30***	0.26	-1.12***	0.26
Scotland	-0.37	0.27	-0.33	0.27	-1.18***	0.32	-1.09***	0.31
Ethnic Group								
African-Caribbean	0.95*	0.53	0.77	0.55	1.56***	0.51	1.34**	0.55
Indian[18]	-1.50**	0.74	-1.76**	0.75	-30.94***	0.31	-32.16***	0.42
Other Asian	0.96	0.61	0.24	0.60	2.16***	0.60	1.47***	0.61
White European/other	0	-	0	-	0	-	0	-
Social Class of family in 1986*								
I/II			0	-			0	-
IIINM			0.28	0.19			0.28	0.27
IIIM			0.19	0.15			0.60***	0.19
IV/V			0.46**	0.19			0.64***	0.22
Receipt of means test social security benefits in year before 1986 survey								
No/Not known			0	-			0	-
Yes			0.72***	0.16			0.72***	0.18
Constant	-0.45	0.32	-1.02***	0.36	0.67**	0.28	-0.21	0.33

Number of persons: unweighted 2499, weighted 8544
Total = men with employment information at 26 and parental interview at 16
* denotes significance at the 10% level
** denotes significance at the 5% level
*** denotes significance at the 1% level

[18] In the models of long term unemployment, the extremely low proportion of men of Indian origin who have been long term unemployed creates an infinite coefficient. However, the difference from the other ethnic groups justified retaining it as a separated category.

Table 5.4 Estimated probabilities of unemployment by age 26, men

Probabilities based on Model 2 in Table 5.3

	0-3 months unemployment	4-11 months unemployment	12+ months unemployment
Family Structure At 16			
Both natural parents	0.66	0.24	0.10
Lone mother	0.64	0.21	0.15
Mother and stepfather	0.62	0.24	0.14
Lone father/Father and stepmother	0.78	0.08	0.14
Other guardians/ in statutory or foster care	0.77	0.20	0.03
Highest academic or vocational qualification			
None	0.33	0.33	0.34
CSE Grade 2-5	0.62	0.24	0.14
O Level (or equivalent)	0.57	0.29	0.14
A Level	0.69	0.22	0.09
Higher	0.78	0.17	0.05
Degree+	0.79	0.16	0.05
Year left education			
By 1987	0.74	0.17	0.09
1988-1990	0.68	0.22	0.10
1991 or later	0.46	0.40	0.14
Not known	0.59	0.26	0.15
Region at 16			
North	0.52	0.28	0.20
Yorkshire and Humberside	0.71	0.21	0.08
North West	0.62	0.25	0.13
East Midlands	0.65	0.25	0.10
West Midlands	0.67	0.22	0.11
East Anglia	0.76	0.19	0.05
South West	0.77	0.22	0.11
Wales	0.73	0.19	0.08
South East (inc London)	0.72	0.20	0.08
Scotland	0.70	0.22	0.08
Ethnic Group			
African-Caribbean	0.23	0.39	0.38
Indian	0.95	0.05	0.00
Other Asian	0.31	0.27	0.42
White European/other	0.63	0.23	0.14
Social Class of family in 1986			
I/II	0.74	0.19	0.07
IIINM	0.67	0.24	0.09
IIIM	0.66	0.22	0.12
IV/V	0.59	0.28	0.13
Receipt of means test social security benefits in year before 1986 survey			
No/Not known	0.70	0.21	0.09
Yes	0.48	0.35	0.17

Table 5.5 Parameter estimates from multinomial logistic models of experience of unemployment by type of family transitions, men

Reference categories are underlined	Model 1 4-11 months		Model 2 4-11 months		Model 1 12+ months		Model 2 12+ months	
	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$
Type of transitions								
Always natural parents	0	-	0	-	0	-	0	-
Natural parents-lone mother	0.08	0.26	-0.46	0.29	0.92***	0.25	0.45	0.28
Natural parents-mother/stepfather, no stepsiblings	0.05	0.28	0.01	0.28	0.14	0.30	0.11	0.29
Natural parents – mother/stepfather – lived with stepsiblings	-0.09	0.48	-0.18	0.51	0.78	0.48	0.67	0.54
Natural parents – lone father or father/stepmother	-0.71	0.51	-0.91*	0.51	0.92**	0.38	0.71*	0.36
Lone mother at birth –all sequences	0.67**	0.33	0.48	0.33	1.48***	0.36	1.33***	0.35
Either parent died	-0.42	0.38	-0.63	0.41	0.41	0.40	0.22	0.44
Any time in statutory/foster care	0.46	0.45	0.19	0.48	-0.61	0.71	-0.84	0.71
Other sequences	-0.16	0.41	-0.48	0.38	-0.26	0.50	-0.48	0.50

Number of persons: unweighted 2499, weighted 8544
Total = men with employment information at 26 and parental interview at 16

* denotes significance at the 10% level
** denotes significance at the 5% level
*** denotes significance at the 1% level

Table 5.6 Parameter estimates from multinomial logistic models of experience of unemployment by number and timing of family transitions, men

Reference categories are underlined	Model 1 4-11 months		Model 2 4-11 months		Model 1 12+ months		Model 2 12+ months	
	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$
Number and timing of transitions								
No transitions	0	-	0	-	0	-	0	-
1 transition, complete by age 6	0.16	0.32	-0.04	0.33	1.02***	0.34	0.85**	0.33
2+transitions, complete by age 6	0.45	0.37	0.40	0.38	0.45	0.44	0.41	0.46
1 transition, complete by age 11	-0.25	0.32	-0.62*	0.35	0.94***	0.26	0.57	0.29
2+ transitions, complete by age 11	-0.08	0.27	-0.23	0.26	0.00	0.33	-0.13	0.32
1 transition, age 11+	0.11	0.27	-0.19	0.29	0.75**	0.28	0.46	0.31
2+ transitions, last transition age 11+	-0.50	0.35	-0.69*	0.37	0.10	0.36	-0.10	0.35

Number of persons: unweighted 2499, weighted 8544
Total = men with employment information at 26 and parental interview at 16

* denotes significance at the 10% level
** denotes significance at the 5% level
*** denotes significance at the 1% level

Table 5.7 Parameter estimates from multinomial logistic models of experience of unemployment by type and timing of family transitions, men

Reference categories are underlined	Model 1 4-11 months $\hat{\beta}$	Model 1 4-11 months $se(\hat{\beta})$	Model 2 4-11 months $\hat{\beta}$	Model 2 4-11 months $se(\hat{\beta})$	Model 1 12+ months $\hat{\beta}$	Model 1 12+ months $se(\hat{\beta})$	Model 2 12+ months $\hat{\beta}$	Model 2 12+ months $se(\hat{\beta})$
Timing and type of transition (selected sequences)								
Always natural parents	0	-	0	-	0	-	0	-
Transitions complete by age 6								
Natural parents-lone mother	0.18	0.60	-0.31	0.60	1.38***	0.55	0.97*	0.52
Natural parents-lone mother-mother/stepfather	0.22	0.48	0.06	0.50	0.08	0.55	-0.07	0.56
Transitions complete by age 11								
Natural parents-lone mother	-0.09	0.41	-0.63	0.46	1.02***	0.33	0.56	0.35
Natural parents-lone mother-mother/stepfather	-0.07	0.37	-0.10	0.37	0.53	0.37	0.48	0.37
Transitions complete age 11+								
Natural parents-lone mother	0.13	0.36	-0.42	0.39	0.52	0.41	-0.01	0.44
Natural parents-lone mother-mother/stepfather	-0.05	0.42	-0.03	0.42	0.16	0.42	0.18	0.41

Number of persons: unweighted 2499, weighted 8544
Total = men with employment information at 26 and parental interview at 16

* denotes significance at the 10% level
** denotes significance at the 5% level
*** denotes significance at the 1% level

Table 5.8 Parameter estimates from multinomial logistic models of experience of unemployment by family structure at 16, women

Reference categories are underlined	Model 1 4-11 months		Model 2 4-11 months		Model 1 12+ months		Model 2 12+ months	
	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$
Family Structure At 16								
Both natural parents								
Lone mother	0	-	0	-	0	-	0	-
Mother and stepfather	-0.07	0.18	-0.18	0.20	0.53**	0.21	0.35	0.24
Lone father/Father and	0.31	0.19	0.28	0.23	0.66***	0.21	0.89***	0.23
stepmother	0.32	0.32	0.29	0.34	0.19	0.42	0.14	0.42
Other guardians/ in statutory or foster care	0.55	0.55	0.53	0.55	0.92	0.62	0.88	0.66
Highest academic or vocational qualification								
None	0	-	0	-	0	-	0	-
CSE Grade 2-5	-0.45	0.28	-0.42	0.28	-1.08***	0.27	-1.01***	0.28
O Level (or equivalent)	-0.66***	0.25	-0.63**	0.25	-1.38***	0.23	-1.33***	0.23
A Level	-1.12***	0.28	-1.07***	0.28	-2.37***	0.30	-2.28***	0.29
Higher	-1.16***	0.30	-1.09***	0.30	-3.53***	0.45	-3.42***	0.40
Degree+	-1.46***	0.35	-1.39***	0.35	-3.24***	0.47	-3.16***	0.47
Year left education								
By 1987	0	-	0	-	0	-	0	-
1988-1990	0.14	0.16	0.14	0.16	-0.01	0.19	0.02	0.22
1991 or later	1.01***	0.25	1.01***	0.25	0.85**	0.40	0.88**	0.39
Not known	0.66***	0.20	0.62***	0.20	1.21***	0.21	1.18**	0.26
Region at 16								
North	0	-	0	-	0	-	0	-
Yorkshire and Humberside	-0.52*	0.28	-0.53**	0.27	-0.61*	0.35	-0.61*	0.36
North West	-0.45*	0.24	-0.49*	0.24	-0.06	0.29	0.04	0.29
East Midlands	-0.48*	0.25	-0.51**	0.25	-0.27	0.32	-0.26	0.32
West Midlands	-0.26	0.24	-0.28	0.24	-0.02	0.31	-0.03	0.31
East Anglia	-0.34*	0.29	-0.33	0.30	-0.12	0.36	0.11	0.37
South West	-0.56**	0.24	-0.57**	0.24	-0.69**	0.33	-0.71**	0.33
Wales	-0.35	0.27	-0.34	0.27	-0.60	0.38	-0.59	0.38
South East (inc London)	-0.67***	0.21	-0.67***	0.21	-0.82***	0.29	-0.82***	0.29
Scotland	-0.43*	0.25	-0.42*	0.25	-0.12	0.32	0.12	0.32
Ethnic Group								
African-Caribbean	1.36***	0.45	1.31***	0.43	1.73***	0.51	1.60***	0.55
Indian	0.84**	0.42	0.83*	0.43	0.81	0.55	0.78	0.55
Other Asian	1.29*	0.70	1.24*	0.71	2.91***	0.56	2.82***	0.57
White European/other	0	-	0	-	0	-	0	-
Experience of financial hardship in year before 1986 survey								
No/Not known			0	-			0	-
Yes			0.47***	0.17			0.65***	0.20
Interaction								
Mother and stepfather family*financial hardship			-0.10	- 0.48			-1.76***	0.59
Constant	-0.56**	0.29	-0.64**	0.29	-0.36	0.32	-0.49*	0.32

Number of persons: unweighted 3171, weighted 7898
Total = women with employment information at 26 and parental interview at 16

* denotes significance at the 10% level
** denotes significance at the 5% level
*** denotes significance at the 1% level

Table 5.9 Estimated probabilities of unemployment by age 26, women

Probabilities are calculated from Model 2 in Table 5.8.

	0-3 months unemployment	4-11 months unemployment	12+ months unemployment
Family Structure At 16			
Both natural parents	0.77	0.17	0.07
Lone mother	0.75	0.15	0.10
Mother and stepfather	0.62	0.22	0.16
Lone father/Father and stepmother	0.70	0.22	0.08
Other guardians/ in statutory or foster care	0.68	0.26	0.16
Highest academic or vocational qualification			
None	0.29	0.33	0.38
CSE Grade 2-5	0.58	0.24	0.18
O Level (or equivalent)	0.65	0.21	0.14
A Level	0.80	0.14	0.06
Higher	0.84	0.14	0.02
Degree+	0.86	0.11	0.03
Year left education			
By 1987	0.79	0.14	0.07
1988-1990	0.77	0.16	0.07
1991 or later	0.61	0.31	0.08
Not known	0.57	0.23	0.20
Region at 16			
North	0.63	0.26	0.11
Yorkshire and Humberside	0.77	0.17	0.06
North West	0.70	0.18	0.12
East Midlands	0.74	0.17	0.09
West Midlands	0.68	0.21	0.11
East Anglia	0.68	0.20	0.12
South West	0.76	0.16	0.06
Wales	0.73	0.20	0.07
South East (inc London)	0.80	0.15	0.05
Scotland	0.69	0.18	0.13
Ethnic Group			
African-Caribbean	0.18	0.43	0.29
Indian	0.53	0.32	0.15
Other Asian	0.02	0.41	0.57
White European/other	0.75	0.17	0.08
Experience of financial hardship in year before 1986 survey			
No/Not known	0.75	0.17	0.08
Yes	0.63	0.24	0.13

Note: The interaction between living in a stepfamily at 16 and experiencing financial hardship has been incorporated into the baseline logit.

Table 5.10 Parameter estimates from multinomial logistic models of experience of unemployment by type of family transitions, women

Reference categories are underlined	Model 1 4-11 months		Model 2 4-11 months		Model 1 12+ months		Model 2 12+ months	
	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$
Type of transitions								
Always natural parents	0	-	0	-	0	-	0	-
Natural parents-lone mother	0.09	0.22	-0.22	0.24	0.49*	0.26	0.21	0.27
Natural parents-mother/stepfather, no stepsiblings	-0.10	0.27	-0.12	0.30	0.65**	0.27	0.92***	0.28
Natural parents – mother/stepfather – lived with stepsiblings	0.70*	0.41	0.70	0.41	0.31	0.51	0.51	0.50
Natural parents – lone father or father/stepmother	0.51	0.38	0.49	0.39	0.13	0.58	0.12	0.57
Lone mother at birth –all sequences	0.33	0.31	0.25	0.36	1.15***	0.29	1.49***	0.30
Either parent died	-0.12	0.26	-0.16	0.26	0.60*	0.31	0.50	0.32
Any time in statutory/foster care	0.65	0.44	0.57	0.45	0.41	0.54	0.20	0.58
Other sequences	-0.10	0.41	-0.20	0.41	0.19	0.45	0.04	0.47
Experience of financial hardship in year before 1986 survey								
No/Not known			0	-			0	-
Yes			0.47**	0.18			0.78***	0.20
Interaction								
*Mother and stepfather family*financial hardship*			0.16	0.62			-2.27***	0.84
*Lone mother at birth*financial hardship*			-0.01	0.69			-2.19**	0.89

Number of persons: unweighted 3171, weighted 7898
Total = women with employment information at 26 and parental interview at 16

* denotes significance at the 10% level
** denotes significance at the 5% level
*** denotes significance at the 1% level

Table 5.11 Parameter estimates from multinomial logistic models of experience of unemployment by number and timing of family transitions, women

Reference categories are underlined	Model 1 4-11 months		Model 2 4-11 months		Model 1 12+ months		Model 2 12+ months	
	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$
Number and timing of transitions								
No transitions	0	-	0	-	0	-	0	-
1 transition, complete by age 6	0.08	0.25	0.03	0.26	0.66**	0.26	0.60**	0.26
2+transitions, complete by age 6	-0.50	0.53	-0.58	0.48	0.39	0.35	0.29	0.38
1 transition, complete by age 11	0.02	0.31	-0.04	0.31	0.52	0.34	0.44	0.34
2+ transitions, complete by age 11	0.15	0.24	0.09	0.25	0.10	0.32	0.04	0.33
1 transition, age 11+	0.28	0.22	0.20	0.22	0.77***	0.26	0.68**	0.26
2+ transitions, last transition age 11+	0.12	0.30	0.08	0.30	0.66**	0.32	0.63*	0.32

Number of persons: unweighted 3171, weighted 7898
Total = women with employment information at 26 and parental interview at 16

* denotes significance at the 10% level
** denotes significance at the 5% level
*** denotes significance at the 1% level

Table 5.12 Parameter estimates from multinomial logistic models of experience of unemployment by type and timing of family transitions, women

Reference categories are underlined	Model 1 4-11 months		Model 2 4-11 months		Model 1 12+ months		Model 2 12+ months	
	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$
Timing and type of transition (selected sequences)								
Always natural parents	0	-	0	-	0	-	0	-
Transitions complete by age 6	-0.66	0.60	-0.79	0.61	0.39	0.54	0.23	0.54
Natural parents-lone mother	0.22	0.44	0.23	0.43	0.51	0.44	0.79	0.46
Natural parents-lone mother-mother/stepfather								
Transitions complete by age 11	0.34	0.37	0.20	0.37	0.67	0.44	0.45	0.44
Natural parents-lone mother	0.08	0.34	0.08	0.35	0.58	0.37	0.80**	0.37
Natural parents-lone mother-mother/stepfather								
Transitions complete age 11+	-0.16	0.31	-0.32	0.32	0.44	0.35	0.22	0.37
Natural parents-lone mother	0.09	0.39	0.10	0.42	0.68*	0.40	0.85**	0.41
Natural parents-lone mother-mother/stepfather								
Experience of financial hardship in year before 1986 survey								
No/Not known			0	-			0	-
Yes			0.48***	0.17			0.59***	0.20
Interaction								
*Natural parents-lone mother-stepfather (any age)*financial hardship*			-0.26	0.60			-2.03**	0.84

Number of persons: unweighted 3171, weighted 7898
Total = women with employment information at 26 and parental interview at 16

* denotes significance at the 10% level
** denotes significance at the 5% level
*** denotes significance at the 1% level

Figure 5.9 Predicted probability of unemployment by family structure at 16, men

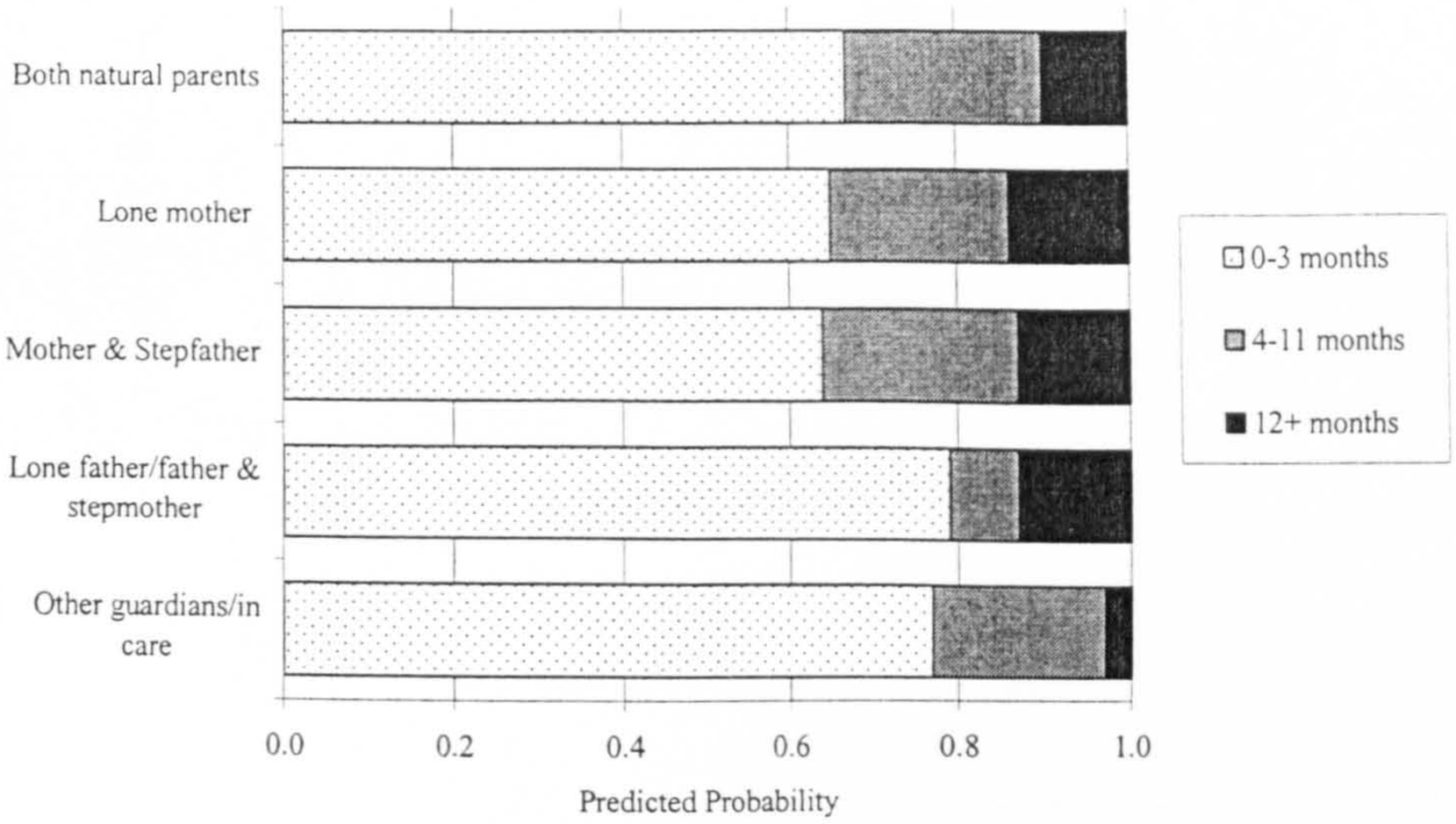


Figure 5.10 Predicted Probability of unemployment by type of family transition, men

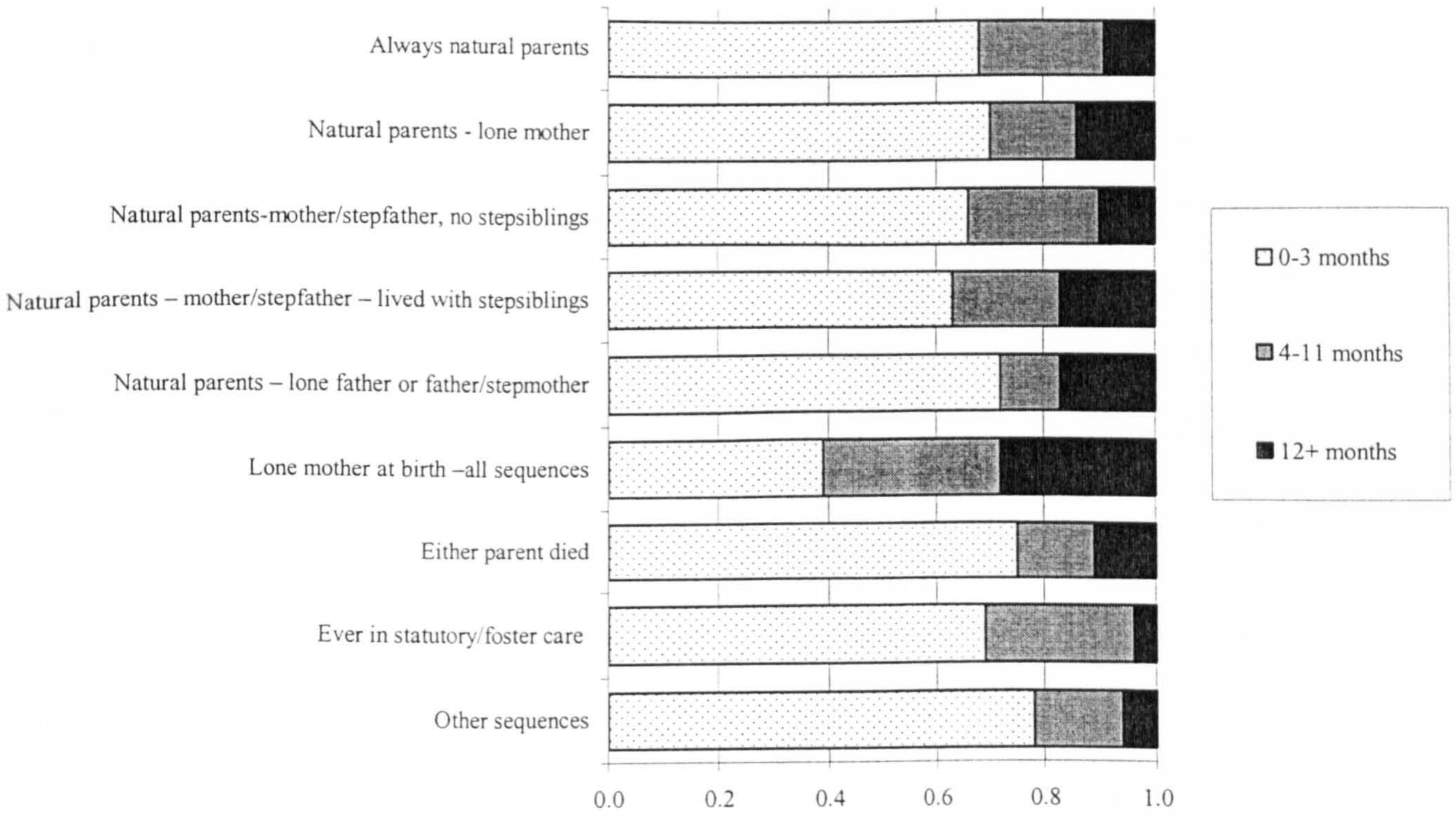


Figure 5.11 Predicted probability of unemployment by number and timing of family transitions, men

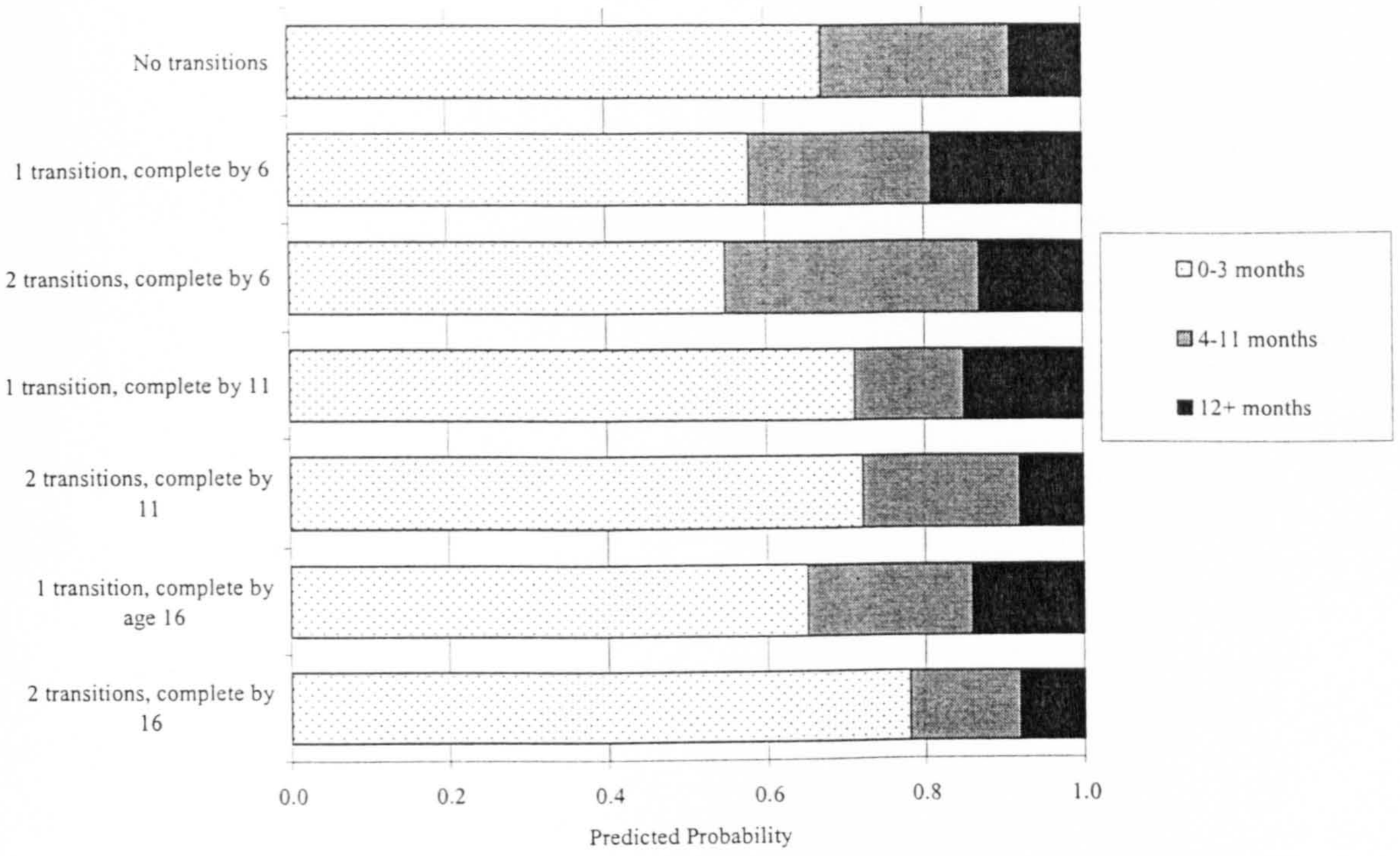


Figure 5.12 Predicted probability of unemployment by timing and type of transition, men

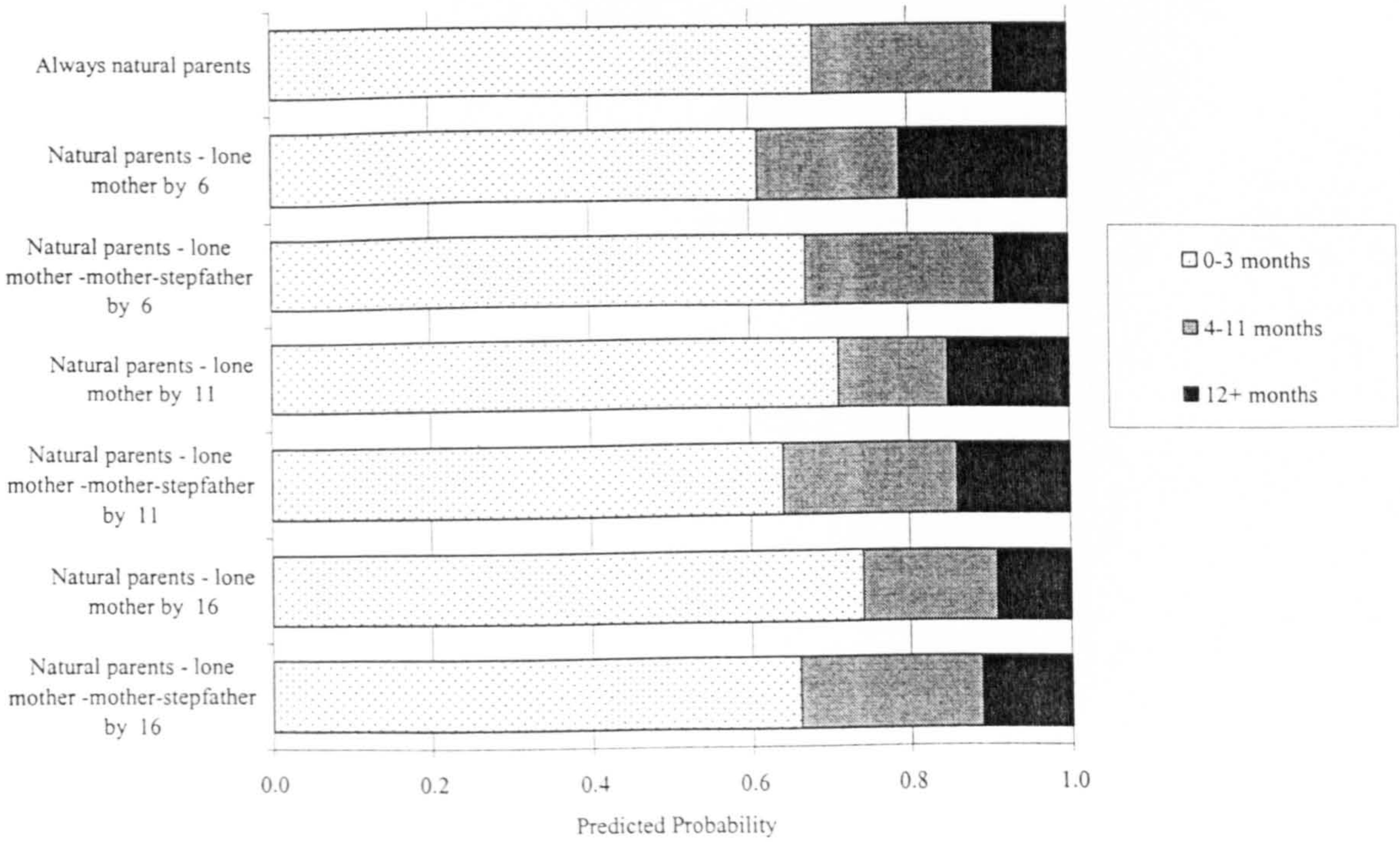
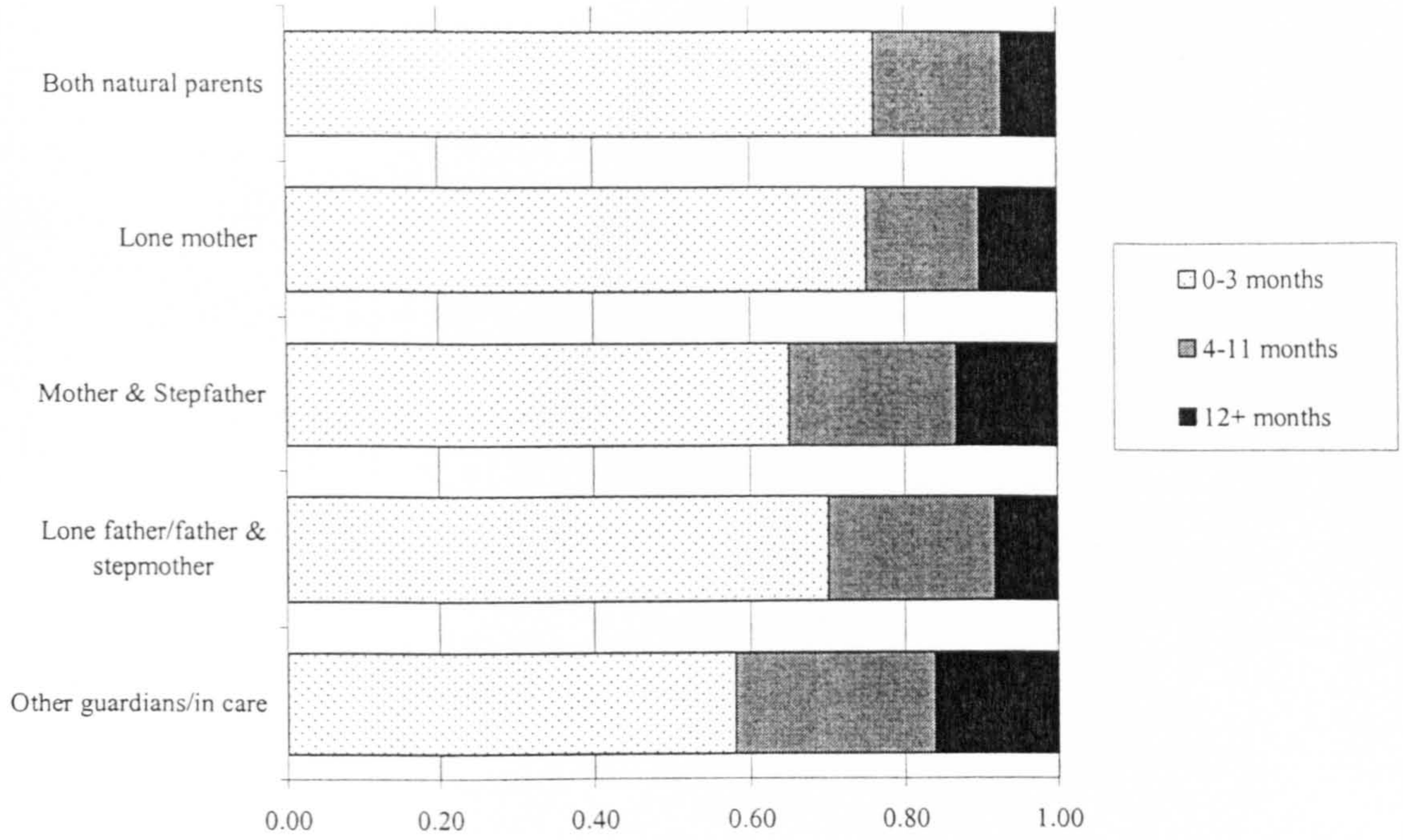
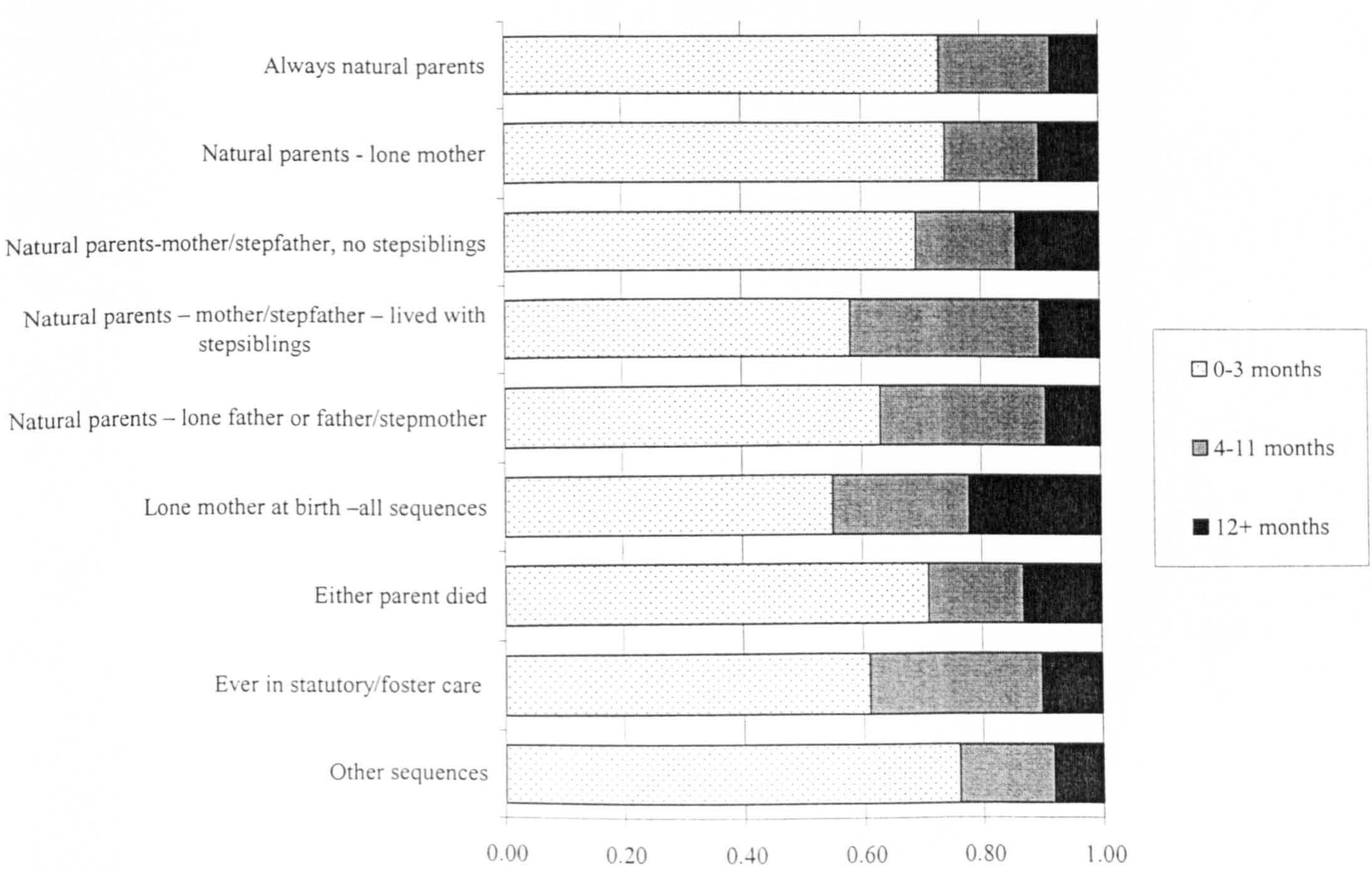


Figure 5.13 Predicted probability of unemployment by family structure at 16, women



Note: The interaction between living in a stepfamily at 16 and experiencing financial hardship has been incorporated into the baseline logit.

Figure 5.14 Predicted probability of unemployment by type of family transition, women



Note: The interaction between living in a stepfamily at 16 and experiencing financial hardship has been incorporated into the baseline logit.

Figure 5.15 Predicted probability of unemployment by number and timing of transitions, women

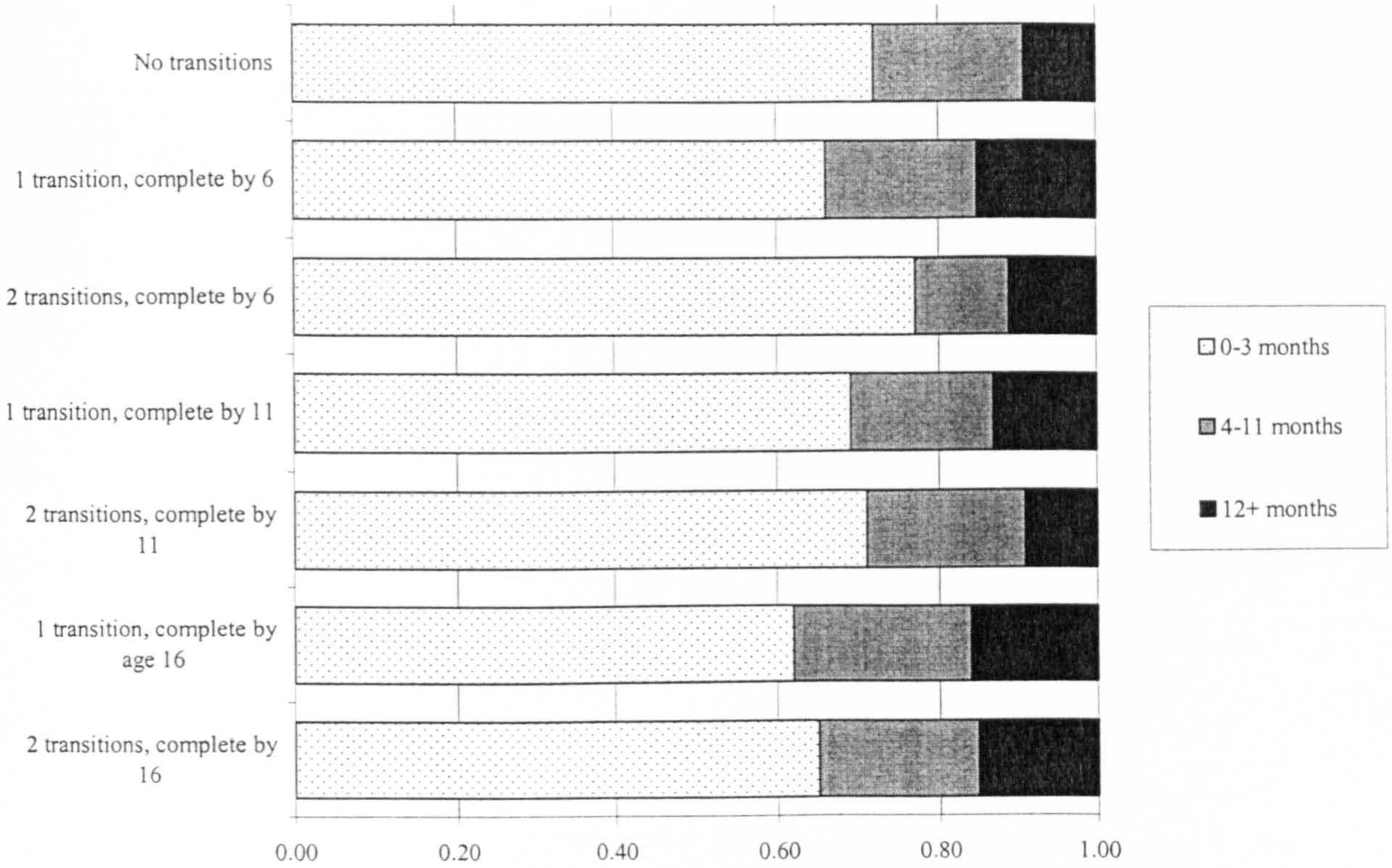
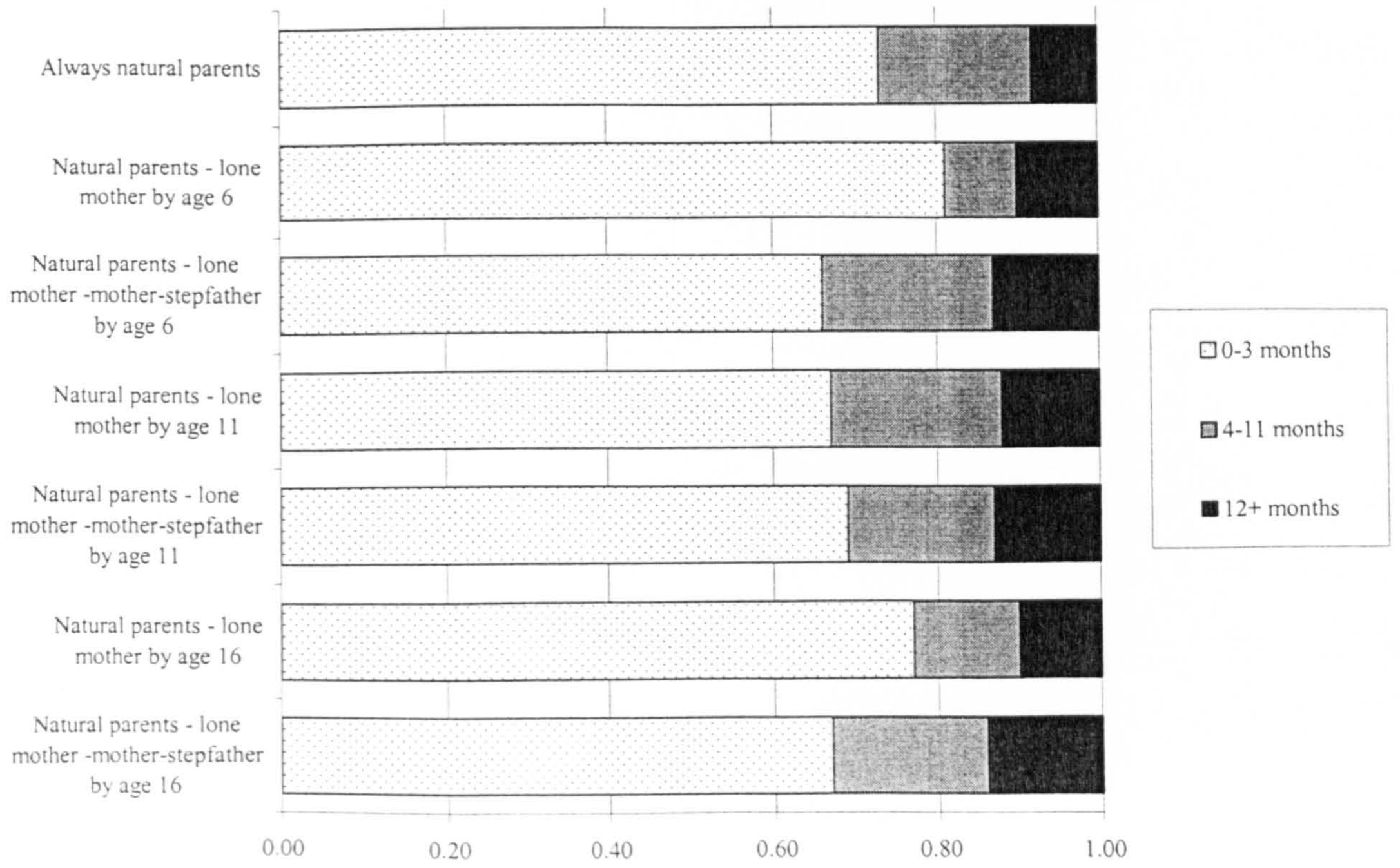


Figure 5.16 Predicted probability of unemployment by timing and type of transitions, women



Note: The interaction between living in a stepfamily at 16 and experiencing financial hardship has been incorporated into the baseline logit.

5.4 Family formation and unemployment

Men with dependent children at age 26 in the BCS70 study were more likely to be employed (Joshi and Paci 1997; Payne et al. 1996) . Among women, the opposite was true, possibly because they were likely to have spent time out of the labour market (Payne et al. 1996). Where family disruption was found to be a precursor of unemployment it is possible that early family formation could have been an intervening factor.

Model 2, presented in Tables 5.3 to 5.12, was refitted adding the number of children present in the cohort member's household at 26[19]. Although we know the age that women in the cohort became mothers, comparable data is missing for over one quarter of the men who had become fathers because only the ages of children in the household were collected. This additional analysis examined whether becoming a parent (or step-parent) is associated with either medium or long term unemployment and also, whether the parameter estimates for the association between family structure and unemployment change after adding this factor into the model.

Men who had three or more children in the household at 26 were found to be more likely to have experienced four to 11 months unemployment than those who were not residential parents, although the estimate was only significant at the 10% level. After adding this covariate, the coefficients for the different types of family structure or sequence were unchanged. Regarding long term unemployment, once more only men with three or more children had a higher probability of unemployment than those without children and again, there was no change in the size of the coefficients for the association between childhood family structure and unemployment. As discussed earlier, it is difficult to untangle a causal relationship between a man's labour market participation and family formation patterns. Excluding multiple births, we can suggest that men with three or more children probably were young fathers, but we do not know the timing of the births in relation to their periods of unemployment. However, this investigation indicated that becoming a father was not an intervening factor in the association between childhood family disruption and later unemployment.

The picture was different for women. Becoming a mother was highly associated with reporting periods of unemployment and the probability of long-term unemployment increased with the number of children in the family. This is an interesting result in the light of our knowledge

[19] To avoid duplication, the parameter estimates for these revised models are not presented here.

about women's participation in the labour market after childbearing (Kiernan and Hobcraft 1997) and raises questions about the interpretation of the self-completion questionnaire. It could be that when completing the survey, women who had spent time out of the labour market caring for children were defining these periods as unemployment. It will be informative to re-examine their work histories using data collected in the face to face interviews at age 30.

In the original models of unemployment, women who had lived in stepfather families and women born to a lone mother had higher probabilities of long term unemployment compared to those who grew up with their natural parents. After controlling for family size the two groups still had higher predicted probabilities of long term unemployment, but the coefficients were smaller. These young women were more likely to become unemployed, but early family formation could be an intervening factor between childhood family disruption and that unemployment. However, without the dates of any periods of unemployment or exact date of the birth of any children we cannot say which factor is a precursor of the other. Given its importance, an alternative approach could have added family size to the results presented for women in Tables 5.8 to 5.12, but that would equally require the assumption that early childbearing was the precursor of unemployment rather than vice versa. It will be easier to address these issues with the age 30 data.

5.5 Discussion

In Chapter 4, boys who had lived in stepfather families with stepsiblings and girls who had lived in most types of post transition families had higher odds of low educational attainment than young people who had grown up with both natural parents. Furthermore, for girls, transitions in adolescence were associated with higher odds than transitions at primary school age or younger. This chapter took the results of Chapter 4 as its starting point and considered whether childhood family disruption continues to impact on the chances of unemployment in young adulthood after taking into account the educational attainment of the young person and circumstances of the family at age 16. The results are reviewed in the light of the key processes by which family disruption may affect a young person's life course that were reviewed in Chapter 1.

Although some types of family disruption were found to be precursors of unemployment, not surprisingly the educational attainment, region and ethnicity of the individual were much stronger predictors. The probability of long term unemployment among men ranged from 0.05 for men with a degree to 0.34 for those with no qualifications, whilst it only ranged from 0.04 among those who grew up with their natural parents to 0.12 among men born to a lone mother. Analysing the labour market experience of the BCS70 has revealed how their risk of unemployment was sensitive not only to their qualifications, but also the timing of their entry into the labour market. Although those with degrees would have clear long term advantages over those with lower or no qualifications, this particular cohort of graduates were trying to get a job in the recession of the early 1990s.

Financial Circumstances

Evidence suggested that family disruption might have an indirect effect on the probability of unemployment through the limits it can place on the transmission of human capital. Of the covariates tested from the age 16 stage of the survey, those reflecting socio-economic circumstances of the family were found to be more powerful predictors of unemployment than covariates reflecting the teenager's attitudes and relationships in the family. It appears that the limited resources available in some families to either provide financial support for their adult children, or help them find work through contacts in the labour market, is important.

Taking these circumstances into account greatly reduced the estimated impact of living in a lone mother family after parental separation on the chance of unemployment and, to a lesser degree, most of the other transition types among both men and women. The socio-economic

circumstances of the post-transition family did appear to have continuing effects into young adulthood.

Social Capital and Self Esteem

Issues of the transmission of social capital and self esteem could be used to explain the particularly high predicted probability of unemployment among men and women who were born to a lone mother as well as men who experienced very early family transitions. Those experiencing early transitions are most likely to have lost touch with their non-resident parent and boys in particular may be disadvantaged if they lack a male role model and contact with the labour market (McLanahan 1985).

Change, stress and conflict

In the US, Biblarz and Raferty (1999) found that children who experienced the further transition to a stepfamily fared worse in the labour market that those who remained in a stable lone mother family. In this analysis, overall rates of unemployment lasting longer than three months were not markedly different between men who had lived in stepfather families and those who grew up with their natural parents. However, women had slightly higher predicted probabilities of long term unemployment if they had lived in a stepfather family.

Compared to educational outcomes, the possible impact of living with stepsiblings in childhood on unemployment in young adulthood was less clear. Total levels of unemployment among men and women who had lived with stepsiblings were higher but this was accounted for by a higher level of long term unemployment for men and medium term unemployment for women. Additionally, boys in their father's custody after parental separation had a similar predicted probability of long-term unemployment to those living with stepsiblings. Resources could again be stretched both between the stepfamily and other households but also because stepmother families were quite likely to contain stepsiblings.

The picture for women was clouded by the association between family disruption and early childbearing, which will be explored in the next chapter. Women who grew up in stepfather families with step-siblings or who were born to a lone mother had higher predicted probabilities of unemployment but controlling for the number of children in the household at 26 attenuated these differences. The patterns of unemployment reported by women indicated that there was possibly quite a range of interpretations of the meaning of unemployment that places limits on the scope for using the data. However, the same analysis can be repeated using the more detailed age 30.

In all, childhood family disruption was rather weakly associated with the probability of unemployment once the young person's educational attainment and post transition circumstances of the family were taken into account. However, patterns were different from those found for educational outcomes. Men living with lone mothers at 16 were not found to be at risk of lower educational attainment but they were possibly disadvantaged in their contact with the labour market in young adulthood, particularly if their parents had separated at an early age. Women in stepfather families and men and women who were born to a lone mother were more likely to be unemployed but among women at least, the interaction with financial hardship indicated that much of this was related to the resources available to the young person. In contrast to the educational outcomes, the timing of the transition to a stepfather family did not seem to be so important.

Chapter 6 Childhood family disruption and young motherhood

6.1 Introduction

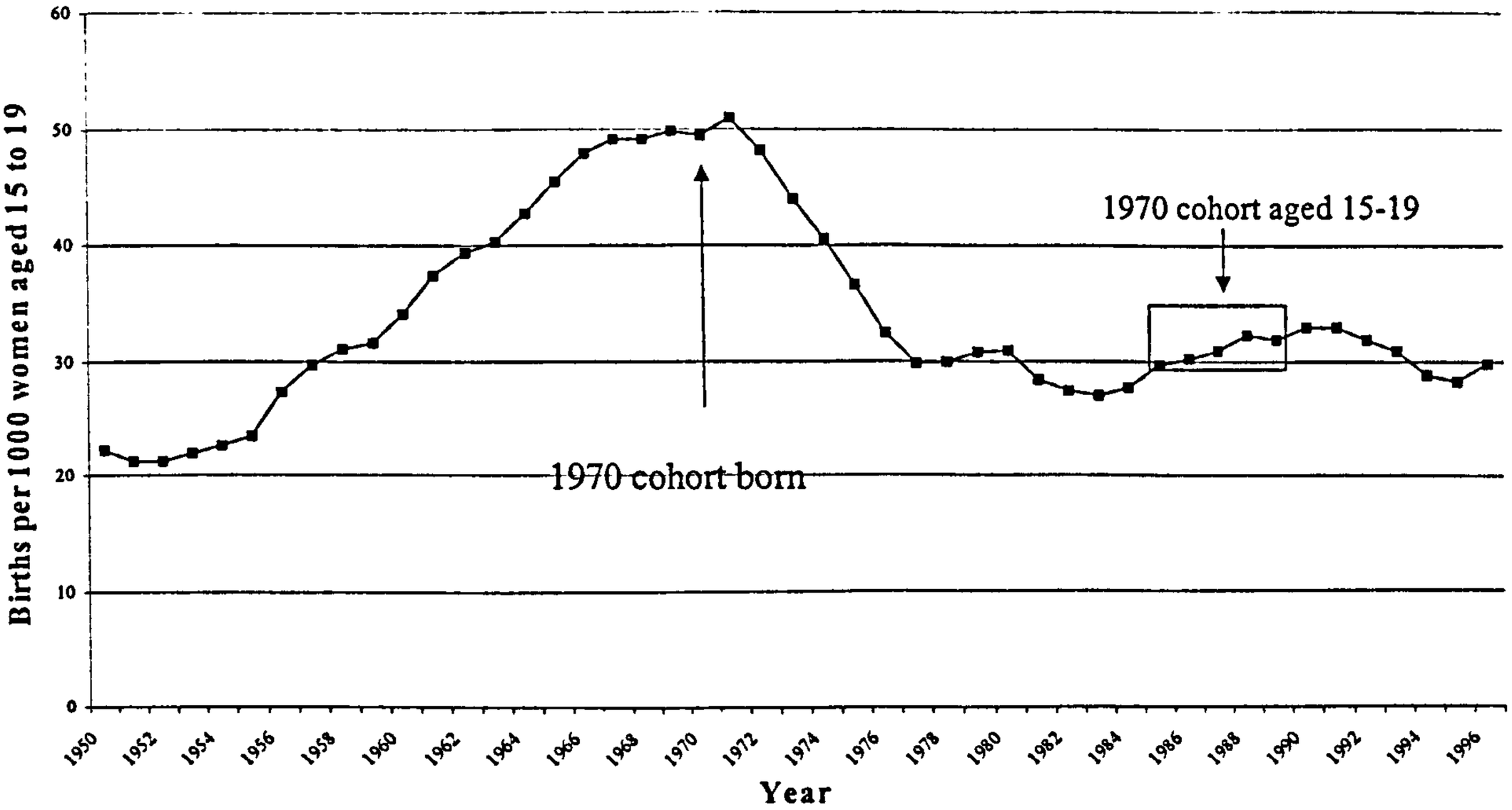
This chapter explores the association between family disruption and young motherhood, again looking at the pertinence of either the type or the timing of transitions. Women who experienced childhood family disruption have been found to have a higher likelihood of an early birth (US: McLanahan and Bumpass 1988; Michael and Tuma 1985; Thornton 1991); (UK: Kiernan 1992; Kiernan and Hobcraft 1997; Manlove 1997), although the estimated probabilities vary according to the research design, the methodological differences in the measurement of family transitions and the number of pre-existing family characteristics and circumstances that are taken into account (US: McLanahan and Teitler 1999); (UK: Ní Bhrolcháin et al. 2000). Even then, data such as the BCS70 are limited in the extent to which they allow us to unravel whether it is truly family disruption that is a precursor of young motherhood rather than associated confounding factors that are unobserved in the study (UK: Ní Bhrolcháin et al. 2000; Rutter 1994). This chapter addresses two related questions. First, does the association between family disruption and early motherhood persist among this cohort after controlling for characteristics and circumstances that predate the disruption and how does that association change when an increasing number of factors from early and late childhood are added to the analysis? Secondly, does that association vary according to the number, type and timing of transitions?

6.2 Birth rates among women in the 1970 Birth Cohort

6.2.1 Trends in fertility

The 1970 cohort was born at a time when young motherhood was a relatively common occurrence. Teenage childbearing was near its peak in 20th Century Britain at 49.4 births per 1000 women aged 15 to 19 (Figure 6.1) and the mean maternal age at first birth was 23.8 (Office for National Statistics 1998). The 1967 Abortion Act had legalised abortion in Britain with effect from 1968, but teenage birth rates only began to fall in the early 1970s. Among the mothers of the BCS70, one in four began childbearing as a teenager and nearly two thirds had become mothers before their 24th birthday.

Figure 6.1 Births to women aged 15 to 19, England and Wales, 1950 to 1996



Source: Office for National Statistics (1998) Table 10.1

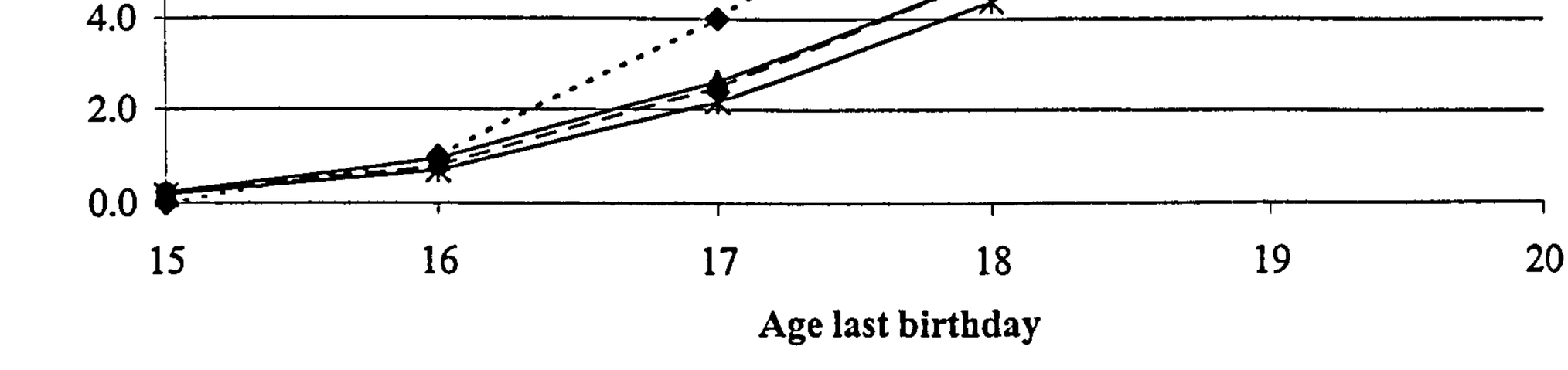
By the late 1980s, a teenage birth was much more unusual than it had been in 1970, although it was more likely to be outside marriage. The teenage birth rate had fallen to between 30 and 32 births per 1000 women aged 15 to 19 and the mean age at first birth was just over 25 (Office for National Statistics 1998). Nationally, 13% of women born in 1970 in England and Wales became teenage mothers. Women were also more likely to continue in higher education than in previous decades with 24% of the women in the BCS70 gaining degrees or other higher qualifications (Bynner and Parsons 1997).[20] Therefore, a birth before a woman's 21st birthday was chosen as indicative of young motherhood among this cohort, both because of its distance from the mean age of childbearing and potential disruption to a woman's education.

6.2.2 Birth rates among women in the cohort

Figure 6.2 shows the cumulative percentage of women in the survey at age 26 who had become mothers by each age up to exact age 21. As in previous chapters, the unweighted percentage for all women in the study at age 26 is compared to the weighted and unweighted percentages for women who were also in the survey at 16. The levels are plotted against national figures for women born in England and Wales in 1970. The biases in favour of those from more advantaged backgrounds who remain in the study are reflected in the lower birth

rates. The weighting increases the proportion estimated to have become mothers by their 21st birthday from 11% to just over 12% but still falls short of the national figure of 17%.

Figure 6.2 Percentage of women who have had a first birth by age 21, BCS70 and England and Wales (women born in 1970)



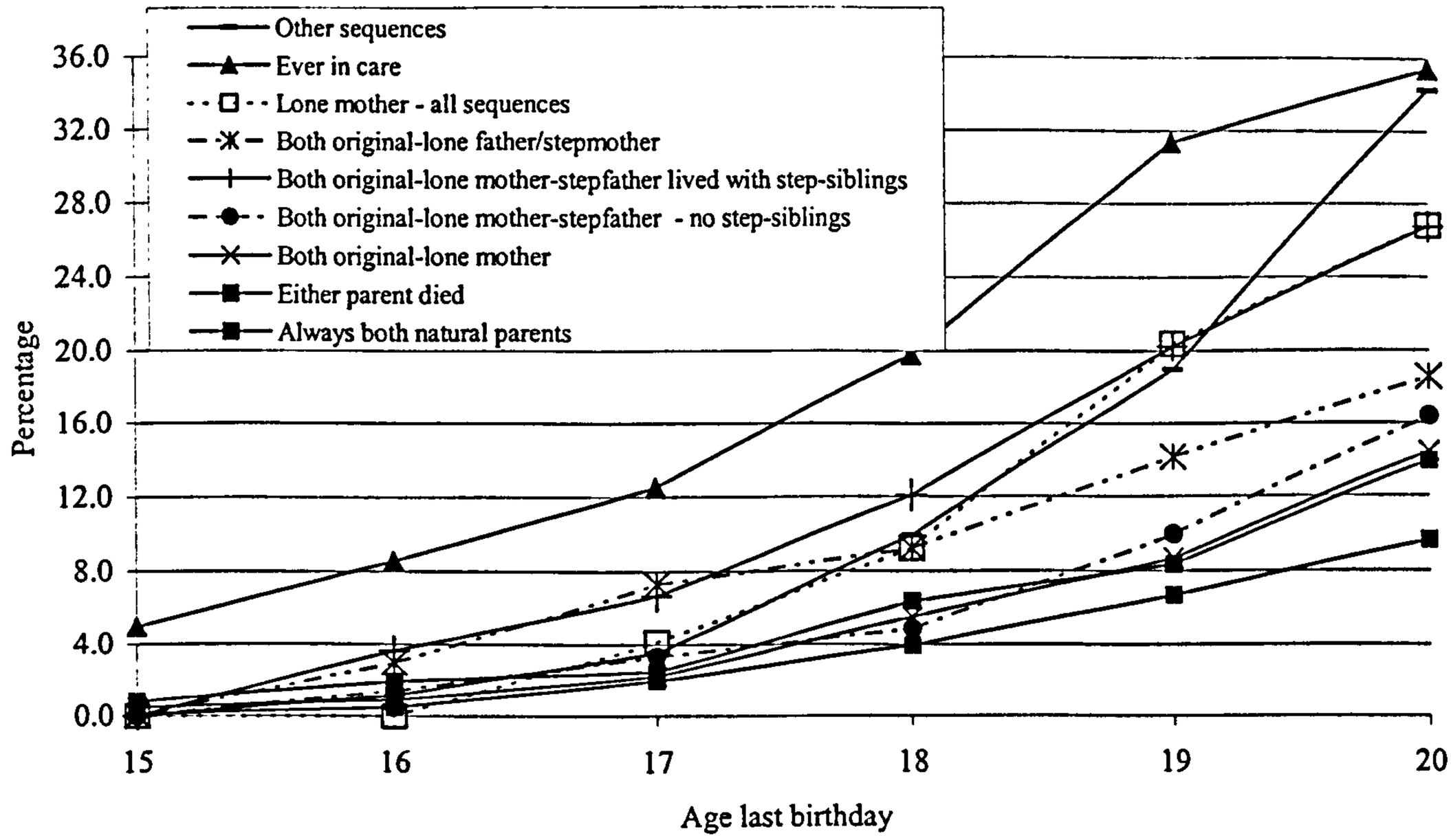
Source: England and Wales, Office for National Statistics (1998) Table 10.3

In England and Wales, 38% of women born in 1970 had experienced a first birth by age 26, compared to 33% of women in the cohort who had become mothers by the time they were interviewed shortly after their 26th birthday. The larger weights for those from disadvantaged backgrounds, who may be more likely to become young mothers, have not counteracted the particularly high attrition among women who had an early birth.

Figure 6.3 shows the cumulative percentage of women in the BCS70 who had experienced a first birth according to the main types of family trajectory. Only 9% of women who grew up with two natural parents had become mothers by age 21 compared to over one third of women who had spent any of their childhood in care and over one quarter of those born to a lone mother who lived in a stepfamily with stepsiblings. However, the proportion of women who had become mothers among those experiencing the most common transitions into a lone mother or stepfather family without stepsiblings was much lower (16% and 15% respectively).

[20] The weighted figure for women who took part in both the age 16 and 26 surveys is 23%. See Table 4.2.

Figure 6.3 Percentage of women on the BCS70 who had experienced a first birth by age 21 by sequence of family transitions



This chapter examines the relationship between these childhood family trajectories and young motherhood after taking into account some of the pre-existing characteristics of the family known to be precursors of an early birth. Chapter 3 highlighted how those experiencing family disruption are more likely to have a mother who began childbearing early and to come from disadvantaged backgrounds. Both of these factors are consistently found to be predictors of early childbearing and the analysis will examine the difference in predicted probabilities of a birth at each age up to 21 by type of family trajectory after controlling for these characteristics.

6.3 Evidence of the association between family transitions and young motherhood

This section reviews evidence of the association between family disruption and young motherhood according to some of the suggested processes by which family disruption can impact on a young person's life course, introduced in Chapter 1.

Financial Hardship

Socio-economic disadvantage in childhood is consistently found to be a precursor of young motherhood. Children with parents who had low educational attainment or grow up with financial hardship are most at risk of an early birth (US: Dubow and Luster 1990; Kahn and Anderson 1992; Michael and Tuma 1985); (UK: Coleman and Salt 1992; Kiernan 1997a; Kiernan and Diamond 1983). In all, it has been estimated in the US that roughly half the

increased risk of teenage motherhood among girls in non-intact families can be attributed to the lower financial resources available (McLanahan and Teitler 1999).

The mechanisms by which socio-economic disadvantage translates into early motherhood are multiple. A limited ability to buy goods for the child that might assist in the accumulation of social and educational capital (Becker and Murphy 1986) could affect her educational progress and, in turn, her aspirations for the future. Childhood disadvantage may also reduce the young woman's perceived opportunity costs of young motherhood (Kahn and Anderson 1992; Stevens-Simon 1995), if her expectations of future education and employment opportunities are already low.

Young mothers are more likely to experience financial hardship than older mothers through complex interactions between educational opportunities and employment outcomes (UK: Hobcraft and Kiernan 1999; Social Exclusion Unit 1998). Yet still, girls born to young mothers are more likely to go on to become young mothers themselves after controlling for financial circumstances. As with the other outcomes, the association does not appear to diminish if the young woman moves on to live in a stepfather family (UK: Ní Bhrolcháin et al. 2000). As discussed in earlier chapters, there may be longer term effects of a period in poverty, if it has affected choices of school or neighbourhood. Also, stepfamilies tend to have more children than original families (UK: Haskey 1994); the step-parent may have financial obligations to a previous family; and resources may not be shared equally among members of a stepfamily (Becker and Murphy 1986; Furstenberg Jr 1987).

The first model to use background covariates controls for the mother's age at her first birth, parental education and social class. A family transition may not add to the risk of an early birth over and above these factors. The later models, using more background covariates from early childhood, examine whether financial hardship as a consequence of disruption might affect the opportunities and aspirations of the daughter. If financial hardship is a key predictive factor then we might expect women who had spent longer durations in non-intact families to be at greater risk of an early birth over and above their original socio-economic backgrounds.

Social capital and control

It has been argued that both being born to a young mother and experiencing family disruption can affect the socialisation of children. In the US, both mothers who began a family at a young age and separated mothers have been found to hold more tolerant views of early sexual activity among their children (Thornton and Camburn 1987). Young mothers may transmit more positive messages about early childbearing to their daughters (Anderton et al. 1987; Presser 1978; Thornton 1980), whilst the dating behaviour of separated mothers may influence teenage daughters (Thornton 1991). In the 1990/1 British Sexual Attitudes and Lifestyles Survey, those who experienced parental divorce were more likely to become young parents and were also more likely to report that their parents were 'easy going' when they were teenagers (Kiernan and Hobcraft 1997).

Similarly, the absence of a father figure in childhood has been suggested to influence the cognitive and psychological development of a child (Baydar and Brooks-Gunn 1991) and possibly the development of appropriated sex – typed relationships in later life (Hetherington 1981; Hetherington et al. 1983b). A limitation of this approach is the focus on early life events. Although young children may have strong emotional reactions to family disruption there is little empirical evidence that this reaction persists over time into early sexual activity as a teenager. By contrast, the same level of emotional reaction at a later age may be more likely to be acted out in a range of risk behaviours, including sex. In fact, girls who live with their fathers after separation have been found to have more behavioural and educational difficulties, possibly leading to early sexual activity, than girls who live with their mother (UK: Maccoby and Martin 1983). Although the absence of a female role model may be important, it is very difficult to develop general ideas about what, in the 1970s and 1980s, was a very small and highly selective group.

Additionally, the social control perspective is concerned with the parents' ability to structure and guide the behaviour of children as they become older and more likely to engage in conflict with their parents and anti-social behaviour outside the home. Given the evidence (reviewed in Chapter 1) of the diminished parenting quality in the years surrounding disruption (Amato and Keith 1991), a social control hypothesis would suggest that the family situation when the cohort member is a teenager is particularly important when sexual activity is among a range of available behaviours. Families with lower parental control, as well as lower resources, may be less able to prevent that behaviour.

The social capital and social control evidence suggests that there will be a strong association between a mother and daughter's age at first birth. Secondly, if father absence can affect early role development then living apart from the natural father in early childhood could be associated with the risk of young motherhood. Alternatively, because of the possible impact on parenting practices, young women living in lone mother families as teenagers could be at a higher risk of an early birth.

Conflict and change

This approach would suggest first that the sheer number of transitions is associated with the risk of an early birth because any change is associated with disruption to routine, changes in roles in the family and the potential for conflict. Secondly, girls moving into stepfamilies at older ages may be at higher risk because they may engage in sexual activity as a reaction to conflict surrounding the formation of the new family. Empirically, the sheer number of family changes in childhood has been found to be associated with an elevated risk of a non-marital birth (Wu and Martinson 1993), although not a teenage birth (McLanahan and Sandefur 1994).

Childhood Resilience

Even if some childhood experiences may increase the risk of negative outcomes, we must not forget that over 85% of the cohort had not become mothers by 21 and, even two thirds of women who had ever been in care had not had a birth by this age. Of children born to teenage mothers, those with a positive sense of self-efficacy have been found to be more resilient to problem behaviour outcomes which could include early engagement in sexual activity (Dubow and Luster 1990). In this analysis, it is possible to test whether children who demonstrate higher educational ability and less anti-social behaviour at age five are less likely to go on to become young mothers.

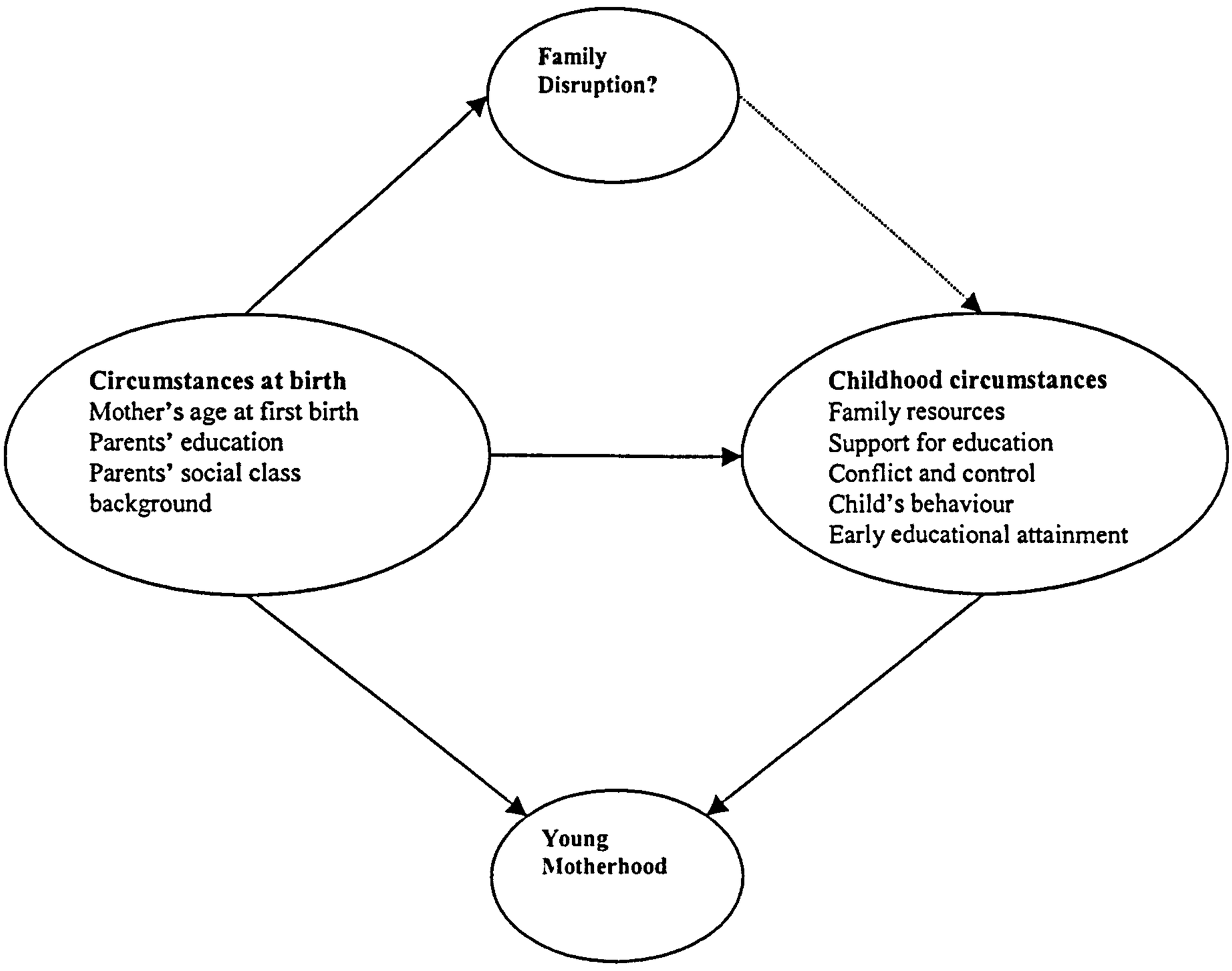
Historical time

There are two reasons to expect the associations between family disruption and young motherhood to be weaker among the BCS70 than among the NCDS. First, childbearing patterns have changed. Women experiencing disruption may still begin childbearing relatively young, but that could be in their early 20s rather than as teenagers. Secondly, the sociological literature, discussed in Chapter 1, implied that as family disruption has become more common, and children have more direct and indirect experience of its occurrence, then its potentially negative impact would diminish. We may not be able to test empirically the exact role of

changing times in the association between childhood family disruption and young motherhood but, we might expect any associations found among the 1958 cohort to be weaker among the BCS70.

Figure 6.4 summarises graphically how family disruption may impact on a young woman's family formation. The mother's age at first birth, parental education and class background have the most direct impact on the chances of young motherhood, but they are also known to be factors associated with an increased risk of family disruption. The other factors, such as resources, support for education, and the child's own behaviour and educational progress which, in themselves, are all associated with the likelihood of an early birth may or may not be affected by the incidence of family disruption. This is represented by the dotted connecting line.

Figure 6.4 Conceptual framework for modelling the association between family disruption and young motherhood



6.4 Methodology

6.4.1 The discrete-time hazards model

In the postal survey at age 26, the ages of any children born to the cohort member were recorded as the age at last birthday. The analysis uses discrete time hazards models to consider the probability of a birth occurring to a woman from age 15 to her 21st birthday whilst allowing for the overall increased probability of having a child in each year[21]. Discrete-time event history analysis was outlined in Chapter 3 (See Section 3.3) and this chapter repeats the same type of model using both fixed and one time varying covariate. The models are restricted to women who took part in the survey at ages 16 and 26 (n=3297) but exclude 41 women who did not report their child's age because they were no longer living in the same household. Ideally, one would consider the inter-related process of the initiation of sexual activity, contraceptive use and termination decisions among young women. Girls in non-intact families have been found to begin sexual activity earlier (US: Newcomer and Udry 1987; Wu et al. 1997); (UK: Kiernan and Hobcraft 1997) with its associated risk of lower contraceptive effectiveness (US: Abma et al. 1998); (UK: Wellings and Field 1996). In turn, there is some evidence that pregnant young women in non-intact families are less likely to have a termination than those in original families (Cooksey 1990; Udry et al. 1996). In the BCS70 data, however, we are restricted to knowing only the age of any live born children.

6.4.2 Selecting covariates

As in Chapter 4, the analysis takes a cumulative approach, adding covariates from successive stages of the study and examining the change in the coefficients for the family disruption variable. In Model 1, only the age of the woman and the measure of family trajectory is used to examine the initial associations. Model 2 selects factors from the birth survey only. By definition, all of these characteristics will unambiguously predate any disruption and indicate the extent to which disruption may add to the chances of an early birth over and above these original circumstances. Model 3 considers the early life course of the woman, using measures of the child's characteristics and family environment at the age five and 10 surveys. From one perspective this model adds to the knowledge of the existing family characteristics, however, for children experiencing early transitions it could already be reflecting the consequences of disruption. Finally, Model 4 asks a slightly different question. If women experiencing certain types of disruption are found in Model 3 to be more likely to become young mothers, then is

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[21] Fieldwork for the age 26 survey began in April 1996, immediately after the cohort turned 26. The ages of any children would therefore quite closely correspond to the ages of the mothers. However, if a mother responded late to the survey (in August or September), some of the ages at birth would have been estimated to a be a year younger than was actually the case.

this operating through a pathway of disengagement from education, low attainment or conflict within the family? This model selects factors from the age 16 survey which improve the fit of the model and then re-examines the coefficients for the measures of family transitions. Appendix V contains the percentage distributions of all the independent variables tested for selection in the models as well as a comparison of the key results using weighted and unweighted data.

Table 6.1 summarises the results of the selection process. As in Chapters 4 and 5, within each model a backward elimination procedure was used, beginning with the covariates hypothesised to be least associated with the outcome of young motherhood. The measure of family disruption was fixed in the model regardless of its level of statistical significance. Once factors from the birth survey were selected, they were fixed in the model and the variables from the next, early childhood stages were tested without removing any of the earlier factors. A Wald test statistic was again used because of the unsuitability of the –2 log likelihood test with weighted models (see Appendix III). In general, only variables found to improve the fit of the model at the 1% level of statistical significance were retained. However, a couple of exceptions were made for substantive reasons. First, social class at birth only just failed to reach the 1% threshold. Rather than abandon a measure often used in other analyses of young motherhood the control was retained. Similarly, in Model 4 the aim was to examine whether leaving school and/or gaining few qualifications was a pathway to young motherhood. Here, a time varying covariate was tested indicating if the woman was still in education two years earlier. Using a time lag of two years avoided the situation of a woman leaving education because she was pregnant. Again, this variable was just short of the 1% threshold but was retained because of its importance to the research question.

Table 6.1 Factors tested for their association with young motherhood

Factor	
I) Family background factors at birth	
1. Parental age	
Mother's age at first birth	***
Mother's age in 1970	*
Fathers' age in 1970	
2. Parental education	
Mother's and father's age at completing full time education	***
3. Parent's Occupations	
Family social class	**
Mother's occupational status	
4. Birth order	
5. Ethnic Origin	
6. Parent's Marital Status	
II) Early childhood factors	
1. Socio-economic circumstances	
Father figure unemployed in 12 months before age 5 interview	**
Reason for mother working (if applicable)	
Receipt of free school meals at age 10	
Ever lived in council accommodation	***
Density of persons occupying household	
Type of neighbourhood (rated by interviewer at age 5)	

Factor	
2. Educational test scores at age 5	
Copying ability	
Picture Vocabulary Test	***
3. Parental interest in education (age 10)	
Teacher's rating of parental interest	***
Parents' expectation of when child will leave school	
4. Child's behaviour	
In top 10% of anti-social behaviour rating (at age 5)	
Child believes useless to try hard in school (at age 10)	
Whether child believes in planning ahead (at age 10)	**
5. Parenting characteristics	
Level of authoritarian parenting	**
Father's involvement in childcare	
Mother's attitudes to gender equality	
6. Other transitions	
Number of house moves by age 10	
7. Interactions	
Fourth quartile picture vocabulary test* only one or neither parent very interested child's education	***
Cohort member's age*Parental interest in education	**

* denotes significance at the 10% level
** denotes significance at the 5% level
*** denotes significance at the 1% level

cont/d...

Table 6.1 continued

Factor	
III) Circumstances at 16	
1. Financial circumstances	
Equivalised household weekly income (£)[22]	
Family in receipt of means tested social security benefits in previous 12 months	
Financial hardship in family in previous 12 months (parent self-reported)	***
2. Family environment	
Relationship with parents	
Level of supervision and communication	
Time spent in joint family activities	
Teenager wants to leave home at earliest opportunity	
3. Teenager's attitude to education and work	
Considers truancy acceptable	*
Wants to leave school at earliest opportunity	
Belief in the value of qualifications for getting a good job	
Whether believes no use planning a career	**
4. Other family characteristics	
Total sibling size(including step)	***
5. Educational outcomes	
Whether still in education 2 years earlier	**
O level/CSE attainment	***
6. Missing interview with teenager at 16	*
7. Interaction	
Age 20 * 4 or more siblings	**

* denotes significance at the 10% level
** denotes significance at the 5% level
*** denotes significance at the 1% level

6.5 Results

Tables 6.2 to 6.5 present the parameter estimates for the discrete-time logistic regression models of age at first birth using the four different measures of family transition. In conjunction with increasing numbers of other covariates. Selected coefficients are converted into odds ratios in the discussion. As in Chapters 4 and 5, the results for all covariates are only presented once in Table 6.2. Tables 6.3 to 6.5 show the outcomes for the different measures of family transition but do not reiterate the coefficients for the other variables because they are virtually unchanged.

[22] Direct questions on family income were asked for the first time on the age 16 survey and are recorded in the dataset as banded gross income per week or month. However, it does not take into account family size. Given the importance of family size in this analysis the income data has been equivalised to take account of the household composition. Full details of this method and its impact on the estimates of family income according to structure are given in Appendix III.

Model 1 - Using age and measure of family disruption only

After controlling for the increased likelihood of a birth at each age, all women living in non-intact families at 16 were initially found to be more likely to become young mothers. The conditional odds that a woman in a lone mother family would give birth in any given year, were 1.7 times higher than those for a woman living with both natural parents at 16 (95% CI 1.2-2.3) whilst the odds ratio for a woman in a stepfather family was 2.1 (95% CI 1.5-2.9) (Table 6.2, Model 1). Looking at the sequence of transitions revealed that women in stepfamilies without stepsiblings had odds ratios similar to women living in a lone mother family after parental separation, with a higher odds ratio of over three among women in stepfamilies with stepsiblings or those born to a lone mother. The odds ratios were highest among women who had ever been in care (4.8, 95% CI 2.6-8.7) (Table 6.3, Model 1).

When we consider the number and timing of transitions, those experiencing multiple or later transitions have consistently higher conditional odds than those experiencing only one, or earlier transitions. Similarly, looking in more detail at the type and timing of transition shows that the transition to a stepfamily between ages six and 10 or 11 and 16 has higher odds of young motherhood than those who grew up with their natural parents (Tables 6.4 and 6.5, Model 1).

Model 2 - Taking pre-existing circumstances into account

Model 2 in Tables 6.2 to 6.5 adds factors selected from the birth survey. The woman's mother's age at her first birth is a strong predictor of the likelihood of a birth in any year. A woman's conditional odds of a birth in any year if her mother had began childbearing at age 18 or younger were 4.2 times higher than those whose mother began childbearing at age 24 or above (95% CI 2.9-6.1). Even those whose mothers began childbearing between ages 21 and 23, only just below the average for the time, were 116% more likely to have a birth than women with older mothers (Table 6.2, Model 2) (95% CI 49% to 213%).

Apart from the mother's childbearing patterns, the parents' education and social class were both important. The measure of education originally retained separate categories for the mother staying in education longer than the father, and vice versa, in order to investigate whether the mother's education had a more powerful association with her daughter's outcome than the father's education. As it was, the coefficients for either the mother or father continuing beyond the statutory age, but not both of them, were very similar. Compared to those with parents who both continued in education beyond 15, women with parents who both left school at the earliest possible opportunity had conditional odds of a birth that were 3.1

times higher (95% CI 2.0-4.8). Similarly, those from manual social class backgrounds were more likely to have an early birth than those from non manual backgrounds. All of these factors were tested for two way interactions. No interactions with the woman's age were found to be statistically significant, indicating that the effect of these background factors on the hazard of a birth does not vary greatly between ages 15 and 21. There was an interaction between ever going into care and coming from a manual social class background. In short, the net effect of going into care was smaller among the four fifths of such girls who came from a manual social class than among the minority who came from a non-manual background (Table 6.2, Model 2). The interaction is illustrated later in Figure 6.8.

After taking these factors into account all the differences in the hazard of a birth in each year according to the type of family trajectory were attenuated. First, looking at family structure at 16, the greatest reduction in the coefficient occurred among women living in stepfather families. The odds ratio of 1.4 (95% CI 1.0-2.0) was now only slightly larger than that for women in lone mother families. We saw in Chapter 3 that mothers who began childbearing very early and those in disadvantaged circumstances were most likely to separate from the father early and most likely to repartner before the cohort member was 16. These two background factors appear to 'explain' more of the difference between women in stepfather families and those in natural parent families than they do for women in lone mother families (Table 6.2, Model 2).

Similarly, the odds ratio for women in lone mother families after separation or stepfather families without stepsiblings (also after parental separation) were very similar. The odds ratios were both around 1.3 for these two groups (95% CI 0.8-1.9 for both) after taking family background into account. By contrast, the odds for those in stepfather families with stepsiblings did not particularly diminish, remaining high at 2.5 (95% CI 1.3-4.9) (Table 6.3, Model 2).

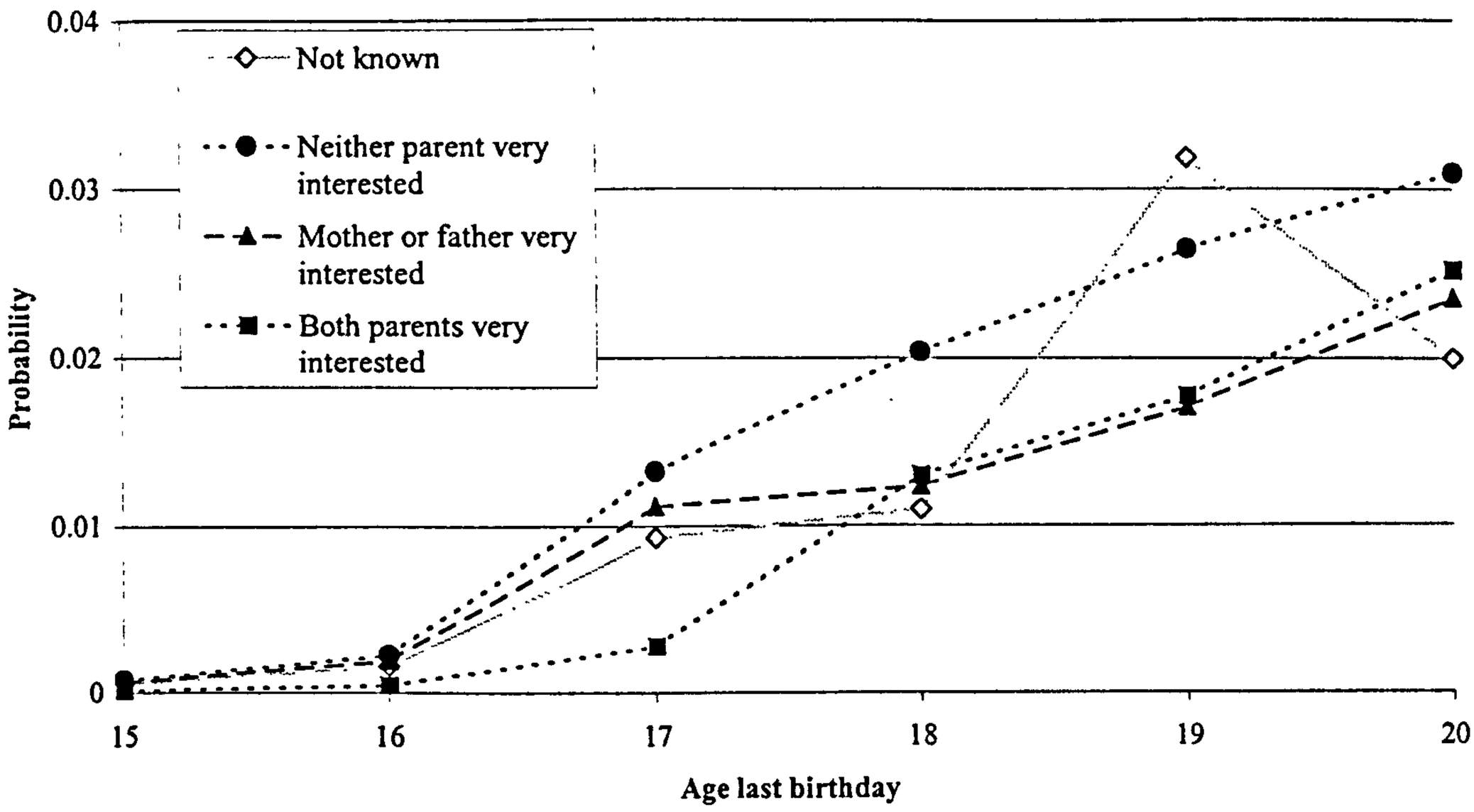
For the timing and type of transitions, all the coefficients were reduced by adding the background factors (Table 6.4, Model 2). Indeed, the biggest reduction in coefficients occurred among those experiencing the transition to a lone mother or stepfather family before age six (Table 6.5, Model 2). Again, this is consistent with the findings of Chapter 3 where early childbearing and disadvantage were strong predictors of early family disruption but were more weakly associated with disruption at longer durations. Controlling for these factors would therefore have a greater effect on the associations between these family types and young motherhood.

Adding early childhood factors

Model 3 adds measures taken from the age five or 10 surveys to give a more detailed picture of the family circumstances. Clearly, for those experiencing early transitions we are already looking at the possible consequences of disruption. The hazard of a birth in any year was higher among women with families who had ever lived in council housing or whose father figure was unemployed at the age five survey[23]. Progress in education was also important. The result of the English Picture Vocabulary Test at age five was a predictor of young motherhood as well as the teacher's rating of the parents' interest in their daughter's education was important. Young women whose parents had shown little interest in their education had a higher probability of a birth at a young age. Here, there was an interaction between parental interest and the woman's age indicating that the negative impact of low parental interest diminished as the woman got older (Table 6.2, Model 3). Figure 6.5 illustrates this interaction using the predicted probabilities of a birth in each year according to parental interest in the daughter's education. The differences between having two parents who are very interested in the daughter's education and neither parent being very interested are much greater at the younger ages than by age 20. The factor perhaps matters more when the woman is still at school and living at home than when she is older.

[23] Questions about the "father figure" at the age five survey allowed the respondent to identify whether apart from a natural father they considered a step-father, a grandfather, or other male figure in the household as the father figure.

Figure 6.5 Predicted probability of a birth at each age according to parental interest in their daughter's education



Note: In the models, ages 15 and 16 are combined as a reference category because of the very low incidence of births at this age. For the predicted probabilities, the estimated probability is apportioned according to the observed differences in the sample as a whole.

Although parents who had separated were reported to show less support for their daughter's education, we cannot be sure whether this was a characteristic that predated the disruption, a consequence of the transition or even reflect biases of the teacher making the judgement. Conversely, the probability of young motherhood is lower in post transition families where both parents continue to be interested in their child's education.

Taking these additional factors into account again slightly reduces the coefficients for young motherhood among those in the most common 'non-intact' lone mother or stepfather families at 16, but the odds ratios for those in stepfather families with stepsiblings remained high at 2.4 (95% CI 1.2-4.7) (Table 6.3, Model 3) as did the odds ratios for those born to a lone mother or who had spent any time in care. Multiple transitions also appear to carry a higher risk, particularly those at older ages (Model 3, Table 6.4 and 6.5). Young women who experienced two or more transitions with the last transition between ages 11 and 16 had odds ratios of 2.0 compared to women experiencing no transitions (95% CI 1.3-3.1).

The characteristics of the post-transition family

Model 4 is an additional model designed to examine the types of post transition circumstances that may explain some of the associations between disruption and an early birth. Factors selected included the number of siblings in the home at age 16 (including stepsiblings), financial hardship in the family in the year preceding the age 16 interview, educational attainment around age 16 and a time varying measure of participation in education. Measures of conflict and communication in the family were not found to improve the fit of the model at the required level of statistical significance.

Young women with no qualifications were most likely to have an early birth. The odds ratio compared to those who gained five or more O levels was 9.4 (95% CI 5.7-15.4) (Model 4, Table 6.2). Similarly, not surprisingly, women who stayed on in education were less likely to have an early birth. The sibling size and financial hardship covariates indicated that stretched resources in a post transition family impact on the chances of an early birth even after controlling for the family's original socio-economic status. The interaction between having four or more siblings and reaching age 20 indicated that the effect of sibling size diminishes over time, possibly after leaving home.

However, adding these later factors that could well be the characteristics of a post transition family had only a small to moderate effect on the coefficients for the association between family disruption and young motherhood. The odds ratio for women who had lived in stepfamilies with stepsiblings fell from 2.4 in Model 3 to 2.0 in Model 4 (95% CI 1.0-4.1) (Table 6.3), but the odds ratio for those born to a lone mother family, or those experiencing multiple transitions or a late transition to a stepfather family remained almost unchanged. Although the odds ratio was still large, controlling for financial hardship and educational attainment had the most attenuating effect on the difference in hazard of a birth between those who had ever been in care and those who grew up with both natural parents.

Table 6.2 Parameter estimates from discrete time logistic regression model of a birth between age 15 and 20 by family structure at 16
(weighted estimates)

Reference categories are underlined	Model 1 (no background controls)		Model 2 (controlling for family circumstances at birth)		Model 3 (adding early childhood factors)		Model 4 (adding factors at age 16)	
	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$
Age last birthday								
<u><=16</u>	0	-	0	-	0	-	0	-
17	1.46***	0.26	1.47***	0.26	1.48***	0.26	1.52***	0.26
18	1.87***	0.25	1.90***	0.25	3.00***	0.60	3.05***	0.60
19	2.28***	0.24	2.32***	0.24	3.32***	0.57	3.24***	0.58
20	2.34***	0.24	2.40***	0.24	3.68***	0.56	3.67***	0.58
Family Structure At 16								
<u>Both natural parents</u>	0	-	0	-	0	-	0	-
Lone mother	0.51***	0.17	0.31*	0.17	0.20	0.17	0.08	0.18
Mother and stepfather	0.75***	0.16	0.37**	0.17	0.28	0.17	0.21	0.18
Lone father/Father and stepmother	0.68**	0.30	0.73**	0.31	0.61*	0.32	0.44	0.32
Other guardians/ in statutory or foster care	0.89**	0.40	0.55	0.41	0.40	0.41	0.36	0.42
I) Circumstances at birth								
Mother's age at first birth								
<=18			1.43***	0.19	1.18***	0.20	1.07***	0.20
19-20			1.12***	0.17	0.95***	0.18	0.82***	0.18
21-23			0.77***	0.19	0.72***	0.19	0.62***	0.19
<u>24+</u>			0	-	0	-	0	-
Parents' age at completion of full time education								
Both 15	1.13***	0.23	0.84***	0.23	0.38	0.24		
Mother 16+, Father 15	0.72***	0.27	0.60**	0.27	0.35	0.28		
Mother 15, Father 16+	0.72***	0.27	0.60**	0.27	0.34	0.27		
<u>Both 16+</u>	0	-	0	-	0	-		
Not known	1.26***	0.32	1.06***	0.33	0.84**	0.34		
Social Class at birth								
<u>I/II</u>	0	-	0	-	0	-		
IIINM	0.43	0.27	0.34	0.27	0.22	0.27		
IIIM	0.40*	0.23	0.26	0.23	0.07	0.23		
IV/V	0.69***	0.24	0.10	0.25	0.16	0.26		

* denotes significance at the 10% level
** denotes significance at the 5% level
*** denotes significance at the 1% level

cont/d.....

Table 6.2 Continued

Reference categories are underlined	Model 1 (no background controls)		Model 2 (controlling for circumstances at birth)		Model 3 (adding early childhood factors)		Model 4 (adding factors at age 16)	
	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$
II) Early childhood factors								
Ever in council accommodation					0	-	0	-
No					0.45***	0.13	0.20	0.14
Yes								
Age 5 – English Picture Vocabulary Test Score								
Top quartile					0	-	0	-
Second quartile					0.84***	0.24	0.46*	0.34
Third quartile					0.86***	0.24	0.62**	0.25
Fourth quartile					0.26	0.32	0.06	0.27
No test score					0.76***	0.25	0.51**	0.25
Age 5 – Father figure unemployed in last year								
No/na					0	-	0	-
Yes					0.51***	0.19	0.49**	0.20
Age 10 – Parental interest in child's education								
Both very interested					0	-	0	-
Father or mother very interested					1.37**	0.58	1.25**	0.58
Neither very interested					1.54***	0.54	1.18**	0.54
Not known					1.19**	0.59	0.72	0.60
Interactions								
*Age*Parental interest in education*								
Age 18*Father or mother very					-1.42**	0.72	-1.42**	0.71
interested					-1.08*	0.64	-1.05	0.64
Age 18 * Neither very interested					-1.36*	0.74	-1.33*	0.74
Age 18 * Not known								
Age 19*Father or mother very					-1.42**	0.69	-1.41**	0.69
interested					-1.13*	0.61	-1.08*	0.61
Age 19* Neither very interested					-0.59	0.68	-0.50	0.69
Age 19 * Not known								
Age 20*Father or mother very					-1.44**	0.66	-1.43**	0.67
interested					-1.33**	0.60	-1.23**	0.60
Age 20 * Neither very interested					-1.43**	0.69	-1.22*	0.71
Age 20 * Not known								

* denotes significance at the 10% level
** denotes significance at the 5% level
*** denotes significance at the 1% level

cont/d...

Table 6.2 Continued

Reference categories are underlined	Model 1 (no background controls)		Model 2 (controlling for circumstances at birth)		Model 3 (adding early childhood factors)		Model 4 (adding factors at age 16)	
	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$
III) Circumstances at 16								
Financial hardship in 12 months preceding interview								
No							0	-
Yes							0.52***	0.15
Total sibling size								
0/1							0	-
2							0.22	0.15
3							-0.14	0.19
4 or more							0.72***	0.19
O level/CSE attainment								
None							2.22***	0.26
Grades 2-5 CSEs							1.10***	0.22
1-4 O levels							0.98***	0.20
5+ O levels							0	-
Not known							1.66***	0.24
Still in education 2 years earlier (time varying)								
No							0	-
Yes							-0.34**	0.16
Interaction								
Age 20 * 4 or more siblings							-0.83**	0.38
Constant	-5.71***	0.22	-7.85***	0.35	-9.55***	0.60	-9.22***	0.63

* denotes significance at the 10% level
** denotes significance at the 5% level
*** denotes significance at the 1% level

Unweighted: number of persons 3297, number of person years 19291
Weighted: number of persons 8232, number of person years 47986

Table 6.3 Parameter estimates from discrete time logistic regression model of a birth between age 15 and 20 by type of family transition
(weighted estimates)

Reference categories are underlined	Model 1 (no background controls)		Model 2 (controlling for circumstances at birth)		Model 3 (adding early chilldhood factors)		Model 4 (adding factors at age 16)	
	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$
Type of transitions								
Always natural parents	0	-	0	-	0	-	0	-
Natural parents-lone mother	0.43**	0.21	0.24	0.22	0.11	0.22	-0.13	0.23
Natural parents-mother/stepfather, no stepsiblings	0.56**	0.23	0.20	0.23	0.10	0.24	0.04	0.24
Natural parents – mother/stepfather – lived with stepsiblings	1.16***	0.33	0.92***	0.35	0.85**	0.35	0.72**	0.34
Natural parents – lone father or father/stepmother	0.73*	0.73	0.65*	0.38	0.56	0.39	0.48	0.40
Lone mother at birth –all sequences	1.13***	0.22	0.68***	0.23	0.53**	0.24	0.57**	0.25
Either parent died	0.31	0.27	0.28	0.28	0.24	0.26	0.19	0.29
Any time in statutory/foster care	1.55***	0.31	2.30***	0.51	1.91***	0.50	1.13*	0.61
Other sequences	0.85***	0.32	0.61*	0.33	0.46	0.33	0.30	0.34
Interaction								
Any time in care*Social Class IIIM/IV/V			-1.32**	0.64	-1.00	0.62	-0.46	0.71

Table 6.4 Parameter estimates from discrete time logistic regression model of a birth between age 15 and 20 by number and timing of family transitions
(weighted estimates)

Reference categories are underlined	Model 1 (no background controls)		Model 2 (controlling for circumstances at birth)		Model 3 (adding early childhood factors)		Model 4 (adding factors at age 16)	
	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$
Number and timing of transitions								
No transitions	0	-	0	-	0	-	0	-
1 transition, complete by age 6	0.42*	0.24	0.13	0.25	0.00	0.25	-0.11	0.26
2+transitions, complete by age 6	0.85***	0.33	0.44	0.34	0.34	0.33	0.16	0.33
1 transition, complete by age 11	0.48*	0.28	0.28	0.29	0.19	0.39	0.05	0.30
2+ transitions, complete by age 11	0.95***	0.20	0.69***	0.20	0.56***	0.20	0.36*	0.21
1 transition, age 11+	0.61***	0.21	0.42**	0.21	0.34	0.22	0.14	0.22
2+ transitions, last transition age 11+	1.03***	0.22	0.80***	0.23	0.69***	0.23	0.77***	0.23

* denotes significance at the 10% level
** denotes significance at the 5% level
*** denotes significance at the 1% level

Unweighted: number of persons 3297, number of person years 19291
Weighted: number of persons 8232, number of person years 47986

Table 6.5 Parameter estimates from discrete time logistic regression model of a birth between age 15 and 20 by timing and type of transitions
(weighted estimates)

Reference categories are underlined	Model 1 (no background controls)		Model 2 (controlling for circumstances at birth)		Model 3 (adding early chilldhood factors)		Model 4 (adding factors at age 16)	
	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$	$\hat{\beta}$	$se(\hat{\beta})$
Timing and type of transition (selected sequences)								
Always natural parents	0	-	0	-	0	-	0	-
Transitions complete by age 6								
Natural parents-lone mother	-0.03	0.52	-0.11	0.54	-0.36	0.54	-0.56	0.53
Natural parents-lone mother-mother/stepfather	0.38	0.43	-0.07	0.44	-0.19	0.44	-0.21	0.46
Transitions complete by age 11								
Natural parents-lone mother	0.62*	0.36	0.61*	0.36	0.39	0.36	0.08	0.38
Natural parents-lone mother-mother/stepfather	0.81***	0.28	0.42	0.28	0.38	0.28	0.26	0.29
Transitions complete age 11+								
Natural parents-lone mother	0.48*	0.28	0.16	0.29	0.11	0.29	-0.10	0.30
Natural parents-lone mother-mother/stepfather	0.84***	0.31	0.69**	0.31	0.55*	0.32	0.48	0.32

Unweighted: number of persons 3297, number of person years 19291
Weighted: number of persons 8232, number of person years 47986

* denotes significance at the 10% level
** denotes significance at the 5% level
*** denotes significance at the 1% level

6.5.1 Predicted probabilities of young motherhood

Figures 6.6 to 6.10 present the predicted probabilities of a birth in each year from 15 to 20 using the results of Model 3 in Tables 6.2 to 6.5. Having taken into account their original family circumstances and some characteristics of both the child and the family up to age 10, the charts show the predicted probability of a birth in each year, on condition that the woman had not previously given birth. First, using family structure at 16, all women living apart from both natural parents are predicted to have a slightly higher probability of a birth, especially those living with a lone father or father and stepmother (Figure 6.6). Using the sequence of family transitions reveals how small the differences are between those who grew up with both natural parents and those who experienced parental separation followed by a lone mother or stepfather family (without stepsiblings). The higher probabilities are found among the less common transitions: those born to a lone mother, those who lived with a lone father or father and stepmother after parental separation or those who lived in a stepfather family with stepsiblings (Figure 6.7). There was an interaction between social class background and going into care that affects the predicted probability of young motherhood. Figure 6.8 picks out two possible sets of probabilities from this group, contrasting women from a social class I/II background with those from a IV//V background. Although the predicted probabilities for women from non-manual backgrounds are still lower than for those from manual backgrounds, the difference is not as pronounced as would have been expected without the interaction. Going into care appears to have a greater 'net effect' on the probability of an early birth for those from non manual backgrounds than those from manual backgrounds.

Figures 6.9 and 6.10 use the measures of the timing of the transition. Figure 6.9 shows the similarly high probabilities among women experiencing two or more transitions either between ages six and 11 or age 11 or older. By contrast, the probabilities among women experiencing only one transition by age six are not discernable from those experiencing no transitions in childhood. Looking at the type of transition (Figure 6.10), the highest probability is found among women moving into a stepfather family between age 11 and 16.

Figure 6.6 Predicted Probability of a birth from age 15 to 20 by family structure at 16

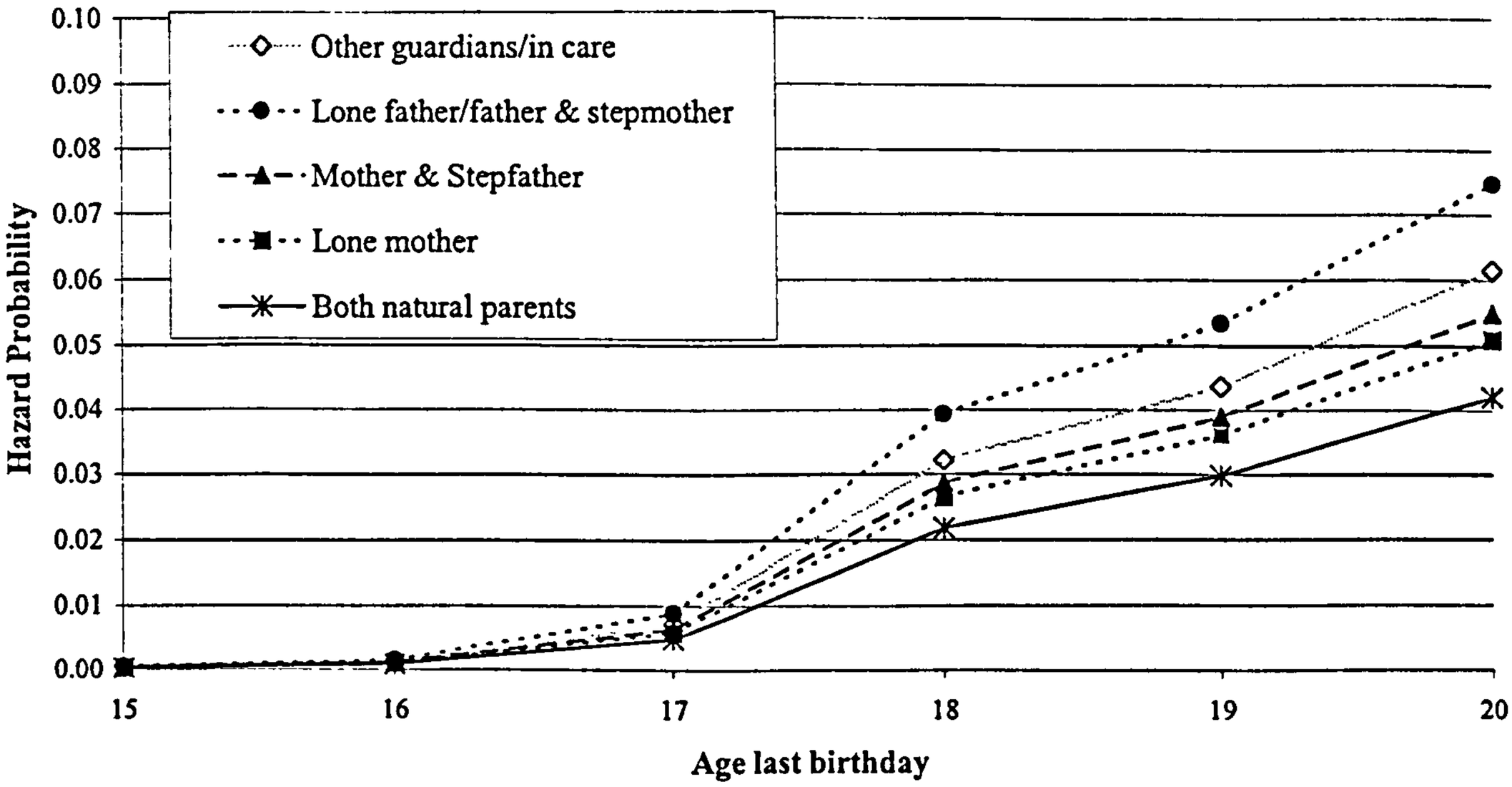


Figure 6.7 Predicted Probability of a birth from age 15 to 20 by type of family transitions

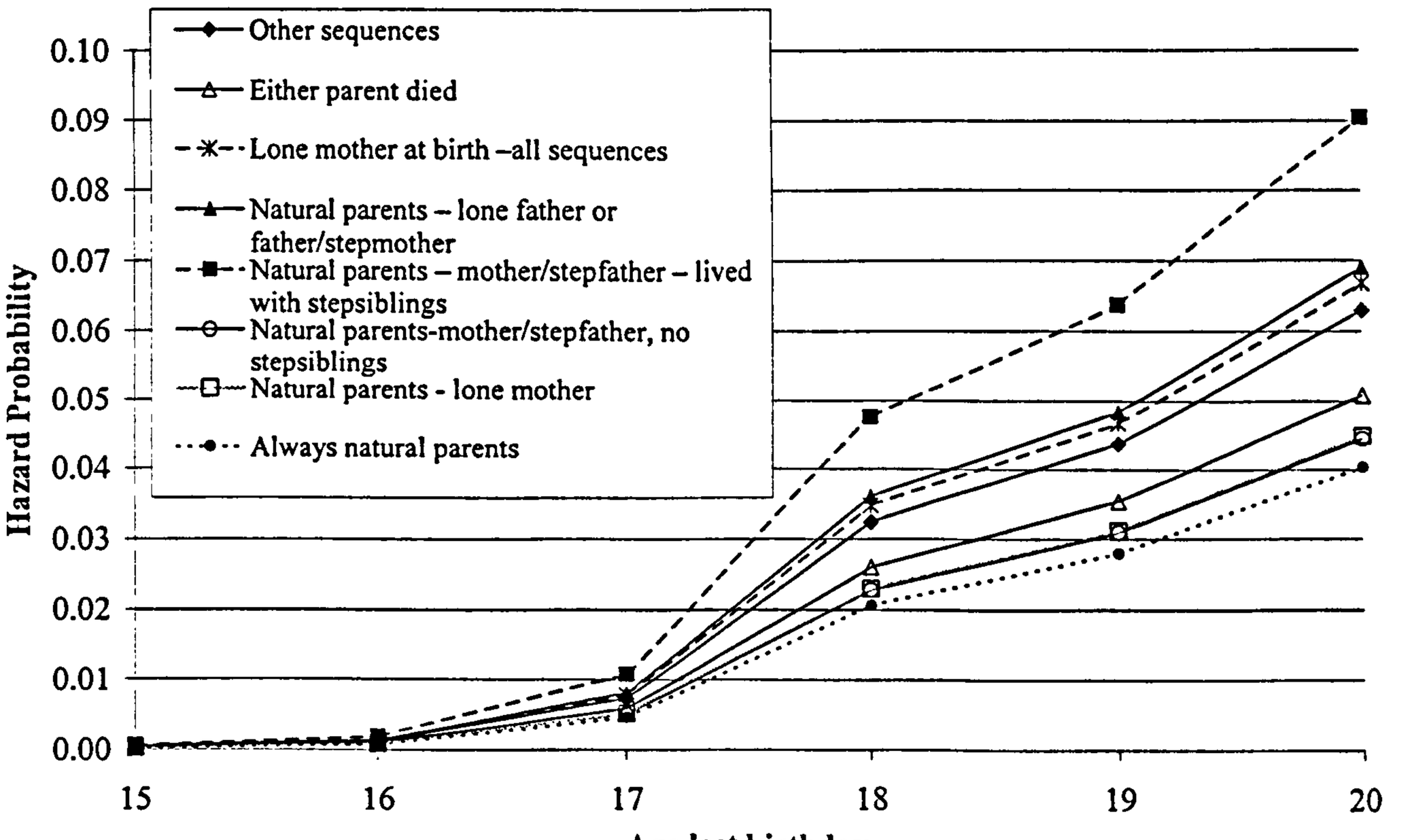


Figure 6.8 Predicted Probability of a birth from age 15 to 20 among women who had ever been in care, Social Class I/II compared to Social Class IV/V

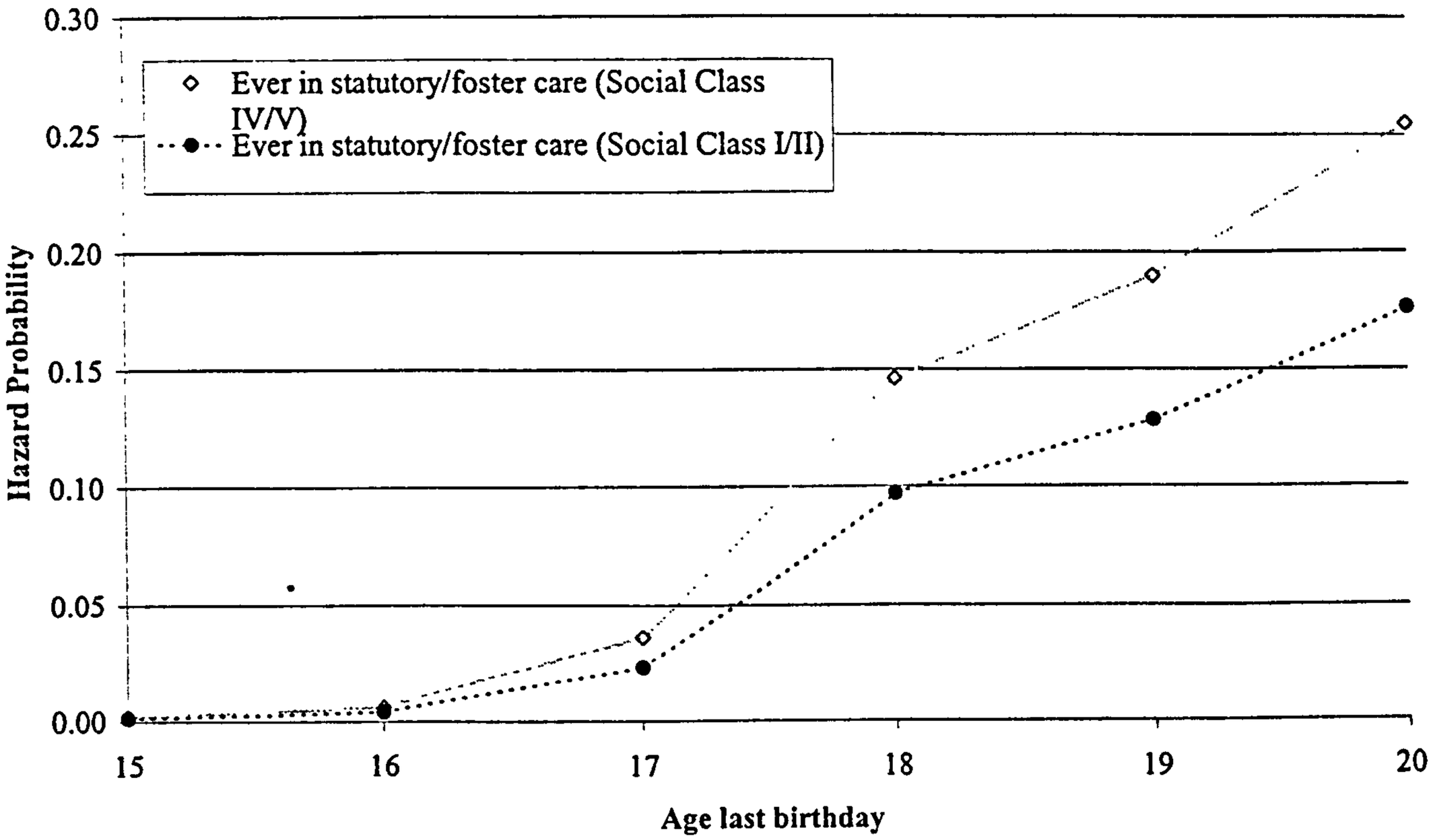


Figure 6.9 Predicted Probability of a birth from age 15 to 20 by timing of family transitions

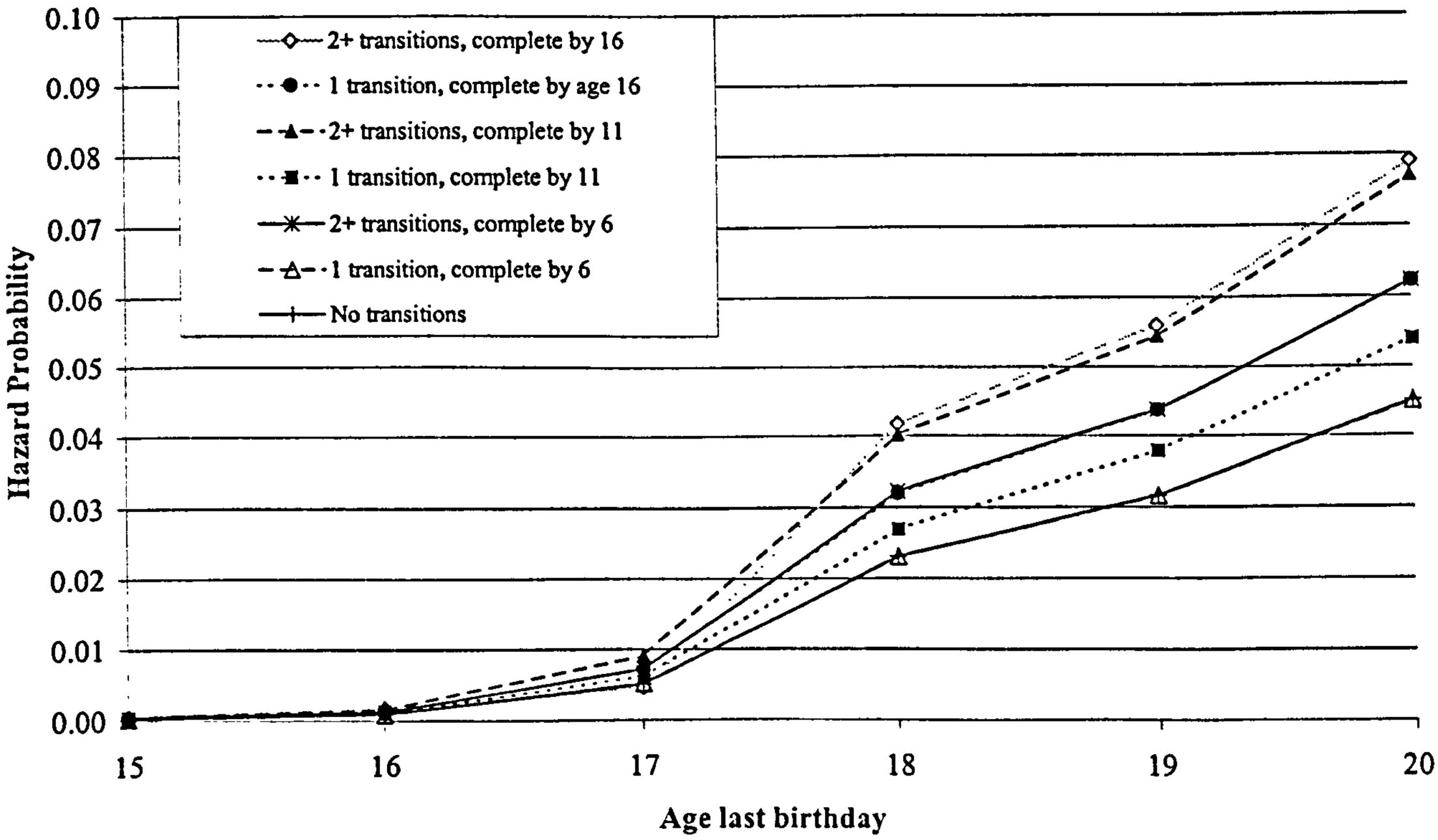
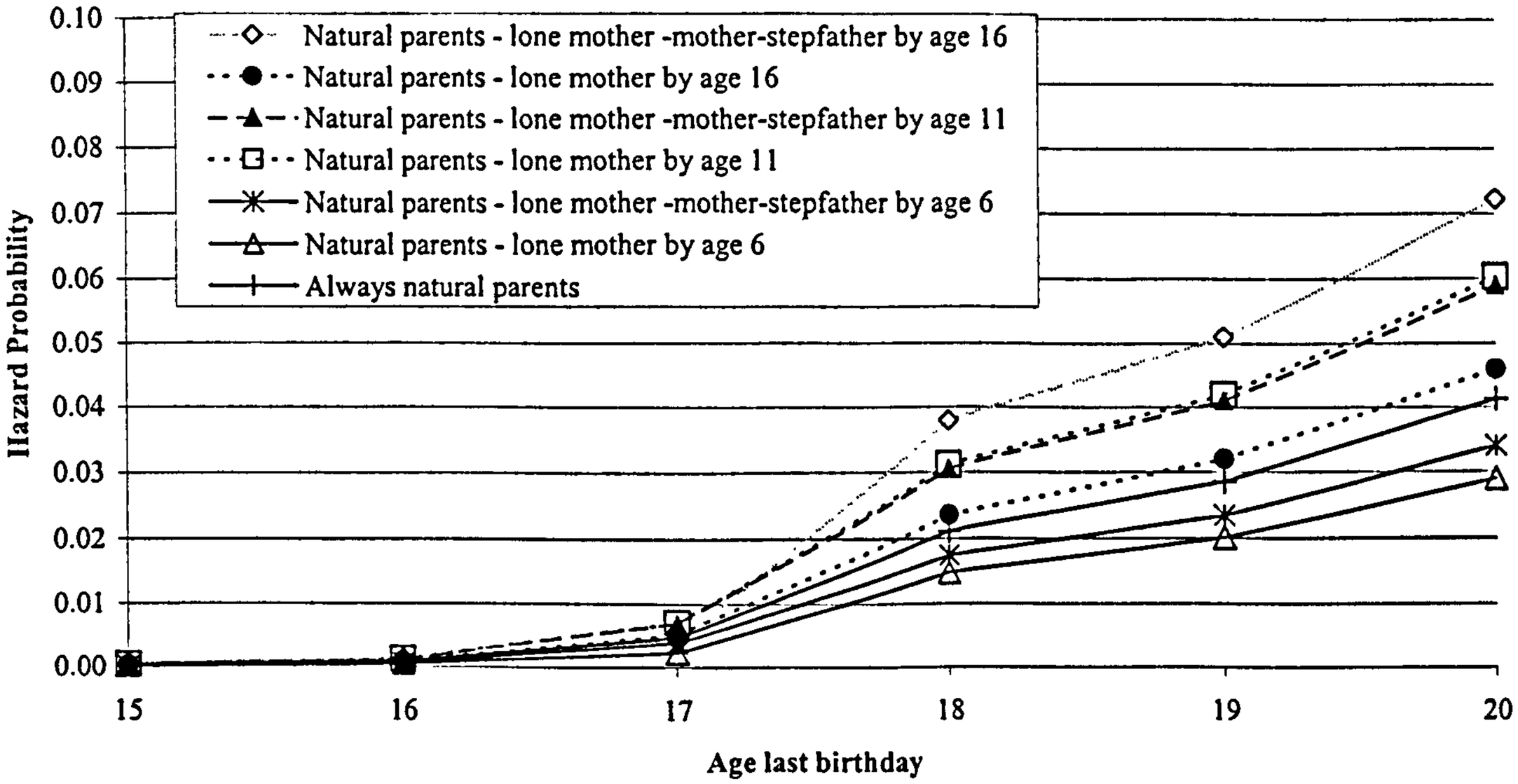


Figure 6.10 Predicted Probability of a birth from age 15 to 20 by type and timing of family transitions



6.5.2 Differences between groups experiencing family transitions

Table 6.6 presents the results of testing for differences between the different groups of women who experienced transitions, rather than comparing them with women who grew up with their natural parents or had no transitions. Women who went into care were found to have estimated coefficients that were significantly higher than a number of other transition groups but also, women who had lived in stepfather families with stepsiblings had coefficients that were significantly higher than those for women who lived in stepfather families without stepsiblings. Although the numbers are small, this difference provides further evidence of the diversity of experiences in stepfamilies.

Table 6.6 Differences in parameter estimates between categories of family disruption *(weighted estimates)*

Original reference categories are underlined
Coefficients are reproduced from Model 3 in Tables 6.2 to 6.5

	$\hat{\beta}$	$se(\hat{\beta})$	Other statistically significant differences
Family Structure At 16			
Both natural parents	0	-	
Lone mother	0.20	0.17	
Mother and stepfather	0.29*	0.17	No other differences statistically significant at the
Lone father/Father and stepmother	0.61*	0.32	10% level
Other guardians/in care	0.40	0.41	
Type of transitions			Natural parents-lone mother & Natural parents-
Always natural parents	0	-	mother/stepfather, no stepsiblings*
Natural parents-lone mother	0.11	0.22	
Natural parents-mother/stepfather, no stepsiblings	0.10	0.24	Natural parents-lone mother & Ever in statutory/foster care***
Natural parents – mother/stepfather – lived with stepsiblings	0.85**	0.35	Natural parents-mother/stepfather, no stepsiblings
Natural parents – lone father or father/stepmother	0.56	0.39	& Natural parents – mother/stepfather – lived with stepsiblings*
Lone mother at birth –all sequences	0.53**	0.24	
Either parent died	0.24	0.26	Natural parents-mother/stepfather, no stepsiblings
Any time in statutory/foster care	1.91***	0.50	& Ever in statutory/foster care***
Other sequences	0.46	0.33	
			Either parent died & Ever in statutory/foster care***
Interaction			
Any time in care*Social Class IIIM/IV/V	-1.00	0.62	
Number and timing of transitions			
No transitions	0	-	
1 transition, complete by age 6	0.00	0.25	No other differences statistically significant at the
2+transitions, complete by age 6	0.34	0.33	10% level
1 transition, complete by age 11	0.19	0.39	
2+ transitions, complete by age 11	0.56***	0.20	
1 transition, age 11+	0.34	0.22	
2+ transitions, last transition age 11+	0.69***	0.23	
Timing and type of transition (selected sequences)			
Always natural parents	0	-	No other differences statistically significant at the
Transitions complete by age 6			10% level
Natural parents-lone mother	-0.36	0.54	
Natural parents-lone mother-mother/stepfather	-0.19	0.44	
Transitions complete by age 11			
Natural parents-lone mother	0.39	0.36	
Natural parents-lone mother-mother/stepfather	0.38	0.28	
Transitions complete age 11+			
Natural parents-lone mother	0.11	0.29	
Natural parents-lone mother-mother/stepfather	0.55*	0.32	

Unweighted: number of persons 3297, number of person years 19291
Weighted: number of persons 8232, number of person years 47986

* denotes significance at the 10% level
** denotes significance at the 5% level
*** denotes significance at the 1% level

6.6 Discussion

The aim of this analysis was twofold. There was the general question of whether, with this more recent dataset, we would still find an association between family transitions and early motherhood even after taking early family circumstances into account. Beyond that, the chapter examined whether there were variations in this association according to the number, sequencing and timing of transitions.

As far as the overall 'impact' of family disruption on the chances of young motherhood is concerned; after controlling for only the pre-existing circumstances of mother's age at first birth, parental education and social class, all women in non-intact families at 16 are found to have a higher risk of an early birth. However, this is not found for women who experienced parental separation followed by living with a lone mother, or for women who lived in stepfather families with no stepsiblings. Instead, being born to a lone mother, going into care, living with stepsiblings or in the father's custody after separation were all associated with a higher risk of young motherhood. Without comparable data from the NCDS it is not possible to conclude whether the association between family disruption and young motherhood has particularly diminished or if this has more to do with the alternative measures used in this analysis.

There was much evidence to suggest that socio-economic disadvantage was an important precursor of young motherhood. Controlling for pre-existing socio-economic status attenuated much of the difference between family types, and adding financial circumstances in middle and late childhood continued to improve the fit of the model. In particular, women in lone mother families who might be most likely to experience financial hardship, showed zero increased risk of young motherhood after taking financial circumstances at 16 (among other factors) into account. On the other hand, women who had been in a stable lone mother family since age five or earlier showed almost zero increased risk of young motherhood even before any background covariates were added to the model. This does not support the suggestion that those who had spent the longest durations in lone mother families were most likely to become young mothers. Possibly, women who separated when they were younger might have been better placed to return to the labour market. Stretched resources could also explain the higher risk of early childbearing among women in families with stepsiblings. The average number of children in these households is 4.0 compared to 2.7 among stepfamilies that do not contain stepsiblings. Whichever way resources are distributed in the household they are likely to be stretched to a greater degree among these types of families.

Women born to young mothers were most likely to become young mothers themselves, supporting the socialisation perspective that the mother is providing a role model for early childbearing. However, there was no support for the suggestion that early father absence has a negative impact on development that impacts on later sexual relationships. As discussed earlier, although children experiencing very early transitions may well experience stress, there is more chance of attaining stability by the teenage years.

The social control hypothesis placed particular emphasis on the family structure at 16, the role of recent transitions and the resources available to structure the teenager's behaviour. It implied that most types of non-intact family at 16 would be associated with a higher risk of an early birth because of the lower parenting resources usually available in post-transition families. The results do not appear to lend consistent support to this hypothesis. Children in the most common types of non-intact family, whether lone mother or stepfather families, at 16 were not universally at risk of an early birth after taking background factors from the early childhood stages into account.

Levels of conflict are not measured at the early stages of the BCS70 so the analysis relied on change as an indicator of the potential disruption to the child's family environment. Here, the results do appear to support the findings of Wu and Martinson (1993) that it is instability and change that matters to children, particularly at older ages, rather than duration in a lone mother family. Experiencing two or more changes between age six and 11 or age 11 or older was associated with an increased risk of an early birth. In the earlier category, the average age at the last change was nearly nine years old compared to nearly seven among those experiencing only one change. These data indicate a higher risk of an early birth among those experiencing later transitions when controlling for early background characteristics. Circumstances at the time of the separation may be more important for these children, when sexual behaviour might be among the range of responses to conflict in the household by the teenager, or the change in financial and housing circumstances that might be occurring just at a time when it could be more disruptive to her education and social networks. Similarly, the transition to a stepfamily is known to be harder if stepsiblings have to live together (Hetherington et al. 1999; Rosenberg and Hajal 1985a). Apart from stretched resources, conflict in the household could explain the higher odds among women in this family type.

This research also uncovered some more tentative findings among those experiencing less common types of family transition. The observation that girls who were living with their father after parental separation were at increased risk of young motherhood is consistent with previous research (US: Maccoby and Martin 1983); (UK: Ní Bhrolcháin et al. 1995). However, the group is small and given custody patterns in the 1970s and 1980s is likely to be highly selective. Finally, there is a persistently strong association between spending any time in statutory or foster care and the chances of becoming a young mother, even after controlling for social and economic circumstances in early childhood. The very particular pathways towards social exclusion among those entering care found in the 1958 NCDS (Buchanan and Ten Brinke 1997; Cheung and Buchanan 1997) do not appear to have abated among this more recent cohort.

In substantive terms, the increased probability of experiencing an early birth among those with the most common types of transition was already very small. Doing well at school and having parents who were supportive of education does much to counteract any remaining potential negative impact of disruption. The evidence supports the suggestion that apart from risks, there are clearly protective factors influencing the young woman's life course.

In summary, this analysis aimed to re-examine the suggested association between family disruption and young motherhood after controlling for selected pre-existing circumstances and characteristics. There is an absence of evidence of a systematic association between all types of disruption and the risk of an early birth. The generally low or zero increased risk of early motherhood among those experiencing the most common types of family transition could reflect a weakening of such links over different generations but also methodologically, it shows the importance of identifying the pathways that children have followed to reach a particular family structure by the end of childhood. The finding that the association between later family transitions and early motherhood is less attenuated by controlling for the broad socio-economic background of the family indicates the need for further investigation of the circumstances surrounding the family transitions of older children.

Chapter 7 Conclusions

To conclude, this chapter returns to the original objectives of the project which were outlined in Chapter 1 and examine the key findings and contribution to the evidence on the outcomes of family disruption that this research has made.

7.1 Methodological Issues

The thesis aimed to address bias resulting from differential non-response and recall error in the data. In the course of the analysis, the issue of the objectivity of data on children experiencing disruption emerged.

7.1.1 Non-response bias

Only 35% of cohort members took part in every stage of the survey up to, and including, age 26. Respondents at 26 were from more privileged backgrounds and were higher educated than those who dropped out of the study (Shepherd 1997). Additionally, the age 16 interviews clashed with a national teachers' strike. Consequently information from the cohort members' schools is missing for nearly two thirds of those who took part in the survey. Finally, limited funds restricted the age 26 survey to a postal questionnaire. People with literacy difficulties in childhood were least likely to respond and the questions asked of those that did were necessarily limited in their scope in order to minimise respondent burden.

Given that family disruption was a precursor of dropping out of this study (see Section 2.2), the unweighted descriptive statistics would have underestimated the level of family disruption among the cohort. Reweighting according to the predicted probability of response at later stages compensated for this bias and increased the estimates of the proportion of children experiencing family disruption. The largest weights were created for those born to a lone mother or experiencing multiple family disruption, who were most likely to drop out of the study.

For the multivariate analysis of the outcomes of disruption, Appendices III to V compared the coefficients with and without the weights. The comparison indicated that although weighting created a slight loss of precision, it went some way to correct the potential bias in the data created by differential non-response. Admittedly, often because of the small numbers involved, most of the 95% confidence intervals around the weighted and unweighted estimates overlapped. It is therefore difficult to draw firm conclusions on the merits of either approach.

Many of the factors used to create the non-response weights, such as family social class or parental education level were also associated with low educational attainment, unemployment or young motherhood. In the models of young motherhood, which selected the highest number of factors that had already been used to create the weights, there was either no difference between the estimates or sometimes the coefficients in the unweighted model were larger than in the weighted one (Table V.3). Again, there were no significant differences between the estimates but perhaps, when factors strongly associated with young motherhood are also predictors of non-response, the loss of precision when using weighting cannot be justified. With hindsight, weighting for non-response may have been less important than expected in this thesis because many factors associated with response were selected to be background controls in the models. However, at the outset it could not be assumed that the same factors would be used in both models and it would not necessarily be the case for all outcomes.

7.1.2 Recall bias

One aim of this research was to explore the pertinence of the timing of family disruption, relying on the parent's (usually the mother's) recall of the year of any changes in parenting arrangements. At the age 16 interview, parents were asked to recall the family structure at the time the cohort member was born, and then when the cohort member was five, 10 and 16. Although it would have been simpler to use this variable alone, the comparison of responses to questions at the age five and 10 surveys regarding the year of any transitions demonstrated the biases that would have entailed (see Section 2.4). Women who had not repartnered by the time of the age 16 interview were more likely to telescope the date of separation into a more recent timeframe, whereas those who were living with a new partner were more likely to push the date of the separation back in time. These recall errors would have created a downward bias in the mean age at parental separation for children in stepfamilies and an upward bias for children in lone mother families. Therefore, using the full range of questions about family transitions at every stage of the study, thereby relying on the responses given soonest after the event, might have been time consuming and raised many inconsistencies (see Appendix I) but it minimised the possibilities of biased data.

The surveys that these variables were derived from were conducted between 1970 and 1986. Since then calendar survey data collection techniques have become more established, where a respondent is presented with time lines showing key events in their work and family lives to check for consistency (Freedman et al. 1988). Also, more questions could have been asked using self-completion survey techniques to avoid either compliance with the perceived

interviewer expectations or those of other household members present at the interview. The age 30 survey of the BCS70 used computer assisted personal interviewing combined with paper calendars to record key life events and prompt respondents' memories. There were also checks in the programs to prevent inconsistent dates being given. Elsewhere, computer assisted self-interviewing has been found to be an acceptable way of asking often very sensitive questions (Black and Ponirakis 2000; Couper 2000; Johnson et al. 2001). This could be utilised in future waves to ask questions about previous relationships.

7.1.3 The validity of data on children experiencing family disruption

The measures of the child's behaviour and development relied on the judgement of an interviewer, parent, teacher or doctor, none of whom can be judged to be wholly objective. In experiments where the same information has been given to teachers about a child, with only the description of their family structure varying, they have been found to have consistently lower expectations of children from divorced families, particularly boys, than children living with both their natural parents (Ball et al. 1984). Whether this is based on their own experience, or the application of a stereotype, the impact of an assumption of a negative impact of divorce on behaviour or school performance can create a disproportionate focus on disruptive behaviour or poorer performance by these children, which, in turn, can reinforce the belief (Amato 1991). In total, lower expectations create the risk of a self-fulfilling prophecy for the child.

This has interesting implications for the use of behavioural background factors in longitudinal research. If, for example, teachers are more likely to consider that a child living apart from a natural parent is disruptive, does adding that rating of their disruptive behaviour obscure any associations between family transitions and later outcomes? In this analysis, the chronological building of models gave the choice of examining the associations after controlling for the very basic social and demographic characteristics of the family, before adding these potentially subjective measures.

7.2 Measuring the type and timing of family disruption among the cohort

A particular advantage of this dataset was the information on the type and timing of any family transitions that happened between the childhood stages of the survey. Using around fifty variables in the data, the family structure at each age up to 16 could be derived. Just over one in four of the cohort members experienced at least one change in residential parent structure by the time they were 16. The majority of these transitions involved the separation of their married parents and, for some, the formation of a stepfather family. Only about one in

10 of the cohort experienced more unusual transitions (for the time), such as living in their father's custody, spending time in statutory or foster care, or experiencing the dissolution of a stepfamily. Separating the experiences of this more disrupted minority from the majority of those experiencing disruption was a central aim of this research in order to examine the outcomes of the most common types of transition in the 1970s and 1980s.

Children born to mothers who married young, who were pre-marital conceptions, had fathers with lower levels of education or substantial age differences between their parents were more likely to experience disruption of living arrangements. Children who were the third or later born in the family were most likely to experience disruption by the time of the age 16 survey. This does not mean that those who were first or second born were less likely to experience disruption. Instead, the observation of the cohort members was censored at age 16 and first or second born children may have gone on to experience parental separation at older ages. Although most of the precursors of divorce indicated disadvantage, an exception was the mother's occupational status. Cohort members with mothers who continued to work after marriage in professional or managerial occupations were actually more likely to experience parental separation.

Similarly, the probability of maternal repartnering was not equal among the cohort. Younger mothers repartnered sooner than older ones and also, mothers who married young were more likely to repartner, perhaps demonstrating a preference for being married rather than single. Widows were much slower to repartner as were women from non-white ethnic minorities.

Many of these factors, such as parents' education, occupation and family formation were also associated with the outcomes of question in this thesis. The analysis in Chapter 3 showed the importance of adding them to any models of young adult outcomes before considering the 'net' effects of family disruption.

7.3 Outcomes in young adulthood

The final three objectives of the research involved examining the associations between the different types and timing family disruption and outcomes in young adulthood. Chapter 1 reviewed the importance of taking a life course approach which places the lives of the cohort in the context of broader societal change as well as their position within the family.

7.3.1 The historical context of the 1970 British Cohort Study

The BCS70 is the most recent cohort study currently available in Britain. Although response and aspects of data quality may have been better for the 1958 NCDS, sociologists today tend to view the 1950s and 1960s as an exceptional period of marriage and nuclear family ideology, after which Britain has continued much longer term trends in family formation and dissolution (McRae 2000). Results from the BCS70 are certainly more recent than the NCDS but they are still historically specific. Nearly all of the cohort were born to married parents compared to just under two thirds of children born in the late 1990s (Haskey 1998). Clean break divorces were common in the 1970s, with the family home more likely to be sold as part of a financial settlement and fathers more likely to lose touch with their children, sometimes because they believed it was less disruptive for the child (Eekelaar and Maclean 1986). Since the 1990s both attitudes and legal frameworks have changed. Children are more likely to stay in the family home, and the Child Support Agency, established in 1993, aims to increase the financial support flowing from fathers to their children, particularly among low income families. The 'Families need Fathers' voluntary organisation was founded in 1974 and grew to exert more pressure on government and the legal system to recognise fathers' rights of access and joint legal custody. The debate continues around the value of the Child Support Agency, balancing the gains of improved financial support (Family Policy Studies Centre 1999) with the potential reduction to informal transfers if a father is forced to pay maintenance (Clarke et al. 1994) or the potential to extend, or even begin, conflicts between the separated parents (Batchelor et al. 1994).

Many of the circumstances of family disruption have changed since the 1970s and 1980s, but with a 30 year gap in cohort studies, ended by the launch of the Millennium Study in 2001 (Centre for Longitudinal Studies 2001), quantitative investigations of young adult outcomes of family disruption must rely on either retrospective data collection, with potential for bias, or panel data from, for example, the British Household Panel Study, where numbers in sub-groups can be small. Yet there are important continuities that make the findings from the BCS70 relevant today, most notably the role that family income and other resources play in determining the life chances of children.

The following sections review the key findings of Chapters 4 to 6, which examined the association between the type and timing of childhood family disruption and educational attainment, unemployment in young adulthood and, among women, early childbearing. In the chapters on educational attainment and young motherhood, a series of nested models were used to examine the association between family disruption and these outcomes, starting with

only the measure of disruption and then controlling initially for family circumstances at birth. This allowed examination of the 'selection' arguments suggesting that the types of families that are most likely to dissolve are also those most likely to have children who have poor educational attainment or go on to become young parents.

Once these models had been fitted, factors from early childhood were added to see if the early experiences and behaviour of the child, whether before or after disruption, set a path for a life course that was more likely to lead to the outcomes in question. In a final set of models, some factors from the age 16 survey were added to the models to examine whether there were characteristics of some post transition families that 'explained' the association with the outcomes. Once each model was fitted using the measure of family structure at 16, it was repeated using the three alternative measures of disruption: the type of transitions; the number and timing of transitions; and, for the most common types of disruption, the type and timing of transitions.

Chapter 5, looking at unemployment, continued on from Chapter 4, taking the young person's educational attainment as its starting point. After controlling for this and other structural factors, including region, ethnic group and year of entering the labour market, it examined whether family disruption continued to have any associations with early labour market experiences. Further factors from the age 16 survey were added in a second group of models to see if they illuminated the mechanisms by which some family backgrounds are precursors of unemployment.

The results showed that using a dynamic measure of family change produces different conclusions than when using a cross-sectional observation of family structure at 16. There was no single type or age at disruption that was consistently associated with all of the adult outcomes among both men and women.

Whilst boys experiencing the most common transitions into a lone mother or stepfather family without stepsiblings had no increased probability of passing fewer than five O levels after taking their socio-economic background into account, women experiencing the same transitions did appear to be at increased risk, particularly if the transitions occurred in late childhood. Although their disadvantaged background explained much of their lower attainment, men who were born to a lone mother or had lived with a lone mother after early parental separation were still more likely to be long term unemployed as adults than men from most other family backgrounds. For women, it was again late transitions that appeared to be

associated with slightly higher probabilities of young motherhood as well as living with stepsiblings. Chapter 1 introduced some themes around which the literature on the life course effects of family disruption can be organised, looking at financial hardship, social capital and control or the effects of change, stress and conflict. The key findings from Chapters 4 to 6 are now reviewed according to these themes to examine both consistency and difference according to the type of outcome and the extent to which these results confirm or bring into question existing evidence.

7.3.2 Financial circumstances

Financial hardship can be both a precursor and consequence of family disruption. Limited resources can restrict the support that parents can provide for their child's education or training and the pressures of living on a low income can put a strain on the family.

Educational attainment

Socio-economic status, reflected by social class, parental educational level and tenure were all strong predictors of educational attainment at 16 among both men and women. Those born to a lone mother were most likely to be disadvantaged in childhood and taking these circumstances into account reduced the parameter estimates to nearly zero for this group. Similarly, for men, the already small increase in the odds of achieving fewer than five O levels among those living with a lone mother after parental separation virtually disappeared after adding socio-economic circumstances at birth. Women's outcomes were additionally found to be more sensitive to the family's financial circumstances at 16 than boys.

Resources in all post-transition families can be limited due to the division of resources on separation and in stepfamilies there may be financial obligations to children from previous partnerships. At the same time, stepfamilies in this cohort tend to disproportionately come from disadvantaged backgrounds. For men in stepfamilies without stepsiblings, just adding the socio-demographic characteristics of the birth family more than halved the parameter estimate bringing it down to a level comparable with those in lone mother families. For women, the inclusion of financial circumstances reduced but did not eliminate the increased probability of achieving fewer than five O levels among those living in a stepfather family, with or without stepsiblings.

Unemployment

The picture was clearer when predicting unemployment. In Chapter 5 the chance of experiencing four to 11 months unemployment was found to be largely a product of the

economic cycle. Graduates were over-represented in this group and there were few clear differences by other characteristics. However, the chances of long term unemployment (12 months or longer) were clearly related to the financial characteristics of the young person's family. Even after controlling for the young person's qualification attainment, family social class, family receipt of means tested benefits at 16 (men) or recent financial hardship (women) were clearly associated with long term unemployment in young adulthood. Adding these factors to the models more than halved the parameter estimates for men and women in lone mother families at 16 after parental separation. There also appeared to be disadvantage for those who had spent longer in lone mother families with higher probabilities of long term unemployment among children of women who separated from the father when they were very young. For women living in stepfather families, there was an interaction showing no "net effect" of this family structure if the family had recently experienced financial hardship.

Young motherhood

The higher probability of becoming a young mother found among women living in a lone mother or stepfather family without stepsiblings was reduced to low and statistically insignificant levels by adding the socio-demographic characteristics of the family of origin. Similarly, financial hardship at 16 attenuated the differences according to family structure, particularly for those who had recently experienced the transition to a lone mother family after parental separation.

McLanahan and Teitler (1999) estimated that financial circumstances explained roughly half the 'effect' of family disruption on later life outcomes. The results of this thesis would both support and refine that conclusion. Although controlling for economic circumstances substantially reduced the predicted probabilities of the more disadvantaged outcomes for those who experienced the most common transitions, the estimates for some less common family trajectories, such as being born to a lone mother, living with stepsiblings or being taken into care were not attenuated to the same degree and continued to show an increased probability of less favourable outcomes, requiring explanation from other perspectives.

7.3.3 Social capital and control

Apart from financial resources, parents may transmit social capital to the child through their values, support and social networks. Family disruption is argued to affect this transmission if, for example, the family has to move to a cheaper area or the child loses touch with the father and, in turn, his family and networks, or the child's self esteem is affected. Within the

household, some types of 'non-intact' family have been found to operate lower parental control, particularly over older children.

Educational attainment

Apart from the greater financial resources that more highly educated parents can provide, the transmission of attitudes to education and parental expectations of the child were critical to the outcome, particularly for women in this cohort. Children whose parents expected them to stay on at school beyond the statutory leaving age and who were considered by their teachers to have parents who were very interested in their education, did better than those with lower parental expectations and interest, independent of their parents' own educational background.

The parents of children in post-disruption families had lower expectations of their children, especially parents in families containing step-siblings, and were less likely to be rated as very interested in their child's education than parents who remained together. We cannot unravel whether this is a pre-existing characteristics of parents who divorce, a consequence of the disruption, or, as discussed earlier, a reflection of teacher bias in their assessment of separated parents. Apart from the transmission of social capital, parental supervision and control was also a factor in the teenage years. Sixteen year olds that were not expected to do their homework and had poor levels of supervision and communication with their parents were most likely to do badly.

Adding factors reflecting social capital and control reduced the estimated coefficients for many types of family disruption and indicated some of the pathways by which family disruption might precipitate lower attainment.

Unemployment

Social capital, and particularly social networks with links to the labour market, could make a crucial difference in the transition to work, particularly once the early 1990s recession began. The analysis bore out the proposition that children born to a lone mother, or those who had been in a lone mother family from a young age, might be most disadvantaged in the labour market because they were least likely to maintain links with their father and their mother's links to the labour market may be at a lower occupational level. By contrast, the lowest, or even negative, parameters for long term unemployment were found among those experiencing transitions in adolescence who were most likely to still be in touch with their father and his extended family.

Young motherhood

The outstanding association in the analysis of young motherhood was the link between a mother and daughter's age at first birth. Although the typical age at family formation is rising across the board, those born to young mothers were far more likely to become relatively young mothers themselves. Apart from the higher probability of a disadvantaged childhood among those born to younger mothers, explanations point to both social and biological transmission of early childbearing preferences.

Young motherhood is also a strong predictor of relationship instability (See Section 3.4). Nearly 20% of cohort members' mothers who were lone mothers after parental separation by the time of the age 16 survey had begun childbearing at age 18 or younger, compared to 10% of those still living with the natural father. Young motherhood was even higher in stepfamilies; here 29% of the mothers who had repartnered had experienced a first birth at age 18 or before. The youngest mothers were most likely to experience relationship breakdown at shorter durations, but also as a result of both their age and time available were most likely to have repartnered by the time the cohort member was 16. It is therefore no surprise that girls living in stepfather families at 16 were initially found to have high rates of early childbearing but then controlling for the their mother's age at first birth, together with parental education and social class greatly reduced the differences according to family type. An outcome that was not explained by this process is the persistent association between living with stepsiblings and living in a stepmother family and young motherhood.

7.3.4 Change, stress and conflict

Adjustment has often been found to be poorest among children experiencing multiple family transitions. Change may involve conflict and even non-conflicted transitions may be stressful for the child if it involves a change in environment or the role that the child plays in the family.

Education

The potential disruption to study in the years preceding O level examinations could be an explanation of the higher probability of low attainment amongst those experiencing late transitions, most notably girls moving into stepfather families. Similarly, accommodating stepsiblings may make the transition to a stepfamily more stressful. Although this is speculation, it is clear that the addition of socio-economic circumstances at birth or early childhood environment did not reduce the predicted probabilities of lower attainment to the same degree as among other family structures.

Unemployment

The stress of change may well impact on educational outcomes but there was less evidence of a direct impact once the cohort members had left education. It is possible though that the higher probability of long term unemployment among men in stepmother families and women in stepfather families could be a legacy of conflict in the teenage years which could reduce the level of support available to the young adult.

Young motherhood

Again, a higher hazard probability of young motherhood was found among women who lived in stepfather families with stepsiblings but not in those without. In Chapter 6, the discussion pointed to the potential for conflict between new step-siblings, and a teenage girl engaged in conflict at home may react by engaging in a range of risk behaviours including early sexual activity.

In summary though, at no point was family disruption found to be more pertinent to young adulthood outcomes than pre-existing factors such as socio-economic disadvantage, parental education or mother's age at first birth. Children who experienced the most common transitions into a lone mother or stepfather family without stepsiblings were generally at a low or zero increased risk of poorer outcomes after taking their original family circumstances into account. If the associations found among this cohort are weaker than those found among the 1958 NCDS it could be because responses to divorce have changed but also it could be a product of the different measures of family transition used in this analysis. Secondly, for women at least, later transitions seemed to carry a higher risk of poorer outcomes than those at younger ages. Children on the NCDS tended to experienced family disruption at older ages and if family structure at 16 is used as the measure, results will be affected by the later average age at transition. At the same time, children experiencing very early transitions, at pre-primary ages, tended to come from the most disadvantaged backgrounds and were born to the youngest mothers. Their outcomes had more to do with their original circumstances than any changes occurring in family structure. As parenting changes become more common, cohort analyses must focus on the variation within those experiencing disruption rather than comparing them as a whole to those who do not.

7.4 Further Research

7.4.1 Researching stepfamilies

There is a considerable dearth of British (and even American) qualitative investigation into relationships in stepfamily networks that is only just being addressed. Indeed, Ribbens McCarthy and colleagues began their recent report of stepfamily research with the statement that their study was the

> "first qualitative sociological study of step-parenting since the ground-breaking work of Burgoyne and Clare (1984) fifteen years ago"
>
> (Ribbens McCarthy et al. 1999, p5)

Even then, sibling relationships, let alone stepsibling relationships are often overlooked due to the emphasis on the parents' relationship and, in turn, their relationship with the children. In the US, Rosenberg and Hajal argued that researchers were ignoring the "percolator effect" whereby either the supportive or disruptive behaviour of the siblings in a stepfamily could upwardly influence the stability of the new partnership (Rosenberg and Hajal 1985b).

The formation of a stepfamily, particularly with stepsiblings, requires far more rapid adjustment for a child than the evolution of an original family. The arrival of the step-parent can confirm to the child that the parents' partnership has ended and provide a competitor for the biological parent's affections. Step-siblings can suddenly disrupt the child's birth order in the family creating problems of role displacement, especially if the child is used to being the eldest or youngest sibling (Beer 1989). Children may have to share rooms and possessions with someone that they have very little shared history with and older step-siblings may be sexually attracted to each other but uncertain about the boundaries of their relationship.

However, the focus on the negative aspects of stepfamily formation has been criticised for its reliance on clinical samples without consideration of adjustment among the majority or how the creation of stepfamilies varies according to the socio-economic status of the family (Eggebeen 1991). Gorrell Barnes and colleagues' qualitative follow up of 50 people from the NCDS who had lived in stepfamilies avoided this clinical bias and provided insight into sub-groups, such as the 12 people who had ever lived with stepsiblings (Gorell Barnes et al. 1998). Contrary to some of the clinical perspectives they found that only three out of the 12 respondents reported consistently severe conflict with their stepsiblings and although conflict was more likely to occur in the teenage years, the hostility often lacked the emotional intensity that can occur between biological siblings. The authors concluded that the levels of conflict

between stepsiblings tended to depend on the quality of the relationship with the parents and their ability to treat the children fairly.

The arrival of a half-sibling was not dealt with in this thesis. Given the small numbers involved, stepfamilies could not be categorised four ways according to whether or not they contained half-siblings, stepsiblings, both or neither. The Gorrell Barnes study commented that emotional intensity towards half-siblings was somewhere between the high levels towards full biological siblings and lower levels towards stepsiblings. Much of the relationship depended on the age difference with very closely and very distantly spaced siblings having different problems to overcome. The Exeter Study (Cockett and Tripp 1994) makes one reference to conflict between stepsiblings in one or two families but in the discussion reverts to more general speculation about the possible impact of gaining responsibilities for younger stepsiblings as well as the divided attention of parents.

The results of the analysis in this thesis indicated that young people who had lived in a stepfather family with stepsiblings were generally disadvantaged in young adulthood in a way that was not universally the case among those who had not lived with stepsiblings but they tended to come from the most disadvantaged backgrounds in the first place. McLanahan and Bumpass (1988) concluded that, in terms of later outcomes, the additional stress in stepfamilies might cancel out the benefits of the increase in family income. A qualitative study of resources and relationships in stepfamilies that have, or have not, contained stepsiblings would help to explore this conclusion.

7.4.2 Researching households and researching families

This analysis of the BCS70 can clearly be criticised for falling into the trap of conflating household composition with family type (Wilson and Pahl 1988). The limitations on data collection in such a wide ranging survey restricted the priority given to researching the role of the non-resident family of the cohort member. The focus at every stage of the study was on the cohort member and his or her household. We know very little about the strength of their personal ties with non-resident parents, grandparents, siblings or other relatives. In particular, a child can simultaneously belong to two step-families spending time at both parents' homes. Family research needs to focus more on the dyadic relationships around the cohort member, regardless of residence, to examine how individuals may both gain support from family outside their household as well as live with people to whom they do not feel particularly close (Norway: Levin and Trost 2000).

In Britain, Scott has defended the value of using quantitative surveys for this type of investigation in addition to more detailed ethnographic research. Her analysis of the British Household Panel Survey used questions on events of significance to the respondent to explore the importance of non-household kin and "the permeability of households" (Scott 1997). She concluded that although we may be living outside nuclear family households, either alone or in other family forms, family events are consistently perceived to be more important to people across all types of households than aspects of their employment or health.

In the BCS70, in the childhood stages, mothers were asked who looked after their children if they worked and, at 16, the cohort member was asked how much contact they had with their absent parent, but not how they felt about that contact or their relationship with the parent. The Millennium Cohort Study (Centre for Longitudinal Studies 2001) is asking more questions about the parenting arrangements for the child at the time of the birth and has potential to track the ongoing relationships in the child's life that may be outside the household. Similarly, in adulthood, the age 30 wave of the study collected more details of children born to the cohort member as well as stepchildren in the household. Future waves of the survey could carry forward information on these children to track their residence and contact with the cohort member. With both policy and academic interest in new family forms, there seems justification for questions drawing out who the cohort member considers to be their family and who they feel obligations towards, and not just who they live with.

Appendix I Data cleaning and editing

This appendix documents the stages of data cleaning and editing that were undertaken before analysis could begin. An expanded version of this report, which contains the serial numbers of all cases referred to, is available from the author.

I.1 Selecting records for analysis

I.1.1 Merging the datafiles

The data was supplied by the UK Data Archive in 22 separate files. The different stages of the survey do not have a common serial number so the procedures given in the survey documentation for deriving a common serial number were followed (Despotiduou and Shepherd 1998). All the cases were successfully merged across the different stages with the exception of 36 respondents at the age 26 stage. The documentation for the age 26 survey confirms that out of the 9003 interviews, in 36 cases the "key" common serial number variable used to match data with previous waves had a value of zero. In four cases this was due to an omission in the creation of the variable and the values of the key variable were corrected as instructed in the documentation. In a further nine cases, although there was no initial match with the earlier data, the value given at another serial number variable (CHESNO) allowed the cases to be matched with data from the earlier stages. These cases were checked individually to confirm successful matching according to the sex and selected characteristics of the cohort member. Finally, the remaining 23 cases had no further information that could enable them to be matched to earlier data and were, therefore, dropped from the dataset.

I.1.2 Dropping cases unsuitable for analysis

People who immigrated to Britain after 1980

Thirteen records related to respondents who joined the survey at age 16 because they had immigrated to Britain since the previous stage in 1980. These cases were dropped as they had spent the majority of their childhood outside the country and their experiences might have been substantially different from the rest of the cohort.

No family information

A further 84 cases were contacted for the first time at age 16 but no parental interview was conducted. They were dropped from the analysis because there would be no information on the family history that forms the basis of this thesis. Finally, 171 cases had serial numbers relating to the survey stages before age 16, but no family information was collected at any point in the study. The majority of this group comprised respondents who were new to the

study at age 10 and then were either total or partial non-responders at age 16. Again these cases had to be dropped. In total, 268 cases were dropped from the dataset as they were unsuitable for analysis leaving a total of 17, 380 respondents who had lived in Britain at least by age 10 and for whom there was some family information available between birth and age 16.

I.2 Weighting for non-response

Table I.1 Percentage distributions of co-variates tested for their association with the probability of response at 16, and 16 and 26

	%
Sex	
Male	51.8
Female	48.2
Ethnic Group	
White European	93.9
African Caribbean	3.5
Asian	2.6
Birth order	
First born	38.0
Later born	62.0
Parents' education level	
Neither beyond 15	49.1
Either 16+	43.6
Not known	7.3
Region of birth	
North, Yorkshire & Humberside	15.1
North West	12.8
East Midlands	6.1
West Midlands	10.5
East Anglia	3.2
South West	6.2
Wales	5.1
South East	29.7
Scotland	9.6
Overseas/not known	1.8
Mother's age in 1970	
<=19	9.7
20+	90.3
Total	*17,380*

	%
Family structure at age 5	
Both natural parents	79.9
Other	20.1
Mother's age at first birth	
<=19	24.1
20+	75.9
Number of house moves by age 5	
<=1	58.4
2+	16.3
Not known	25.3
Social Class	
Non-manual	28.9
Manual	65.8
Not known	5.3
Birthweight	
Lowest quartile	24.1
2nd quartile	24.2
3rd quartile	22.8
Heaviest quartile	23.9
Not known	4.8
Ever in care by age 5	
Yes	0.8
No/Not known	99.2
Total	*17,380*

Table I.2 Percentage distribution of composite variable for birth and age five characteristics

		%
Living with both natural parents at age five and..		
Parent's education: *Either/ both age 16 or later and...*		
Education score at 5:	*Higher*	17.6
or	*Lower*	11.4
or	*Not known*	3.1
Parent's education: *Neither beyond age 15...*		
Education score at 5:	*Higher*	13.4
or	*Lower*	19.0
or	*Not known*	3.6
Not living with both natural parents at age five and..		
Parent's education: *Either/ both age 16 or later and...*		
Education score at 5:	*Higher*	1.2
or	*Lower*	1.4
or	*Not known*	0.2
Parent's education: *Neither beyond age 15...*		
Education score at 5:	*Higher*	1.2
or	*Lower*	2.9
or	*Not known*	0.4
Missing age five stage		19.8
Missing birth and age five stage		4.6
Total		*17380*

I.3 Constructing parenting histories

I.3.1 Overview

An aim of this project was to consider the timing, duration and sequencing of family transitions in childhood in addition to the observed family structure at any single stage of the study. To date, analysis of family diversity on the BCS70 has been confined to the current status information recorded at one stage of the survey (Osborn 1980; Ely 1999). However, there may be a variety of pathways to the same family type that are not reflected in this type of analysis. The BCS70 is unique among the British Cohort Studies in having questions at all of the childhood stages concerning the timing and reasons for the departure and arrival of parent figures of the cohort member between waves of the survey. This information can be used together with the family structure at the time of the interview to construct variables reflecting the family type that the child was living in for each year up to age 16. A considerable part of this research was devoted to deriving these variables, overcoming the high levels of case and item level non-response as well as the inconsistencies in retrospective accounts of the family history. This section documents the editing and imputation that took place beginning with the methods of data collection, relevant questions and potential for error.

I.3.2 The survey instrument

Each survey stage was distinct in its design and questions on parenting arrangements. A brief outline of topics covered is given in Table I.3. It shows that a large number of variables were available from all waves of the survey that could be used to construct a family history and, in total, the retrospective family history relied on a combination of over 45 variables. At each stage of the study the parents were asked to recall any parenting changes since the birth of the child so it was often possible to overcome omissions resulting from wave non-response.

Table I.3 Sources of information on parenting at each stage of the BCS70

Type of Information	Stage			
	Birth	**Age 5**	**Age 10**	**Age 16**
Current parenting information	Marital status	Relationship of parent figures to the child	Relationship of parent figures to the child	Relationship of parent figures to the child
Other adults in the household	-	Derivable from total number in household and total number of children in household	Derivable from total number in household and total number of children in household	Other adults and their relationship to the cohort member
Separation from the natural mother or father	-	Year and reason	Year and reason	Year and reasons for change in situation between 0&5, 5&10 and 10&16
Arrival of a new parent figure	-	-	Derivable from details of time in a lone parent family	Year
Past periods in a lone parent family	-	-	Year and structure of most recent time in a lone parent family for more than 6 months	Derivable from year of separation from natural parent and arrival of new parent figure
Periods in statutory care	Current status	Current status & derivable from year separated from mother and whether ever in a residential children's home	Current status and age first and last in statutory care and longest period	Current status and ever been subject of a residential care order (no year)*
Other information			Whether lived with the 'same two parents' since birth*	Broad family structure at 5, 10 and 16+

* not used to derive family type as lacking specific details
\+ used only when all other information was missing

Definitions

At each stage, the parental interview was conducted by different types of interviewers ranging from a midwife at birth, health visitor at five, a range of medical professionals at 10 and self completion at 16. The definition of who is a parent figure was largely left to the respondent as long as the adult concerned met the requirement of usually residing in the child's household. A common result of this is the variation in whether a resident grandparent or cohabitee is considered to be a parent figure and this has been taken into account in deriving family type. Here, all cohabitees were classified as a step-parent to the child whilst resident grandparents were classified as "other adults". Similarly, although the pre-coded responses listed the options of adoptive, step or foster parent, the first prompt is that of 'natural' parent. At ages 10 and 16 a small number of stepfathers (including some who had become the legal adoptive father) identified themselves as the 'natural' parent of the child. In these cases the family type was corrected back to that of stepfamily.

Apart from problems of definition, respondent error in recalling the year of any transition was shown to be quite high in Section 2.4. Parents who remained in the survey at all stages will have been asked for information on family change a total of three times for the period between birth and age five, twice for the period between age five and 10 twice and only once for between 10 and 16. As a general principle, the information supplied closest to the event was used as the valid data for analysis and not overwritten if a response a later stage was inconsistent.

I.3.3 Deriving parenting histories

This section describes in detail the procedures adopted for creating a variable for family type for each year from birth to age 16. The data was supplied in its original form after keying, without checks on the validity of the responses across questions. Details of common inconsistencies, and the actions taken to overcome them are described.

Family type at birth

At birth, the mother was asked about her marital status rather than her living arrangements. Married women, who comprised over 92% of the sample, were assumed to be living with the natural father. Unmarried women were classified as lone parents if they stated that they were unsupported by the father and gave no occupational details for him. Those who gave full information on the father were tentatively classified as cohabiting. A small number of cases with no data on marital status were classified as lone or both natural parent families according to the same criteria for information on the father.

Family type at age five

At age five there were two questions concerning the relationship of the mother and the father figure to the child resulting in 22 reported parenting combinations. Each parent was asked if they were one of the following types of parent figure.

1. Natural (mother/father)
2. (Mother/father) by legal adoption
3. Step (mother/father)
4. Foster (mother/father)
5. Grand (mother/father)
6. Elder (sister/brother)
7. (Mother's/father's) cohabitee
8. Other (mother/father) figure
9. No (mother/father) figure

(Source: BCS70 Five Year Follow Up, Home Interview, Questions E010 & E011)

The same wording was used subsequently in the surveys at age 10 and 16.

Family transitions between birth and age five

Parents were then asked if the child had been separated from the natural mother or father and, if so, the year of that separation. Where a transition was reported and a date at change given (about 7% of respondents, n=872), the family type at birth was copied forward up to the year of the change at which point it switched to the family type at age five. For those in a stepfamily at age five, at this stage there was no information on the duration of any interim period in a lone parent family. This would later be obtained from the age 10 data.

This information was also useful to check the early circumstances of women who were not married at the time of the birth, but responded at age five (n=706). Of these cases around 75% had been classified as lone mothers and the remainder as possibly cohabiting with the father according to criteria described earlier. By age five, 39% were living with the natural father comprising nearly all of the cases that had initially been classified as cohabiting plus a further group who had reported at the birth survey that they were not supported by the father and gave no occupational details for him. For these cases, if there was no recorded transition it was assumed that the father moved in around the time of the birth and family type was recoded to that of living with both natural parents from the first year of life ('Year 0'), but family type at birth itself was left unchanged.

In 176 cases the family type at age five differed from that at birth, but the dates of the change were missing. If the child had been adopted the transition was imputed as occurring before their first birthday. This was selected because among those adopted children for whom a date of separation from their parent(s) was given, 77% were adopted within a year of birth. Therefore, it seemed more reasonable to impute this year for those with missing data rather than pursue a more involved approach. For the remaining cases, the transition would be entered at a later stage using responses at age 10 or 16. In some cases the transition year was not available at a later stage and had to be imputed, as described in Section I.4.

For cases with no birth data (n=392), the reverse procedure was carried out by copying family type at age five back to birth or any year of separation from a natural parent. If the child was still living with the other natural parent we can deduce that they were with both natural parents before, but if not, the earlier family type could not be established and was left as 'not known'. This was most common among cohort members who were in adoptive families at age five. In addition to these transitions, if a child had entered a residential children's home or foster care at any point in a year, the family type for that, and subsequent completed years in the home, was changed accordingly. There were 11 cases with no birth data who were not living with both natural parents and were missing the dates of transition. Four of these were in an adoptive family and the family type was again changed from the first year of life with the family type at birth retained as 'not known'. For the remaining seven, the year of transition would be entered using information at a later stage. Finally, six cases where the child had been separated from both natural parents, but at different ages, were inspected individually to deduce family type for each year.

Family type at age ten

At age 10 there were a number of separate survey instruments and out of the 14,875 responding cases counted as responding, 13,715 contained information on parent figures. Current family type was derived as described for age five and by now 30 different parenting combinations were identified. The responses at the age 10 stage were checked against the available birth information and age five stage, revealing a number of inconsistencies.

Stepparents identified as natural parents

In 12 cases, men who identified themselves at the age five wave as the stepfather or cohabitee of the natural mother were now identified as the natural father. There were no such switches among stepmothers. Although there is a small possibility that the natural parents had reconciled, none of the couples reported that there had been any parenting changes since the age five stage. Therefore, the family type was overwritten at age 10 to be consistent with the type of stepfamily at age five.

Similarly, there were a number of children reported as living with both natural parents at age 10 who were coded as living with lone parents at either age five (n=17) or at birth (n=29). We usually have no way of telling whether this is the natural father who has moved back in, or a stepfather identifying himself as the natural parent. In only three cases could the information given at age 10 be overwritten to that of stepfamily because at age 16, the father figure identified himself as a stepfather who moved in before 1980.

Adoptive parents identifying as natural parents

Another scenario was reported adoptive parents at the age five stage who identified themselves as the natural parents at age ten. In three cases, the family type was overwritten to that of adoptive parents or adoptive lone mother according to the circumstances. In one case, which was new at age ten, the parents originally identified themselves as the natural parents. However, at age 16 they reported that they had adopted the child in 1970. Therefore, the family type was retrospectively corrected to adoptive parents.

Family transitions by age ten

The age 10 survey asked a range of questions on the child's parenting history. The relevant page from the questionnaire is reproduced in Figure I.1. As discussed in Chapter 2, the survey was conducted in 1980, predating the development of life history calendar interviewing techniques and a certain amount of inconsistency is to be expected.

Figure I.1 Questions on family structure in the age 10 parental interview

For the purpose of this study a parent should only be counted as such if he or she is normally resident in the study child s household
Parents who are temporarily away from home (e g because of their job in hospital or for similar reasons) should be given as parent figures

A5 (a) What is the relationship to the child of the person now acting as his/her mother?

A5 1

- ☐ Natural mother
- ☐ Mother by legal adoption
- ☐ Stepmother
- ☐ Foster mother
- ☐ Grandmother
- ☐ Elder sister
- ☐ Cohabitee of father
- ☐ Other mother figure

  please specify A5.2

- ☐ No mother figure

(b) Please give reason(s) for any past changes in the child's srtuation, e g family changes divorce, mother died, etc

A5 3
A5 4

(c) If child is not now living with natural mother, please ask when the mother and child were separated

A5 5

Separation occurred in ☐☐☐☐ 19

A6 (a) What is the relationship to the child of the person now acting as his/her father?

A6 1

- ☐ Natural father
- ☐ Father by legal adoption
- ☐ Stepfather
- ☐ Foster father
- ☐ Grandfather
- ☐ Elder brother
- ☐ Cohabitee of mother
- ☐ Other father figure

  please specify A6 2

- ☐ No father figure

(b) Please give reason(s) for any past changes in the child's srtuation, e g family changes divorce, father died, etc

A6 3
A6 4

(c) If child is not now living with natural father, please ask when the father and child were separated

A6 5

Separation occurred in ☐☐☐☐ 19

IMPORTANT Throughout the questionnaire the terms 'mother' and 'father' should be taken to mean the mother figure and father figure given in questions A5 and A6 above

A7 Has the study child lived with the same two parents since birth?

A7

- ☐ Yes
- ☐ No

A8 Has there *ever* been a period of six months or more when the child lived with only one parent figure?

A8 1

- ☐ Yes, *and still living with only one parent figure*
- ☐ Yes, but now with two parent figures
- ☐ No
- ☐ Not known

If No or Not known please continue at question A9

If Yes, please give the following details concerning the *most recent* time when the child was living with only one parent figure

A8 2

(a) How old was the child when this began? ☐☐ years
If under one year please put 0

A8 3A A8 3B

(b) How long did this situation last? ☐☐ years ☐☐ months
If still with only one parent please put NA *years* NA *months*

(c) With whom did he/she live for most of the time during this penod?

- ☐ Mother figure — A8 4A
- ☐ Father figure — A8 4B
- ☐ Other person — A8 4C

  please specify

(d) What was the main reason for this situation?

- ☐ Death of a parent — A8 5A
- ☐ Illness/disablement of a parent — A8 5B
- ☐ Divorce, separation — A8 5C
- ☐ Other reason — A8 5D

  please specify

3

For example, 11% of children reported to be currently living in a lone parent family at Question A8 were identified as living with both natural parents or in a stepfamily at Questions A5 and A6. Furthermore, the reported date of separation from the natural parent (QA5c and A6c) was not necessarily consistent with the reported data of the most recent period in a lone parent family (Q8a) either because of recall error or multiple family transitions.

For those with previous data at either birth or age five, the family type was copied forward from that stage up to age ten. Dates of separation from the natural parent were used to derive a change in family status for each particular year. Any dates of transition previously given at age five were not overwritten if they differed from a date given at age 10. So, for example, if a mother reported at age five that the father had left in 1974 but at the age 10 survey said that the separation occurred in 1976, the date of separation was left unchanged at 1974. In a number of cases at age 10 a separation was reported as occurring in 1974 or 1975 that was not identified by the survey at age five. Apart from recall error, this could happen if the separation had occurred soon after the fieldwork or if the situation was not clear at the time of the fieldwork. In these cases the family type was change from immediately after the age five survey.

Apart from separations, the parents were asked if the child had spent any time in a lone parent family and, if so, the most recent period was recorded. Note that this would omit details for children who had spent two or more distinct periods in a lone parent family before the age of ten. This information was used for all cases to 'superimpose' periods in a lone parent family between birth and age ten. This meant that children identified as living in stepfamilies at age five could now have a period in a lone parent family recorded. Finally, later in the questionnaire, the parent was asked if the child had spent time in statutory or foster care and the family type for the first and any subsequent completed year in care was amended accordingly. The age 10 data was also used to override the date of transition if the child was not living with both natural parents at age five, but the year of the change had been missing at this previous stage. There were 77 cases at age 10 where it was now possible to add in the correct year that the child had been separated from the natural parent.

In 60 cases family type had changed between age five and 10 but neither a year of separation from the natural parent or period in a lone parent family was given. These records would be corrected using age 16 data. Similarly, eight cases where there was no age five data, recorded a change between birth and age 10 but had no year of transition and would be corrected later. Eight cohort members were separated from both natural parents by age ten, but at different

dates and their parenting histories were edited individually to establish exactly when they were separated from each parent.

Family type at 16

The age 16 data required by far the largest amount of cleaning and editing. The parental information was collected by self completion questionnaire and contained a high level of inconsistency both within the age 16 stage and with earlier waves of the survey.

The type and ordering of questions on family structure at age 16 differed from earlier stages. The parental questionnaire began with a household grid which listed all members of the household and their relationship to the cohort member (variables oa72 to oa79). In the course of the interview, the respondents were then asked the relationship of the "mother figure" and the "father figure" to the child in questions that were worded identically to the parent questions in the age five and 10 surveys (variables oa9_1 and oa10_1). Later in the questionnaire the respondents were asked how many natural and stepparents the teenager was living with at 16 (variables oa11_4 and oa11_8). This, therefore, gave three opportunities to provide, potentially inconsistent, information of family structure.

Initially, the questions asking the mother and father figure relationship were used to derive family type. These questions are consistent with the previous stages and are most commonly used to identify family structure by users of BCS70. However, by checking the responses at this question with the other variables on the family and consistency with previous stages it became apparent that up to 5% of cases would have been misclassified if we had relied on these variables alone. In particular, the analysis would have overestimated the presence of natural fathers in the household and underrepresented the number of lone and step families. It appears that the question on mother or father figure was more broadly interpreted by respondents than the household grid section and questions on residential family structure. For example, over 200 fathers who were not recorded in the household grid as resident and were noted as absent at the later questions were identified as the "father figure" to the child, perhaps because they continued to play a role in their lives. Details of the editing required for these cases are given below.

Mother and father figure information missing

In some cases the responses to the mother and father figure questions (oa9_1 and/or oa10_1) were missing. If so, the response elsewhere on the questionnaire was investigated. Sometimes the variable was missing because there was no mother or father figure at all (although there was a code for this), but in other situations the family type was given in either the household grid or later questions on family structure. Seventeen cases that were blank at both oa9_1 and oa10_1 were assigned a family structure according to information from other questions.

Some cases were missing information for the mother figure only (oa9_1). Most of these were indeed lone father families but 17 were corrected according to the household grid information or later questions on family structure. Similarly, in seven cases the father figure information at oa10_1 was missing, but was established from the other family information not to be living in a lone mother household.

Adoptive parents identified as natural parents

Some parents identified themselves as the natural parents when they had previously been recorded as adoptive parents. Sometimes matters were further complicated if the adoptive parents had separated or repartnered by age 16. Eleven cases were edited to a type of adoptive family.

Step-parents identified as natural parents

Again, 32 families identified themselves as two natural parents, but there was evidence to believe that one parent was a stepparent. Cases that had identified themselves as a mother and stepfather family at the previous stage of the study but reported themselves as the natural parents at age 16 with no recent parenting changes were reclassified as stepfamilies.

Stepfamilies that were not established by the mother and father figure question could also be identified by their response to the other family questions at age 16. Twenty-six cases were reclassified as a stepfamily family because they had identified themselves as a stepfamily on the household grid or later on the family structure question.

Lone parent families

In over 200 cases although a natural father figure was identified at the variable oa10_1, the residential family was described as a lone mother family and there was no father figure recorded in the household grid information. Similarly, a few cases were recoded to a lone father family because the mother did not appear to be resident.

In 11 cases although they were originally coded as two natural parents, they were missing a response at oa11_8 (giving the details of family structure at 16). According to oa11_4 (which asked how many natural parents the teenager lived with) they were not living with both natural parents and if there was also only one natural parent present in the household grid they were reclassified as a lone parent family.

Two cases originally coded as lone father families appeared to be keying errors and were corrected to lone mother families based on the evidence at oa11_4 as well as the previous family structure. A further 154 cases were missing both full household grid information and the responses on family structure at oa11_4 and oa11_8. The responses given at the mother and father figure questions (oa9_1 and oa10_1) could only, therefore, be assumed to be correct.

Table I.4 shows the frequencies of family type before and after these corrections. It shows that there was a small reduction in the percentage of cohort members classified as living with both natural parents with increases in the percentage living in lone parent or stepfamilies. By this stage, there were 37 possible parenting combinations.

Table I.4 Frequency of family type at age 16 before and after editing

Relationship of parent figures	Before editing	After editing	Percentage change
Both natural	7431	7137	-4%
Lone mother	673	897	+32%
Mother and adoptive father	91	102	+12%
Mother and stepfather	614	652	+6%
Mother and foster father	1	1	-
Mother and cohabitee	100	109	+9%
Mother and older brother	7	17	-
Mother and grandfather	10	10	-
Mother and other adult	24	26	-
Lone father	141	147	+4%
Father and adoptive mother	2	2	-
Father and stepmother	96	99	+3%
Father and cohabitee	7	7	-
Father and older sister	6	10	-
Father and other adult	8	8	-
Both adoptive parents	120	124	+3%
Lone adoptive mother	5	5	-
Adoptive mother and stepfather	6	10	-
Lone adoptive father	3	2	-
Adoptive father and grandmother	0	1	-
Both foster parents	17	17	-
Both grandparents	20	20	-
Lone grandmother	7	7	-
Older brother and sister	1	1	-
Lone stepfather	7	3	-
Lone foster father	2	2	-
Lone older brother	1	1	-
Older brother and other adult	1	1	-
Lone other male guardian	1	0	-
Lone stepmother	1	1	-
Lone foster mother	7	7	-
Foster mother and grandfather figure	1	1	-
Lone older sister	3	3	-
Older sister and other adult	4	4	-
Stepmother and stepfather	1	1	-
Other female guardian	6	1	-
In care	10	19	-
Two other guardians	7	7	-
Missing family information	0	10	-
Total	*9467*	*9467*	-

Family transitions between age 10 and age 16

Similar procedures to those at age five and 10 were followed to create variables reflecting family type at each age since the last available stage of the study for each cohort member At this stage, information was collected on both the year the child was separated from a natural parent and the year of arrival of a stepparent with an interim period in a lone parent family. Again periods in care were imposed on the data. In total, 1212 teenagers had changed family structure since the time of the last interview, whether that was at age ten, five or at birth. Additionally those cases that responded at age five or 10, but were missing earlier dates of family transition, could be retrospectively corrected using the dates given at age 16. As at previous stages, eight teenagers had been separated from both natural parents, but at different times. Again, their circumstances were inspected individually to classify their changes in family structure.

Cases missing dates of transition

Quite a number of respondents at age 16 had experienced parental separation or repartnering but there was no information as to when this change had occurred. This was mainly due to the amendment of many family types to that of lone or step family that was described in the previous section. These parents would not have been routed to the questions on parenting change as that section was dependent on the responses to the parent figure questions (variables oa9_1 and oa10_1) rather than the household grid or questions on family structure. Those cases that were missing the year of a family transition posed a particular challenge as there would be no further chances to 'fill in the gaps' with data from later stages. Table I.5 shows the numbers of cases missing such data according to the response pattern

Table I.5 Number of cases missing year of transition by response pattern at 16

Parental information at:	All cases	Cases changing family type between waves	Cases changing family type and missing year of change
10 & 16	8495	995	387
5 & 16	614	149	60
0 & 16	211	68	19
No previous parental information	147	n/a	n/a
Total	*9467*	*1212*	*466*

Similarly, there were a handful of cases for which dates of transition had been missing at earlier stages and there were no further details given at age 16. The stage at which the data was missing and counts are given in Table I.6.

Table I.6 Number of cases still missing year of transition from earlier stages

Family transition between:	Number of outstanding cases still missing year of transition
0 – 5	5
5 – 10	21
10 – 16	5
Total	*31*

Fortunately, at the age 16 survey, the parents were asked to recall the family structure when the cohort member was aged zero, five and 10 (variables oa11_1 to oa11_7). All except 10 respondents from the group with missing year of transition data supplied information to this question and, in fact, these nine cases all responded at age 10 and 16. We, therefore, know for all of these cases whether the change occurred between birth and age five, age five and age 10 or between age 10 and 16. It was relatively unusual for a respondent who was in a stepfamily to provide a valid year for the departure of the natural parent, but not the arrival of the stepparent or vice versa. A total of 32 cases contained one year of transition, but not the other, and in these situations just the one date needed to be imputed with reference to the known value.

In the first instance, regression based imputation was tested using the methods described in Chapter 2, Section 2.4. In short, a continuous variable may be imputed through a regression framework that uses independent variables that predict the response to a missing item. The year of the parental separation of repartnering was treated as a continuous variable ranging from 1970 to 1986. However, the resulting imputation was not successful. To explain by illustration consider the example of trying to impute the year of separation from the natural father when it is known that it occurred between 1980 and 1986. If the mother had repartnered by 1986 and, in particular, if she recalled that she was already separated by the time the child was age 10 then the imputation was more likely to predict a year of transition of either 1980 or 1981. However, if the mother had not repartnered and reported that she was still living with the natural father at the age 10 survey, no independent variables helped to predict the year of separation. The predicted year for these cases tended to cluster around the mean year of separation, among those with data, of 1982. In fact, of the 271 cases for which this imputation was required, nearly 40% of separations were predicted to have occurred in 1982. This contrasts with 12% of the matched group for whom a year of separation was available. Also, when the regression prediction was tested on cases where the year of transition was known there was a very poor correlation between the predicted and actual values.

Instead, therefore, imputation was tested using an ordered logit approach (McCullagh 1980; Sawkins et al. 1997, also see Chapter 5). The dependent variable (the year of transition) was treated as categorical but the model recognises the ordering in the categories. For *k* ordered response categories, here the year ranging from, for example, 1980 to 1986, there are probabilities $\pi_1(x)$, $\pi_2(x)$,.... $\pi_k(x)$, when the covariates have the value x. The model yields predicted probabilities of a transition falling within a particular year according to selected auxiliary variables.

The probability of observing an observation *i* is then defined as

$$\Pr(\text{outcome} = i) = \Pr\left(\kappa_i - 1 < \sum_j \beta_j x_j + u \leq \kappa_i\right)$$

$$= \frac{1}{1+\exp\left(-\kappa_{i+} + \sum \beta_{,} x_j\right)} - \frac{1}{1+\exp\left(-\kappa_{i+-1} + \sum \beta_{,} x_j\right)}$$

The logit estimation produces a series of cut points, K_is corresponding to the ordered categories of year and each case has a predicted probability of falling between each cut point. These probabilities are then added into a cumulative series of points between 0 and 1 and a year selected by the generation of a random number between 0 and 1, which is matched against the range of points.

Models were created to generate the following information when data were missing.

1. Year of departure of natural father for those with parental data at 10 and 16.
2. Year of departure of natural father for the remaining response patterns.
3. Year of departure of natural mother for all response patterns.
4. Year of arrival of stepfather for those with parental data at 10 and 16.
5. Year of arrival of stepfather for the remaining response patterns.
6. Year of arrival of stepmother for all response patterns.

The only response category with sufficient numbers to analyse separately were cases with parental data at age 10 and 16 who had experienced the departure of their natural father. All other categories were collapsed appropriately due to the relatively small numbers. Covariates were selected by a combination of forward selection and backward elimination, starting with an initial pool of potential factors, for each ordered logit model. The change in the –2 log likelihood was considered and variables retained if the difference was statistically significant at the 5% level. The level was deliberately set higher than that used in the analysis to try and include more factors that may improve the precision of the predictions. Table I.7 summarises the independent variables tested in these models and their level of statistical significance.

Table I.7 Variables tested for their association with the year of family transition

Departure of a natural parent	Year natural father left/died		Year natural mother left/died
	Between age 10 and 16	All others	All separations
Year stepparent moved in (if applicable)	***	***	***
Family structure at age 5 & 10 as recalled by parent at age 16	***	***	***
Family structure at birth as recalled by parent at age 16	*	***	***
Last observed family structure		***	
Reasons for separation (death/separation/other)	**	**	***
Earlier response pattern (age 10 to 16 only separations only)	**		
Marital history at birth of cohort member (not married/grouped duration of marriage)		**	**
Mother's age		**	**
Father's age	*	**	**
Whether mother teenager at first birth			
Employment status of remaining parent at 16		**	
Social Class of family at birth			
Whether maintenance paid now, in the past or never			
Frequency of child's contact with absent parent at 16	**		**
Whether discuss child's welfare with the absent parent at 16			***
If cohort member has older siblings			**
If cohort member has younger siblings			
Parents' age at completing full time education			

Arrival of a step-parent	Year stepfather moved in		Year stepmother moved in
	Between age 10 and 16	All others	All separations
Year natural parent left/died	***	***	***
Family structure at age 5 & 10 as recalled by parent at age 16	***	***	***
Family structure at birth as recalled by parent at age 16			***
Last observed family structure	***	***	***
Reasons for separation (death/separation/other)	**	**	
Marital history at birth of cohort member (not married/grouped duration of marriage)	***	**	**
Mother's age			
Father's age			***
Whether mother teenager at first birth			**
Employment status of remaining parent at 16			**
Social Class of family at birth	**	**	**
Whether maintenance paid now, in the past or never			
Frequency of child's contact with absent parent at 16	***	*	**
Whether discuss child's welfare with the absent parent at 16			
If cohort member has older siblings			
If cohort member has younger siblings		*	
Parents' age at completing full time education			

*** denotes significance at the 1% level
** denotes significance at the 5% level
* denotes significance at the 10% level

Although potentially of substantive interest regarding the push and pull factors on timings of transitions, these analyses were only conducted to select relevant auxiliary variables and therefore, further details of the frequencies of the covariates and the model results are not shown here.

Results

In total, 530 dates were imputed for 488 cases where the child's parents had separated or repartnered (Table I.8) . All of the cases were flagged in the data if they needed to identified.

Table I.8 Number of imputations according to type of family transition and response pattern

Type of Family Transition	*Number of imputations*
Departure of natural father between 10 and 16	271
Departure of natural father between 5 and 16	45
Departure of natural father between 0 and 16	15
Departure of natural father between 0 and 5	5
Departure of natural father between 0 and 10	1
Departure of natural father between 5 and 10	17
Arrival of stepfather between 10 and 16	53
Arrival of stepfather between 5 and 16	8
Arrival of stepfather between 0 and 16	1
Departure of natural mother between 10 and 16	79
Departure of natural mother between 5 and 16	7
Departure of natural mother between 0 and 16	5
Departure of natural mother between 0 and 5	8
Departure of natural mother between 0 and 10	4
Departure of natural mother between 5 and 10	4
Arrival of stepmother between 10 and 16	3
Arrival of stepmother between 5 and 16	3
Arrival of stepmother between 0 and 16	1

Testing the imputation

The accuracy of the modes was tested by examining the association between the predicted and actual year of a transition for cases with a response. For all of the categories approximately 50% of the predicted values fell with the range of plus or minus one year of the actual recalled year of transition and there was a clear linear relationship between the two groups. A closer association would have been preferable but the strength of the association is not surprising given the almost total dependence on categorical data in the models. Figures I.2 and I.3 give two examples of the predicted versus actual values, firstly among the group where the natural father left between age 5 and 16 and then among those who started living with a stepmother at any time between 1970 and 1986.

Figure I.2 Reported and predicted year of separation from natural father among cases responding at age 5 and 16 only

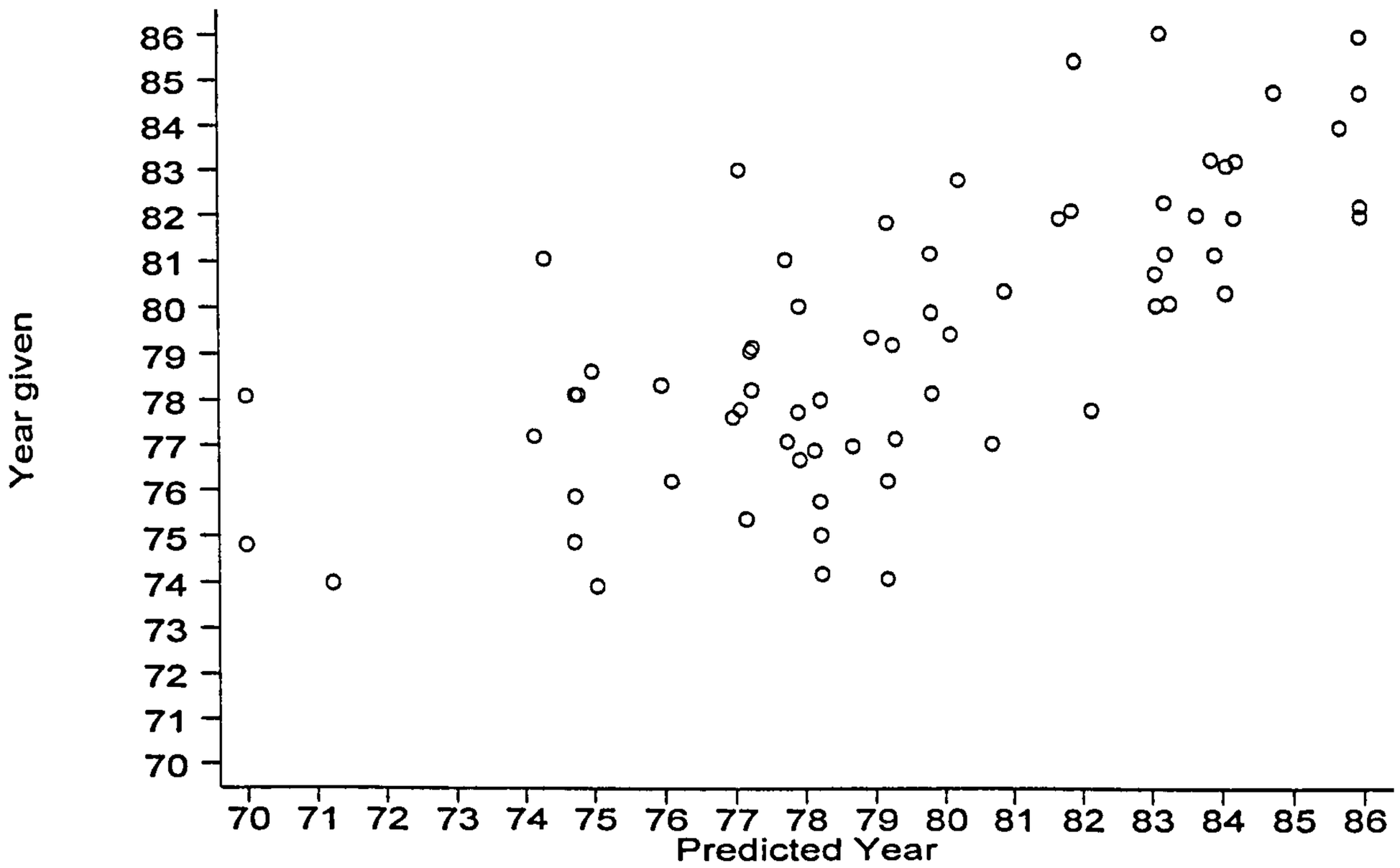


Figure I.3 Reported and predicted year of arrival of stepmother for all response categories at age 16

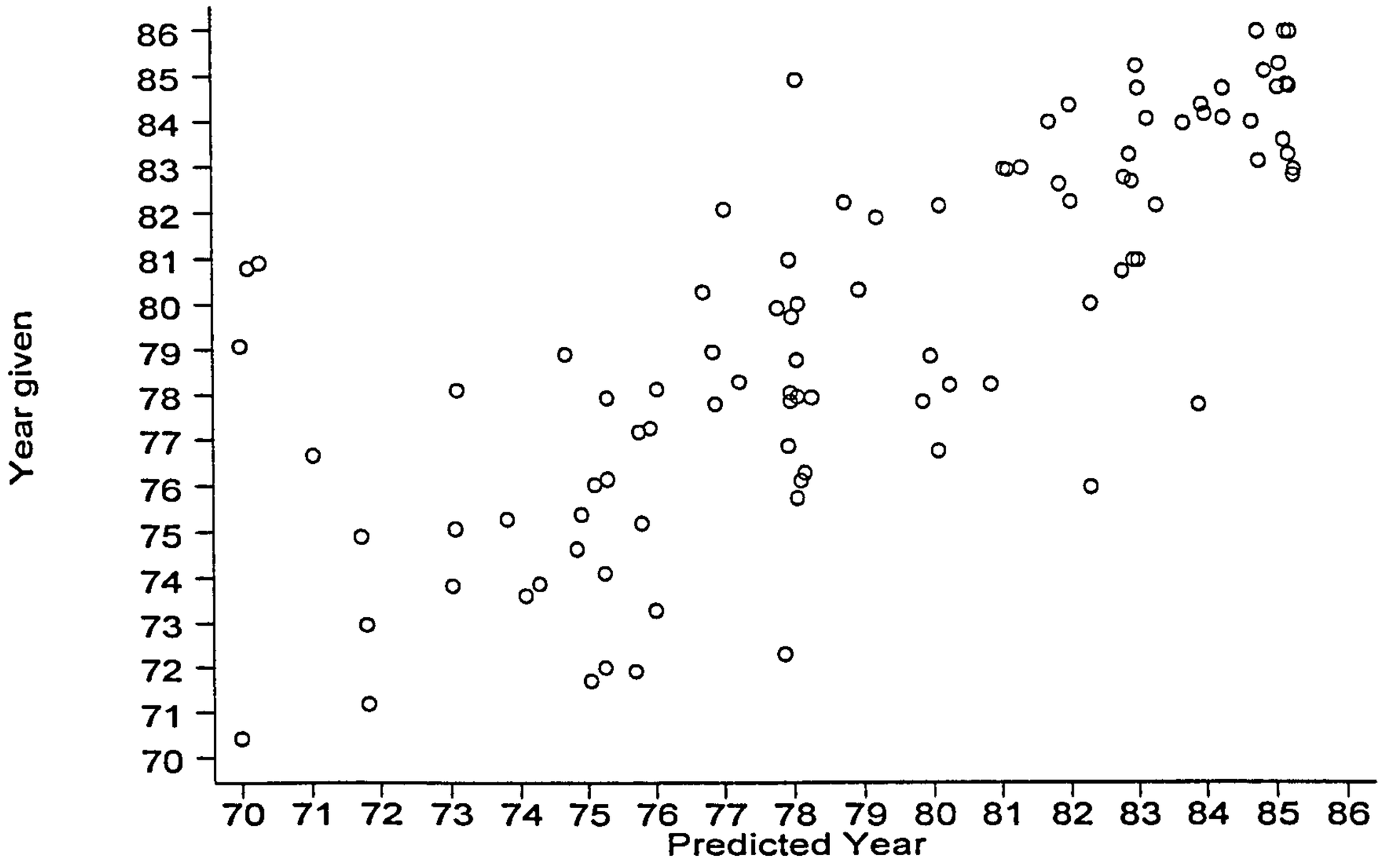
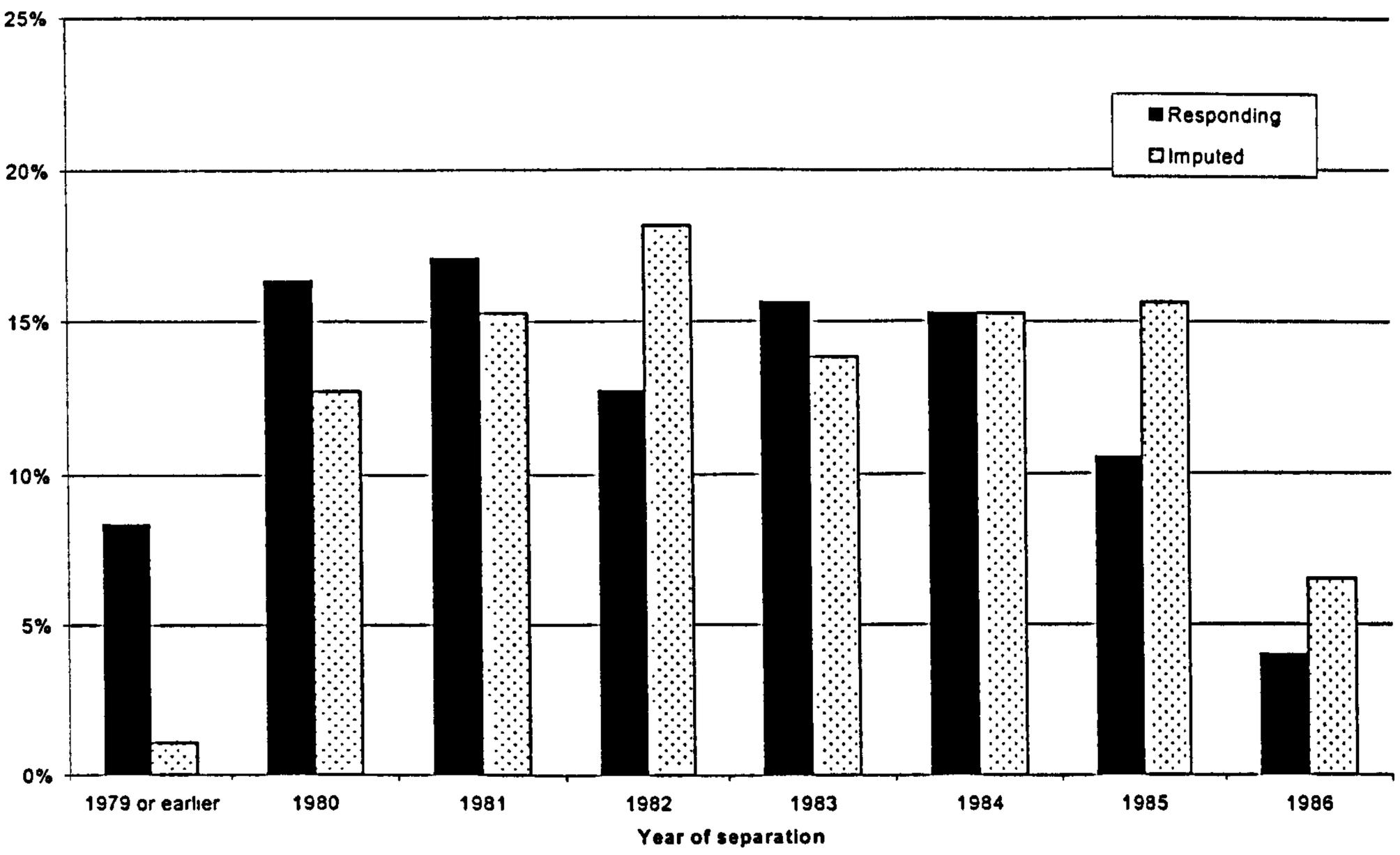


Figure I.2 shows how it was feasible for the reported year of the departure of the natural father from the household to be earlier than 1975 (due to recall error) even though the father was observed to be resident in the household at the age five stage.

Next, Figure I.4 examines the distribution of the imputed and reported dates for cases where the natural father left between the age 10 and the 16 stages. The distribution of the imputed years of transition is shown next to the distribution for cases where a recalled year of transition was given. The responding cases at the 1986 survey are more likely to report a year that is earlier than 1980 compared to the imputed cases. This is a result of using a model which incorporates observed family structure at age 10 thereby reducing the likelihood of predicting a separation year before 1980. However, the distribution of values between 1980 and 1986 are broadly similar.

Figure I.4 Distribution of the year of separation from natural father, comparing cases with response to cases where the date was imputed

Respondents at age 10 and age 16



Consistency

Logically, the imputed date of departure of a natural parent had to occur before, or in the same year as, the arrival of a stepparent. In practice, a handful of cases produced inconsistent results. In three cases the imputed date was inconsistent with a known date for either the departure of the natural parent of arrival of the stepparent. These were corrected to fall in a logical order.

Another issue of consistency is whether the reported year of the transition (variables oa9_3/4, oa10_3/4) should agree with the family type at birth, five and 10 that is recalled at the end of the age 16 questionnaire (oa11_1 – oa11_8). However, there was a considerable mismatch between responses among those who had complete data. For example, over one quarter of respondents who reported that a natural parent had left during or after 1981 at the beginning of the questionnaire reported at the end that the child was not living with both natural parents at age 10. In fact, there is some potential for this to be true as the cohort members' birthdays are in April so the cohort member would still be aged 10 for the first few months of 1981. On balance, it was decided not to recode either the actual or imputed year of transition if it did not exactly agree with the recalled family structure for that time.

I.3.4 Collapsing family type

Finally, the 37 recorded parenting combinations at age 16 reflected a great deal of variety among a small number of cases. Although the detail could be useful for other analysis, such as differentiating between lone parents living with other relatives and those living independently, in this thesis the categories of family structure were collapsed as follows:

1. Both natural or adoptive parents
2. Lone mother
3. Mother and stepfather/cohabitee
4. Lone father
5. Father and stepmother/cohabitee
6. In statutory care/fostered
7. Other

Appendix II Models of parental separation and maternal repartnering

II.1 Model of parental separation

The model selection procedure began with a baseline hazard model using the time dummies only to model the shape of the overall hazard function. Maximum likelihood estimation was used to estimate model parameters, with estimated standard errors and a –2 log likelihood ratio statistic which allows us to test the comparative goodness of fit between two models, one (the reduced model) nested within another (the full model). Under the null hypothesis of various parameters equalling zero, the difference between these statistics will have an asymptotic chi-squared distribution (Yamaguchi 1991). The degrees of freedom of the test equal the difference in the number of parameters between the two models.

The log-likelihood ratio test can be used to see if the addition of further co-variates improves the model at a chosen level of statistical significance. If the less restricted equation has K_1 independent parameters and the more restricted equation has K_0 independent parameters, all of which are included in the less restricted equation, then the null hypothesis states that none of the additional parameters in the larger model differ from zero in the population as a whole. That is for β_j where $j > k_0$, H_0 is that $\beta_{k0+1} = \beta_{k0+2} \ldots = \beta_{k1} = 0$

If L_1 is the maximised likelihood for the less restricted equation that has K_1 independent variables, it has $N - K_1 - 1$ degrees of freedom, and L_0 for the more restricted model with K_0 predictors has $N - K_0 - 1$ degrees of freedom. The test statistic (G^2) compares the ratio of these two likelihoods where

$$G^2 = -2 \log_e \left(\frac{L_0}{L_1} \right) = (-2 \log_e L_0) - (-2 \log_e L_1)$$

With a large sample, such as the BCS70, the creation of a person-period file may create a very large database. For example, in the model of parental separation, using information on just over 7,000 cohort members, over 117,000 person-period records were created. With such a large dataset the chance of finding a significant association is increased. Therefore, covariates were selected only if they were produced an improvement to the model that was statistically significant at the 1% level.

Table II.1 gives the percentage distribution for all variables tested for inclusion in the model. The first column shows the distribution of each covariate in the original survey dataset of

7,437 people and the second column gives the percentages in the expanded person-period datafile. The small differences reflect the fact that groups more likely to experience disruption, for example, mothers who married at age 18 or younger will be less likely to have the full 16 years of records than groups who are less likely to separate.

Table II.1 Percentage distribution of variables selected for model of likelihood of parental separation

	Original	Expanded person-period datafile
Mother's age at marriage		
<=18	22.2	20.9
19-20	31.1	31.2
21-22	23.8	23.4
23 or older	22.9	23.6
Father's age at marriage		
<=18	94.1	94.7
19+	5.9	5.3
Parental age difference		
Father younger than mother	13.4	13.1
Father same age or up to 5 years older than mother	70.6	71.3
Father 6 or more years older than mother	16.0	15.6
Mother's age at first birth		
<=19	20.5	19.2
20-21	20.5	20.3
22-23	22.0	22.2
24+	37.0	38.4
Cohort member pre-marital conception		
No	91.2	91.8
Yes	8.8	8.2
Marriage duration at time of birth of cohort member (years)		
<=2	29.5	28.9
3-5	35.0	35.2
6-10	24.6	24.8
11+	10.8	11.2
Number of older siblings		
0	38.3	38.3
1	34.7	34.7
2	15.3	15.4
3 or more	11.7	11.6
Whether sons in the family		
Yes	60.2	60.3
No	39.8	39.7

cont/d.....

Table II.I Continued

	Original	Expanded person-period datafile
Social class in 1970		
I/II	18.8	19.1
IIINM	13.9	14.1
IIIM	47.1	47.1
IV/V	20.2	19.8
Mother's occupational status before the birth of the cohort member		
Housewife	30.4	30.6
Working, I or II	9.1	9.1
Working, IIINM	29.6	29.8
Working, IIIM	4.7	4.6
Working, IV/V	17.8	17.5
Not known	8.4	8.4
Father's employment status in 1970		
Employed	94.6	94.8
Unemployed	2.5	2.4
Not known	2.9	2.8
Mother's age at completing full time education		
18 or older	10.7	11.0
16-17	25.6	25.5
15 or younger	63.8	63.6
Father's age at completing full time education		
18 or older	14.2	14.6
16-17	22.0	21.9
15 or younger	63.8	63.5
Difference in age parents completed full time education		
Mother 2+ years older than father	7.9	8.1
Mother +/- 1 year of father	79.0	78.5
Father 2+ years older than mother	13.1	13.4
Not known		
Ethnic Group		
White	97.9	97.9
African-Caribbean	0.6	0.5
Asian	1.5	1.6
Country in 1970		
England	84.0	83.9
Scotland	9.7	9.7
Wales	6.4	6.4
Interactions		
*Age 0-5 *Father younger than mother*	n/a	4.1
*Age 0-5 * Father 6 or more years older than mother*		4.9
*Age 6-11 * Father younger than mother*		5.4
*Age 0-5 * Father age 18 or younger at marriage*		1.8
Total	*7437*	*117628*

Testing interactions with time

The simplest hazard models assume that the covariate effects do not interact with time. However, it is common that the effects of a covariate may increase or diminish over time, which would violate this assumption. In discrete-time analysis, this assumption can be tested by including interactions between the predictor covariates and time.

When it comes to either fitting the main effects model or the interactions, some aggregation of the records into grouped time period dummies may be more efficient and can make it easier to test for interactions (Allison 1982; Willett and Singer 1993). For the model of the hazard of parental separation, at the most detailed level, the background covariate could be tested in interaction with each of the 16 time dummies. However, it is more practical to divide time into phases, if possible, according to substantive ideas about the potential importance of the covariates over time. This avoids the production of excessive interaction terms and perfect predictions of the outcome by the model among small sub-groups. Therefore, time (measured as the cohort member's age) was divided into three age phases of 0-4, 5-11, and 12-16. New variables were created that reflected the interactions between the other covariates and this grouped time variable and the –2 log likelihood test was applied to see if the interaction variable, in addition to the main effects, improved the model fit at the 1% level.

Initially, statistically significant interactions were found between the time phases and

i) the age difference between the parents and

ii) the age of the father at marriage

with the interaction term for the age difference between the parents initially having the greatest impact. Therefore, the model with both the interaction terms was tested against the model including only the interaction term for cohort member's age and age difference of the parents. The second term for cohort member's age and father's age at marriage still improved the fit of the model.

These interaction terms plot the variation over time compared to the reference category of the early (0-4 years) time period. However, when the fitted logit profiles of the interactions in models (b) and (c) were plotted, it appeared that there were possibly no substantive differences during the middle and later age phases in the logit profiles for the different categories of age difference of parents or the different categories of father's age at marriage (Figures II.1 and II.2). In other words, there was possibly no interaction effect of either parental age difference or father's age at marriage after the very early years.

Figure II.1 Logit profiles for model including interaction between cohort member's age and parents' age difference

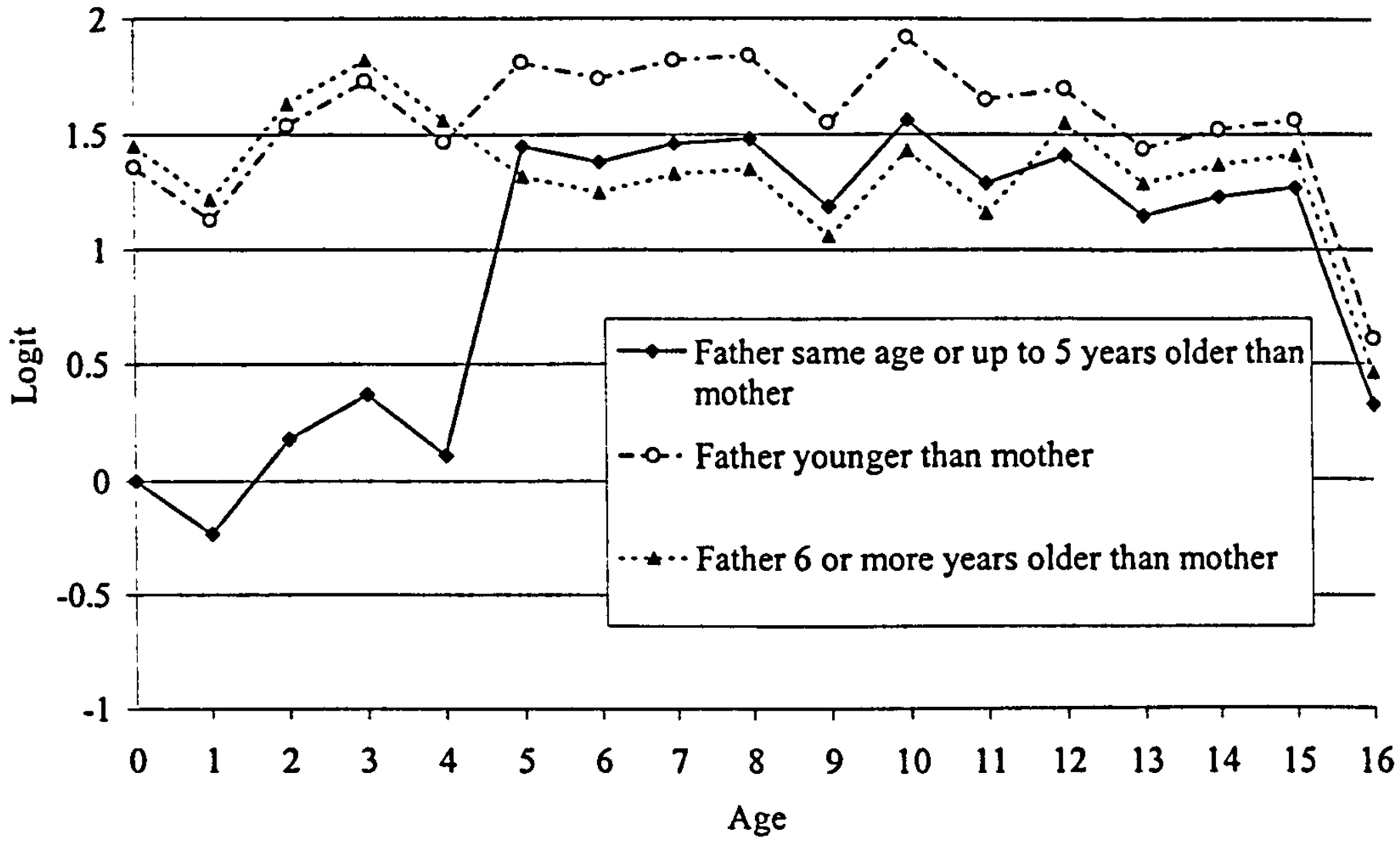
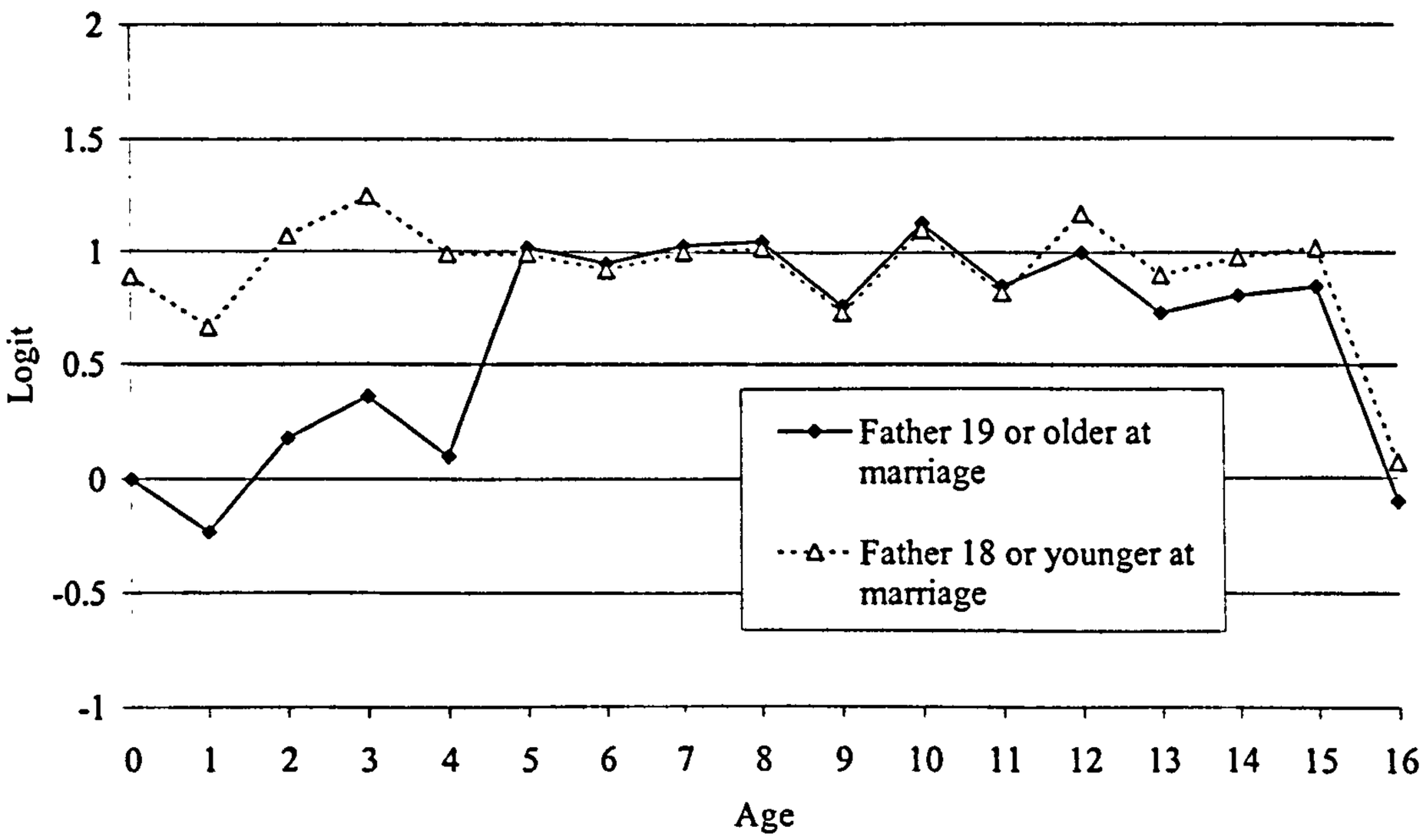


Figure II.2 Logit profiles for model including interaction between cohort member's age and father's age at marriage



To examine this possibility a Wald test was initially used (Hauck and Donner 1977; Wald 1943) to test the hypothesis that the interaction parameters between the age difference or father's age at marriage parameters at the middle and later time phases are zero. The Wald statistic is expressed as:

$$W = \hat{\beta}' S^{-1} \hat{\beta}$$

where $\hat{\beta}$ is the least squares estimate of the vector of regression coefficients to be tested and S is the estimated covariance matrix of $\hat{\beta}$. After the initial hypothesis test, further terms were added cumulatively to test that, for example, not only was there no difference between older fathers and those of the same age in the middle time band, but also there was no difference between younger fathers and those of the same age in the same middle time band. The Wald tests indicated that:

i) there were no differences in the middle and later age phases according to the father's age at marriage and;

ii) there may only be differences between young fathers and the reference group in the middle age phase, but not between any of the other categories in the middle and later age phases.

Therefore, instead of all the main effects and interaction terms for the two covariates the models were retested removing all of these terms and substituting the simpler collapsed covariates of:

Age difference

Father younger than mother & cohort member aged 0-4

Father 6 or more years older than mother & cohort member aged 0-4

Father younger than mother & cohort member aged 5-11

and

Father's age at marriage

Father age 18 at marriage & cohort member aged 0-4

As a final check this model containing the collapsed covariates was compared to the fuller interaction model which confirmed that despite the reduction in the number of parameters there was no statistically significant loss to the fit of the model.

So, the final fitted model (e), is presented which has fewer parameters than the model with all the interaction terms (d) but achieves a similar log likelihood value. Apart from interactions

with time, all other potential interactions between the covariates were tested, but none were found to be significant at the 1% level.

II.2 Model of maternal repartnering

The same procedure was followed to select covariates for the hazard model of maternal repartnering. Table II.2 gives the percentage distribution of the variables tested for selection. No interaction terms were found to improve the fit of the model in this instance.

Table II.2 Percentage distribution of variables selected for model of hazard of maternal repartnering

	Original datafile	Expanded person-period datafile
Cause of separation		
Divorce/separation	14.6	16.5
Widowed	85.4	83.5
Mother's age at marriage		
<=18	30.1	27.0
19-20	28.9	28.4
21-22	15.4	16.8
23 or older	16.7	19.3
Not known	8.9	8.5
Mother's age at time of separation		
<=29	37.5	41.7
30-34	25.5	26.0
35-39	18.8	16.8
40 or older	18.2	15.5
Duration of marriage at separation		
0-4 years	7.3	10.5
5-9 years	23.7	27.8
10-14 years	27.5	29.0
15-19 years	20.8	15.5
20 years or longer	11.8	8.8
Not known	8.9	8.5
Total number of full biological siblings at separation		
None	11.4	13.0
One	39.6	38.3
Two	27.3	26.8
Three or more	21.8	21.9
Age of youngest child at separation		
<=3	30.0	38.5
4-7	29.2	31.7
8-11	23.2	20.8
12-16	17.6	9.0

cont/d....

Table II.2 Continued

	Original datafile	Expanded person-period datafile
Age of eldest child at separation		
0-4	21.6	28.3
5-9	23.2	25.8
10-14	27.6	25.3
16-18	16.6	12.2
19 or older	10.9	8.3
Social class in 1970		
I/II	15.2	15.8
IIINM	11.5	11.1
IIIM	46.0	43.5
IV/V	24.0	24.5
Not known	3.3	5.2
Mother's occupation prior to birth of cohort member		
Housewife	25.9	27.1
Working, Social Class I or II	8.9	9.8
Working, Social Class IIINM	25.8	23.9
Working, Social Class, IIIM	5.7	4.8
Working, Social Class IV/V	19.0	19.9
Not known	14.0	14.5
Mother's age at completing full time education		
15 or younger	62.8	62.7
16/17	24.0	24.1
18 or older	8.5	8.9
Not known	4.6	4.2
Tenure		
Owner occupier	48.2	45.1
Ever council tenant/Private rented	51.8	54.9
Country		
England and Wales	90.0	88.4
Scotland	10.0	11.6
Ethnic Group of Mother		
White	97.6	97.0
African-Caribbean or Asian	2.3	3.0
Total	*1484*	*8511*

Appendix III Model building for logistic regression model of educational attainment

III.1 Covariates used in the analysis

Table III.1 gives the weighted estimates of the percentage distribution for the variables that were selected from the dataset based on evidence from the literature review indicating that they may have an association with low educational attainment.

The three measures of family relationships and environment at 16 were adapted from those derived by Ely et al (2000). In their analysis the sample was based on just age 16 data and only those whose parents gave valid answers to these questions. In this analysis, using a sample based on age 16 and 26 respondents who had family history information, over 2,000 respondents were missing answers to this section of questions on family life. The incidence of educational failure amongst those missing these questions was examined. There was certainly an association between this item non response and achieving fewer than five O levels. Excluding this considerable group would have further biased the sample beyond the scope of the existing weighting scheme. However, adding a valid code for those missing a response at each of the derived measures of time spent with family, quality of relationships and total parental supervision and communication creates the problem encountered at early stages that the three variables become highly correlated because missing at one perfectly predicts missing at the other. In Chapter 2 a complex measure was created that combined all the possible combinations of the contributing variables into one covariate. To make these results easier to interpret, after investigating the two way associations, the variables were collapsed into dichotomous measures of whether the teenager spent i) very little time with their family ii) got on badly or iii) was generally unsupervised.

Table III.1 Weighted estimates of percentage distribution of background variables tested for their association with the likelihood of achieving fewer than five Grade A-C O levels, men and women

i) Circumstances at birth

Factor	Men %	Women %
Country		
Living in Scotland	9.3	9.3
Group - Parents' education		
Mother's and Father's age at completing full time education		
Both at 15	49.2	48.1
Mother 16+, Father 15	12.1	12.4
Mother 15, Father 16+	11.4	12.1
Both 16+	22.3	22.6
Not known	5.0	4.8
Mother achieved a degree	2.5	2.5
Father achieved a degree	11.0	10.7
Group – Parents' Occupations		
Family social class		
I/II	18.7	18.5
IIINM	13.0	13.7
IIIM	46.9	46.9
III/V	21.4	20.9
Mother's occupational status before birth of cohort member		
Working I/II	8.5	8.3
Working IIINM	28.0	27.0
Working IIIM	3.9	4.4
Working III/V	18.2	17.4
Not working	26.9	27.0
Not known	14.5	15.9
Totals: Weighted	*8260*	*7774*
Unweighted	*2429*	*3132*

Factor	Men %	Women %
Group – Parental age		
Mother's age		
<=19	9.6	9.0
20-24	34.9	35.7
25-29	31.6	35.2
30-35	15.7	15.0
35+	8.1	8.0
Father's age		
<=19	2.2	3.0
20-24	19.8	21.2
25-29	29.7	28.3
30-35	20.7	20.4
35+	15.7	14.8
Not known	11.8	12.3
Mother's age at first birth		
<=19	23.5	21.5
20-23	38.8	42.8
24+	37.8	36.7
Group – Birth Order		
Position in Birth Order		
First born	39.2	39.4
Second	35.2	34.2
Third	14.7	15.1
Fourth or later born	10.9	11.3
Older sibling born in 1968/9	18.9	18.5
Group – Ethnic Origin		
Ethnic Group		
White	94.7	95.8
African/Caribbean	2.3	1.6
Asian	3.0	2.6
Totals: Weighted	*8260*	*7774*
Unweighted	*2429*	*3132*

cont/d.....

Table III.I Continued

ii) Early Childhood Factors (Age five and 10 survey)

Factor	Men %	Women %
Group – Socio Economic Circumstances		
Father figure unemployed in year before age 5 interview	4.2	4.3
Reason for mother working		
Not working/Reason not known	80.6	80.4
Necessity	8.5	8.7
Other (career/social contact)	10.9	10.8
Receipt of free school meals		
No	78.4	78.2
Yes	10.6	10.7
Not known	10.9	11.1
Group – Housing		
Ever lived in council housing	25.6	28.5
Density of household (age 10)		
<1.00 person per room	73.0	72.2
1.00 – 1.49 persons per room	23.8	34.6
1.50+ persons per room	3.1	3.2
Type of neighbourhood (rated by interviewer age 5)		
Poor urban	4.1	4.7
Average urban	35.3	36.2
Well to do urban	18.5	18.3
Rural	16.2	16.2
Not known	25.9	24.4
Group - Sibling Structure		
Total sibling size		
0/1	48.9	48.7
2/3	41.8	40.8
4+	9.2	10.4
Whether has brothers	56.8	59.2
Whether sibling born in 1970/1	24.5	25.1
Group – Test Scores at 5		
Copying Ability		
High	32.2	31.1
Medium	23.1	26.0
Low	20.6	20.8
Not known	24.0	22.1
Picture Vocabulary Score		
Top quartile	22.9	15.7
Second quartile	14.9	17.4
Third quartile	17.4	15.6
Fourth quartile	13.5	18.7
Not known	31.1	29.6
Totals: Weighted	*8260*	*7774*
Unweighted	*2429*	*3132*

Factor	Men %	Women %
Group - Parental support for education		
Parent's interest in child's education (rated by teacher age 10)		
Both very interested	28.6	27.8
Father very interested, mother less	2.0	1.6
Mother very interested, father less	13.4	16.3
Neither very interested	29.2	27.1
Not known	26.7	27.2
Parents' expectation of when child will leave school (age 10)		
16	31.1	30.2
17+	52.2	53.1
Not known	16.7	16.7
Group – Child's behaviour		
Top 10% of anti-social behaviour scores (age 5)	8.4	4.4
Whether child believes useless to try in school (age 10)l	8.6	7.0
Whether child does not believes in planning ahead (age 10)	24.3	24.3
Group – Parenting Characteristics		
Level of authoritarian parenting		
Top quartile (high)	16.7	17.6
Second	19.0	19.5
Third	20.5	20.2
Fourth	20.1	20.8
Not known	23.7	21.9
Father's involvement in childcare	49.3	42.9
Equal or higher than mother	28.8	32.6
Less than mother	4.8	6.4
Very low involvement	17.2	18.1
Not known		
Mother's attitude to gender equality		
More traditional attitudes	34.5	33.2
Neither traditional or egalitarian	51.3	52.0
Mainly egalitarian attitudes	14.3	14.8
Group – Other transitions		
Number of house moves by 10		
0	25.8	25.0
1	30.9	31.4
2	15.2	16.7
3+	13.4	12.5
Not known	14.6	14.3
Totals: Weighted	*8260*	*7774*
Unweighted	*2429*	*3132*

cont/d....

Table III.1 Continued

iii) Factors at 16

Factor	Men %	Women %
Group – Financial situation		
Equivalised household weekly net income (£)[24]		
<=49	8.2	8.7
50-99	23.2	23.4
100-149	17.3	16.6
150-199	11.6	10.9
200-249	7.5	7.3
250+	8.2	7.4
Not known	24.0	25.5
Family received means tested benefits in last year	21.8	22.2
Financial hardship in last year (self reported by parents)	12.9	12.9
Type of School attended		
State	26.2	32.4
Private	1.2	1.0
Not known	72.7	66.6
Group – Parental support for education		
Parents assist or encourage teenager with homework	6.1	10.4
Parents do not expect teenager to do homework	3.2	5.1.
Totals: Weighted	*8260*	*7774*
Unweighted	*2429*	*3132*

Factor	Men %	Women %
Group – Family Environment		
More negative than positive responses on family relationships	6.6	9.0
Very low level of parental supervision and communication with teenager	18.0	12.1
Group – Teenager's attitude to education		
Considers truancy acceptable	10.2	10.0
Group – Other disruption		
Number of house moves by 16		
0		
1		
2		
3+		
Number of secondary schools attended		
1	42.6	52.6
2	8.5	10.7
3+	3.3	5.2
Not known	45.0	31.4
Group – non-response		
Missing interview with teenager	43.0	42.3
Totals: Weighted	*8260*	*7774*
Unweighted	*2429*	*3132*

III.2 Selecting background covariates with weighted data

The set of "svy" commands in Stata, including those for logistic regression, properly accounts for survey design factors (such as the differential response probability weights) (Stata Corporation, 2000). Stepwise selection procedures are not available with these commands and so to fit reasonably parsimonious models the procedure known as "chunkwise" (Kleinbaum et al. 1998) or "block" backward elimination techniques (Sribney 1998) was adopted. For each model the possible list of covariates was organised into logical groupings that are shown in Table III.1. For example, one group of variables would refer to all the measures of parental education, another to those regarding parental age factors. The groups were then ordered according to their importance in terms of hypothesised association with the outcome of low attainment with the least important group coming last in the model. After running the model containing all the variables, an adjusted Wald F statistic (Wald 1943) was

[24] See Section III.5 for details of how income was derived.

computed beginning with the group of covariates hypothesised to be least associated with low educational attainment. The adjustment to the Wald test is a multiplier that accounts for the survey design (Stata Corporation 1999).

The threshold of statistical significance was set at the 1% level with the aim of keeping the number of covariates in the selected model to a manageable size. If the first group tested failed to meet the threshold for statistical significance it was discarded without needing to investigate the significance of each individual covariate within each group. The model was then re-run without the first rejected group of variables and the Wald test conducted again on the next least important group. After all the groups had been tested the same procedure was followed for the individual covariates. Here, the first set of individual covariates were tested from the group with the smallest F statistic, which was not necessarily the group originally hypothesised to be least associated with low attainment.

For this analysis of low educational attainment the procedure began with the factors reflecting circumstances at birth. Once individual variables had been selected using the procedures described above, these factors were fixed in the model before the groups of variables measuring early childhood experiences were tested. When this stage was complete the age 16 factors were added to the new combined model. This process allows comparison of a nested set of models beginning with the "full" model incorporating factors from the birth, early childhood and age 16 stages. Because of the research question. The measure of family transition was retained in the model due to the research question, even though, for men, it did not improve the fit of the model at the required level of statistical significance.

Throughout this thesis, categorical factors containing a number of dummy variables, such as social class, were tested as a whole, rather than separating the individual components. As long as the variable as a whole was found to meet the selection criteria, individual parameters may remain that are not statistically significant in their own right. If possible, (for example with age banded factors), the individual dummies were tested to examine if their coefficients were statistically significantly different from each other as well as the reference category. If this was not the case, some categories were collapsed to create fewer dummy variables. Strictly speaking, the test of significance should be more stringent because of the multiple comparisons being made across categories within the individual variables selected. The significance level for k dummy variables at this level should be $0.01/k$ (a bonferroni-adjusted t statistic) (Korn and Graubard 1990). However, it was potentially impractical to drop individual dummy variables because they were not significant at this level although the

categories of the variable (such as household tenure) were substantively different. This additional test was, therefore, not applied.

III.3 The impact of weighting on the analysis

Design effects

The design effect gives a measure of the extent to which a survey sampling scheme has impacted on the variance of the survey estimates. On the BCS70, the study began as a population because it contained all those born in one week in April 1970. (Setting aside astrological debates concerning the variance in the British population according to their time of birth). However, by the later stages of the survey, the likelihood of inclusion in the survey (or responding) has been shown to be non-random process which creates a form of sampling scheme for which the probability weights were created.

The ratio deff (Kish 1965) aims to compared the variance of the estimate obtained when using the sample design factors to the variance that we would have obtained if the data had been collected using simple random sampling without replacement (srwor). Deff is defined as

$$\text{deff} = \hat{V} / \hat{V}_{srwor}$$

where $\hat{V}$ is the design based estimate of variance (ie the standard error^2) and $\hat{V}_{srwor}$ is an estimate of what the variance would be if the same size survey was conducted using simple random sampling without replacement (Stata Corporation 1999).

A design effect greater than 1 indicates that the estimate has a larger variance than under a simple random sample design. This loss in precision, however, is traded off against the reduction in bias that the weighting has brought about. A design effect of less than 1 would indicate greater precision than for a simple random sample and in general, this can occur if the sample was stratified.

Running the models with unweighted data

Additionally, we can examine the difference in the parameter estimates if we run comparable models with weighted and then unweighted data. Here, we compare the the coefficients for the four measures of family transition from two logistic regression models using the same full set of background covariates from the third models presented in Tables 4.7 to 4.10 (men) and 4.11 to 4.14 (women). The first model repeats the weighted estimates and the second presents the coefficients for the unweighted regression. Note that the coefficients for the other background covariates, which are not of direct interest here, have not been presented.

Tables III.2 and III.3 present both the design effects (deffs) and comparable unweighted parameter estimates against the results of the models using weighted data. There are two reasons that we expect the design effects and differences in the coefficients to be relatively small. Large design effects are more common among complex sample surveys with clustering. Here, the only aspect of 'sample' design is the differential likelihood of responding to the survey at age 16 and 26. Secondly, in the analysis of educational outcomes, some of the factors used to derive the weighting adjustment, such as social class and mother's age at first birth, were also background covariates in the model. The more such covariates are used in the weighted model, the less difference we would expect between the results from the two models, bringing into question the value of weighting.

Table III.2 Parameter estimates from weighted and unweighted logistic regression models of passing fewer than five O levels, men

Using selected background covariates in Model 3, Tables 4.7 to 4.10

	Weighted			Unweighted	
	$\hat{\beta}$	$se(\hat{\beta})$	deff	$\hat{\beta}$	$se(\hat{\beta})$
Table 4.7					
Family Structure At 16					
Both natural parents	0	-	-	0	-
Lone mother	-0.11	0.20	1.25	0.09	0.18
Mother and stepfather	0.25	0.21	1.36	0.16	0.19
Lone father/Father and stepmother	-0.20	0.32	1.26	-0.14	0.31
Other guardians/ in statutory or foster care	0.21	0.61	1.15	0.40	0.65
Table 4.8					
Type of transitions					
Always natural parents	0	-	-	0	-
Natural parents-lone mother	-0.18	0.25	1.28	0.07	0.22
Natural parents-mother/stepfather, no stepsiblings	0.07	0.25	1.25	0.03	0.23
Natural parents – mother/stepfather – lived with stepsiblings	1.11**	0.51	1.04	0.79	0.48
Natural parents – lone father or father/stepmother	0.15	0.41	1.28	0.15	0.42
Lone mother at birth –all sequences	-0.44	0.35	1.76	-0.38	0.30
Either parent died	0.44	0.33	1.09	0.31	0.31
Any time in statutory/foster care	0.28	0.53	1.51	0.35	0.50
Other sequences	0.25	0.33	1.38	0.35	0.32
Table 4.9					
Number and timing of transitions					
No transitions	0	-	-	0	-
1 transition, complete by age 6	-0.61*	0.32	1.70	-0.40	0.27
2+transitions, complete by age 6	0.35	0.35	1.58	0.50	0.35
1 transition, complete by age 11	0.25	0.30	1.10	0.32	0.27
2+ transitions, complete by age 11	0.25	0.26	1.22	0.11	0.24
1 transition, age 11+	0.30	0.27	1.17	0.29	0.26
2+ transitions, last transition age 11+	0.19	0.28	1.24	0.21	0.28
Table 4.10					
Timing and type of transition (selected sequences)					
Always natural parents	0	-	-	0	-
Transitions complete by age 6					
Natural parents-lone mother	-0.84	0.51	1.59	-0.72	0.47
Natural parents-lone mother-mother/stepfather	0.46	0.48	1.51	0.57	0.41
Transitions complete by age 11					
Natural parents-lone mother	-0.06	0.44	1.11	0.17	0.24
Natural parents-lone mother-mother/stepfather	0.34	0.33	1.11	0.15	0.33
Transitions complete age 11+					
Natural parents-lone mother	0.17	0.35	1.26	0.37	0.35
Natural parents-lone mother-mother/stepfather	0.04	0.36	1.18	-0.08	0.36

Number of persons: unweighted 2439; weighted 8299

Total =men with educational information at age 26 and parental interview at 16

* denotes significance difference at the 10% level

** denotes significance difference at the 5% level

*** denotes significance difference at the 1% level

Table III.3 Results of weighted and unweighted logistic regression models of passing fewer than five O levels, women

Using selected background covariates in Model 3, Tables 4.11 to 4.14

	Weighted			Unweighted	
	$\hat{\beta}$	$se(\hat{\beta})$	deff	$\hat{\beta}$	$se(\hat{\beta})$
Table 4.11					
Family Structure At 16					
Both natural parents	0	-	-	0	-
Lone mother	0.14	0.16	1.29	0.19	0.14
Mother and stepfather	0.43**	0.17	1.23	0.42***	0.16
Lone father/Father and stepmother	0.60*	0.32	1.25	0.52	0.29
Other guardians/ in statutory or foster care	0.04	0.55	1.13	-0.12	0.47
Table 4.12					
Type of transitions					
Always natural parents	0	-	-	0	-
Natural parents-lone mother	0.42**	0.20	1.20	0.42**	0.18
Natural parents-mother/stepfather, no stepsiblings	0.55***	0.22	1.13	0.51**	0.21
Natural parents – mother/stepfather – lived with stepsiblings	0.52	0.52	1.32	0.50	0.40
Natural parents – lone father or father/stepmother	0.79**	0.40	1.17	0.65*	0.37
Lone mother at birth –all sequences	0.01	0.27	1.48	0.01	0.25
Either parent died	-0.30	0.24	1.28	-0.18	0.22
Any time in statutory/foster care	0.90**	0.45	1.27	0.54	0.41
Other sequences	0.04	0.37	1.45	-0.11	0.32
Table 4.13					
Number and timing of transitions					
No transitions	0	-	-	0	-
1 transition, complete by age 6	-0.03	0.22	1.37	0.00	0.21
2+transitions, complete by age 6	0.30	0.37	1.42	0.37	0.33
1 transition, complete by age 11	0.26	0.26	1.30	0.18	0.24
2+ transitions, complete by age 11	0.71***	0.23	1.27	0.58***	0.21
1 transition, age 11+	0.24	0.22	1.20	0.33*	0.19
2+ transitions, last transition age 11+	0.20	0.25	1.13	0.19	0.23
Table 4.14					
Timing and type of transition					
(selected sequences)					
Always natural parents	0	-	-	0	-
Transitions complete by age 6					s
Natural parents-lone mother	0.17	0.42	1.25	0.15	0.39
Natural parents-lone mother-mother/stepfather	-0.01	0.42	1.38	0.04	0.36
Transitions complete by age 11					
Natural parents-lone mother	0.23	0.33	1.28	0.14	0.33
Natural parents-lone mother-mother/stepfather	0.64**	0.30	1.20	0.63**	0.28
Transitions complete age 11+					
Natural parents-lone mother	0.67**	0.31	1.14	0.72***	0.26
Natural parents-lone mother-mother/stepfather	0.90***	0.36	0.93	0.66**	0.31

Number of persons: unweighted 3144 weighted 7800
Total =women with educational information at age 26 and parental interview at 16

* denotes significance difference at the 10% level
** denotes significance difference at the 5% level
*** denotes significance difference at the 1% level

The deffs range for both men and women from 0.93 to 1.76. Although the weighting has caused a slight loss of precision the deffs are relatively small compared to typical results for surveys involving more complex sample designs (Rao and Thomas 1989).

This is borne out by looking at the coefficients for the weighted and unweighted models. On the one hand, in the unweighted model, which does not take into account the sample design, the standard errors are generally smaller than the true standard errors produced by Stata for the weighted model and, therefore, the parameter estimates may be more likely to achieve statistical significance. Although the differences in the size of the coefficients are small, and all of the 95% confidence intervals for the weighted and unweighted estimates overlap, the coefficients for the unweighted model were generally smaller. It appears that the bias in the unweighted results has counteracted the effect of the smaller standard errors. The greatest differences (and therefore potential bias in the unweighted data) appears to be among those experiencing some of the transitions most associated with non-response at 16 and 26, for example men who have lived in stepfather families with stepsiblings and women who have ever been in care. With the weights, the 'effects' of disruption are found to be larger than without them. Here, the adjustments are compensating for the under-representation of some of the most disrupted, and possibly lowest achieving members of the cohort.

III.4 Equivalising household income

The age 16 survey was the first stage at which family income was asked. Parents were asked for an estimate of the current family combined weekly or monthly gross income. However, no adjustment has been made to the data to account for family size. A family with four children, for example, may struggle to live on an income that would be adequate for a lone parent with one child. This thesis uses an adjustment known as the McClements scale, which is used for equivalising income for the UK Department of Social Security's estimates of Households Below Average Income (Department of Social Security 2000). The scale takes a couple household as the reference point with a value of one, and scales the value up or down according to the household composition. The values assigned to individuals within the household are shown in Table III.4

Table III.4 Equivalence Scale Values

Household Member	Scale Value
Head	0.61
Spouse/partner	0.39
Other second adult	0.46
Third adult	0.42
Subsequent adults	0.36
Each dependent aged:	
0-1	0.09
2-4	0.18
5-7	0.21
8-10	0.23
11-12	0.25
13-15	0.27
16 or over	0.36

Source (Department of Social Security, 2000, Appendix 4, Table 4.1 (HBAI Before Housing Cost Values)

Notes
"Other second adult" is used in place of the weight for "spouse/ partner" when there are 2 (or more) adults in the household but they are not married or living as a couple.

A dependent is defined for the households below average income analysis as a child aged 15 or younger or a young person aged 16 to 18 who is still in full-time further education. As the educational status of other household members on the BCS70 was not known, for the purpose of this analysis people aged 16 or 17 were assumed to dependents and given a weight of 0.36 whilst those aged 18 or over were classified as another adult in the household and assigned a weight of between 0.36 and 0.46 according to their position in the household.

In application, a couple living with children aged 16 and aged 12 would have a total value of

$0.61 + 0.39 + 0.36 + 0.25 = 1.61$,

while a lone mother living with a 16 year old child would have a total value of:

$0.61 + 0.36 = 0.97$.

The weight is then multiplied by the family income to create the equivalised income. So, if both of these example families earned £100 per week, the family with two parents and two children would have an equivalised income of :

$$\frac{100}{1.67} = £59.88,$$

whilst the lone mother family would have an equivalised income of:

$$\frac{100}{0.97} = £103.09.$$

Given that, by definition, all the households in the survey contained at least one 16 year old child, the smallest scale value assigned was that for a lone parent family with one 16 year old child (0.97) whilst the largest family, with many children and other adults living in the household was assigned a value of 4.24. As income was only collected in £50 bands ranging from <£50 per week to £500 or higher, the midpoint of each group was taken to be the gross weekly family income ranging from £25 per week for those in the lowest income group to £525 for those at the very top of the distribution. This midpoint was then multiplied by the family equivalence value.

As might be expected, the effect on the measure of family income varied substantially according to the family type. In particular, the proportion of two parent families with incomes below £150 per week more than doubled after equivalisation whilst there is only a small increase in the same proportion among lone mother families (Table III.5).

TableIII.5 Percentage distribution of families with less than £150 per week income before and after equivalisation by family structure at 16

Family Structure at 16	Before equivalisation	After equivalisation	*Total = families giving income information at the age 16 survey*
Both natural parents	29	62	*5200*
Lone mother	85	90	*804*
Mother and stepfather	40	71	*664*
Lone father	62	68	*130*
Father and stepmother	49	61	*80*
*All families**	37	67	*7040*

* Includes less common family types not shown

Figures III.1 to III.10 show the distribution of income according to the more common family types before and after equivalisation. In summary, equivalisation moves the distribution of income levels down towards the lower bands with a positive skew towards the highest income groups. Children living in larger families with relatively high parental income will appear less advantaged after taking family size into account.

Refusals and missing data

Nearly one quarter of respondents to the parental interview either refused or were unable to give income details. In the multivariate analysis this "don't know/refusal" category has been retained as a valid group.

Figure III.1 Distribution of non equivalised **income,** both natural parents at 16

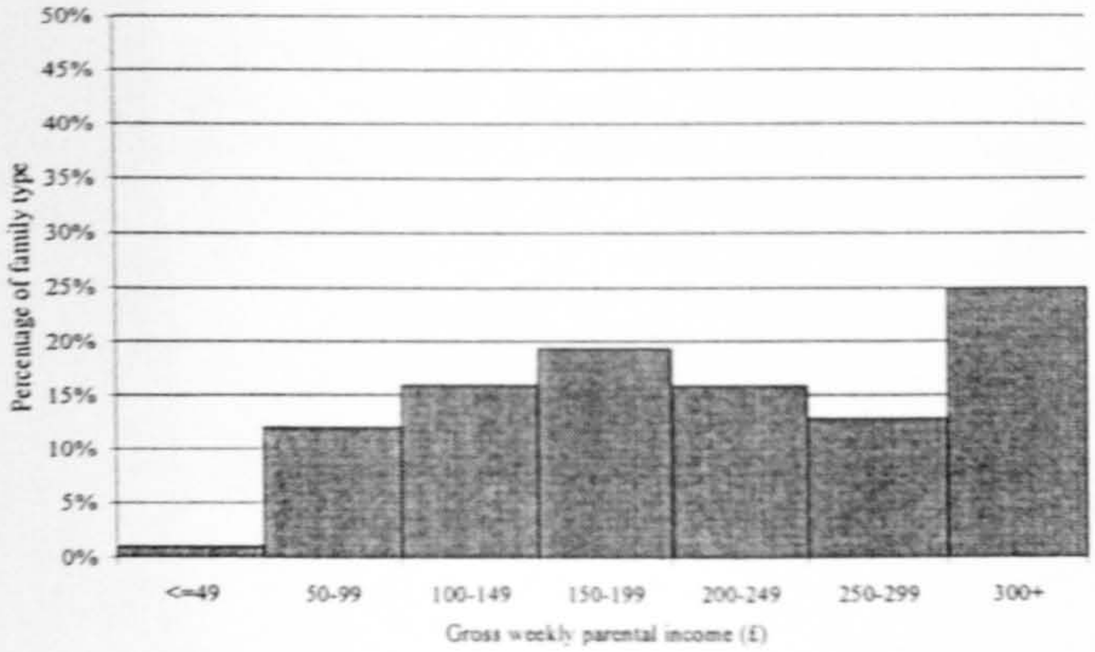


Figure III.2 Distribution of equivalised income both natural parents at 16

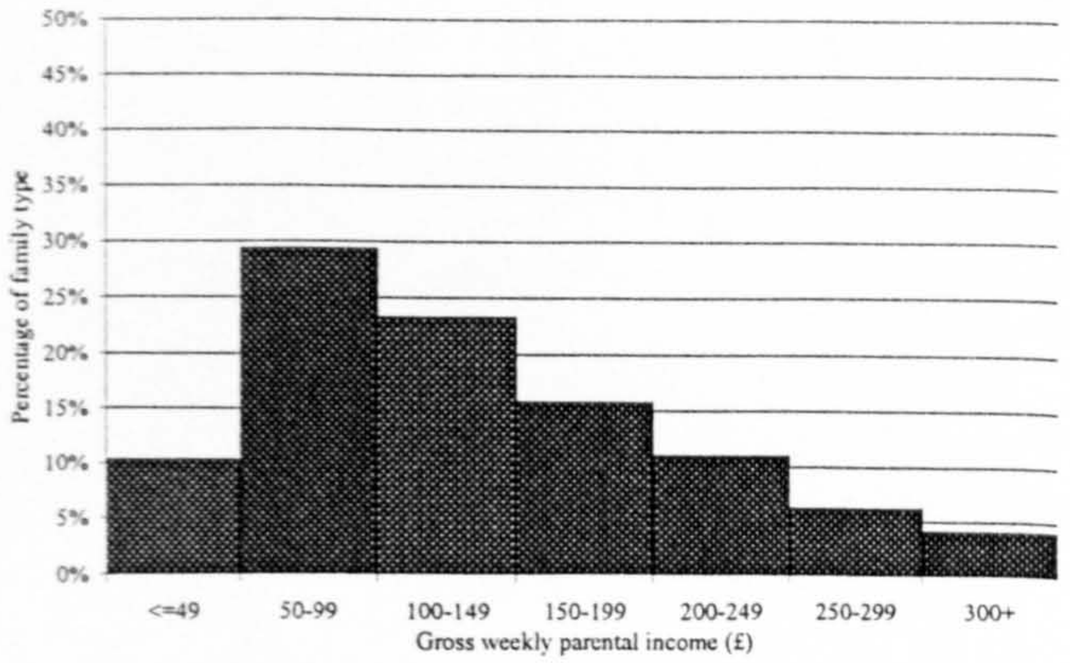


Figure III.3 Distribution of non equivalised **income,** lone mother family at 16

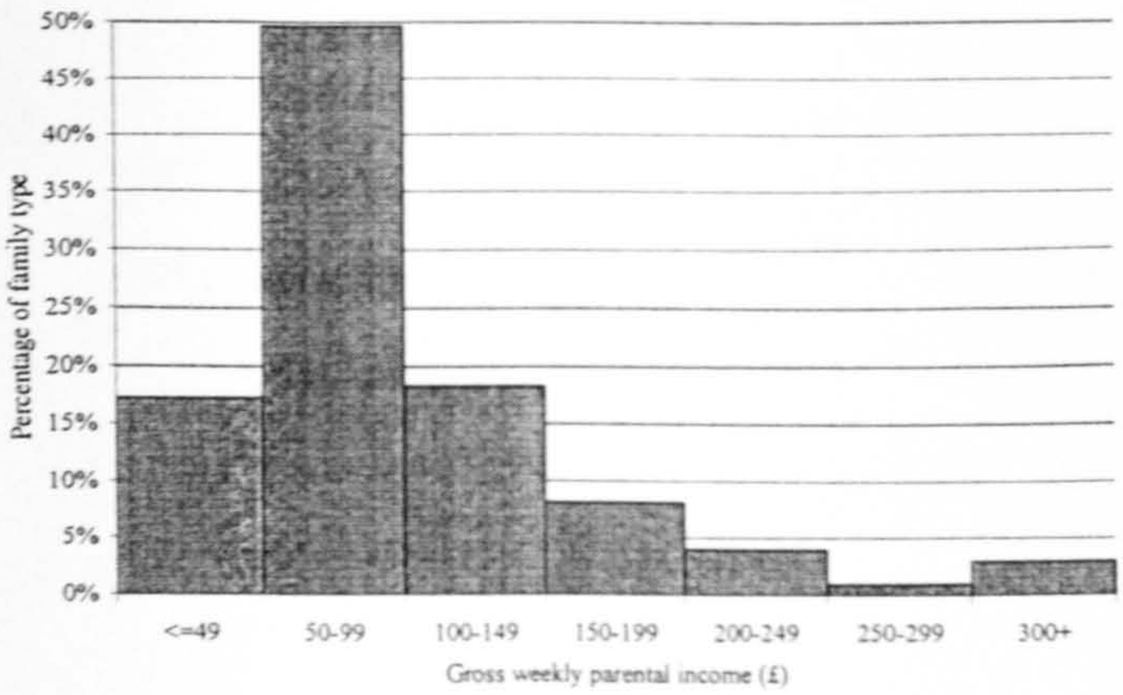


Figure III.4 Distribution of equivalised income lone mother family at 16

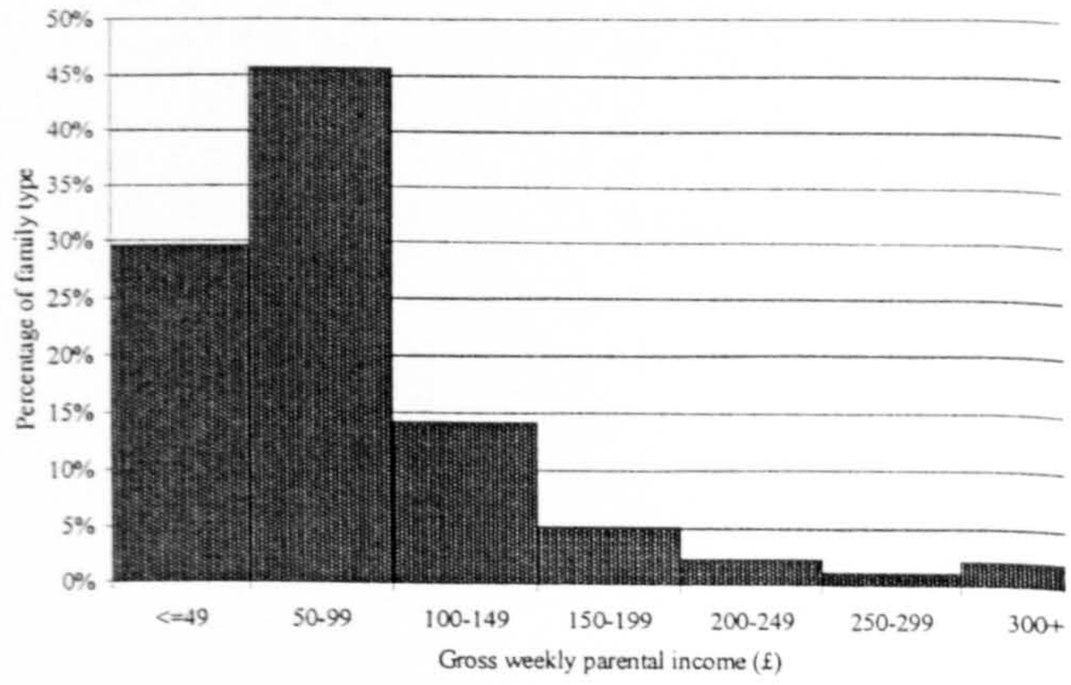


Figure III.5 Distribution of non equivalised income, mother and stepfather at 16

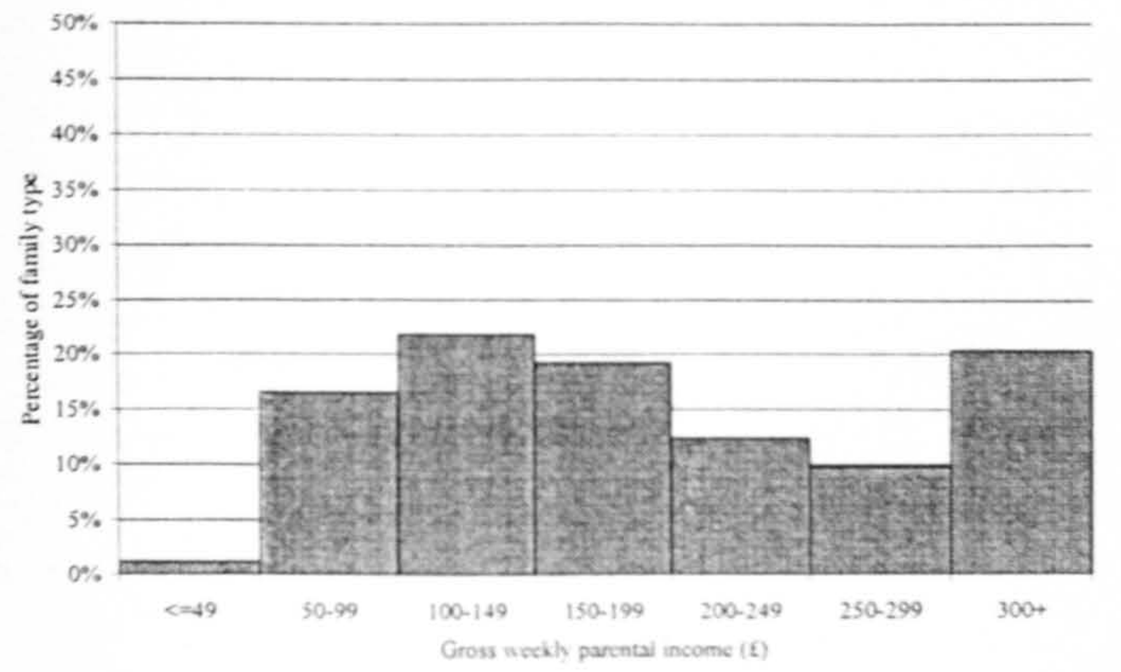


Figure III.6 Distribution of equivalised income mother and stepfather at 16

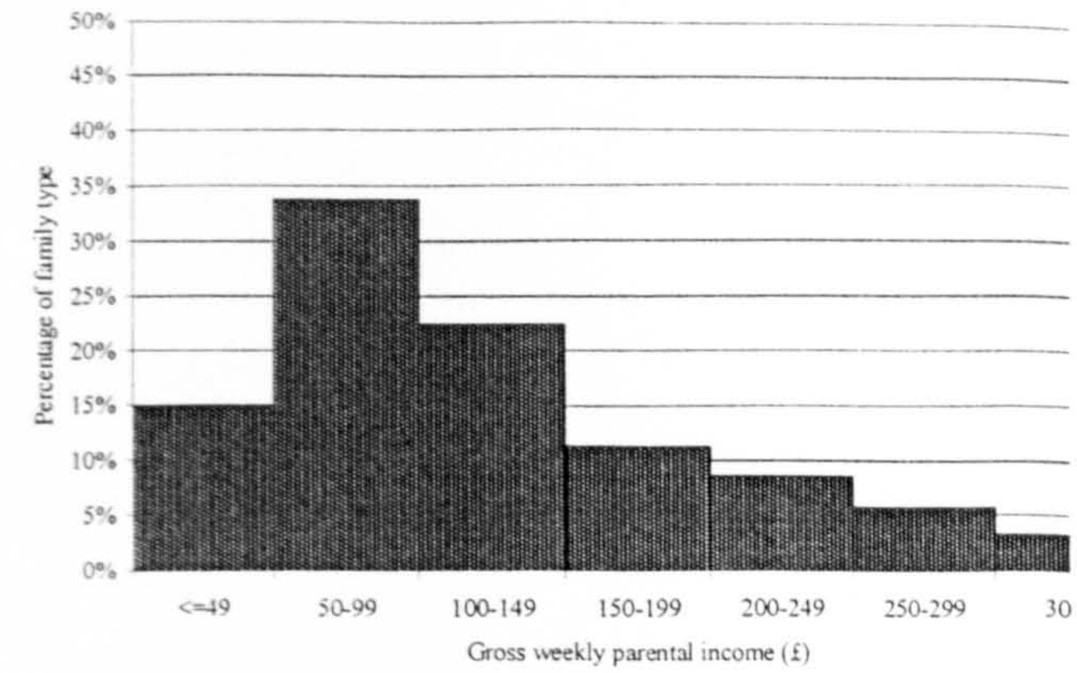


Figure III.7 Distribution of non equivalised income, lone father at 16

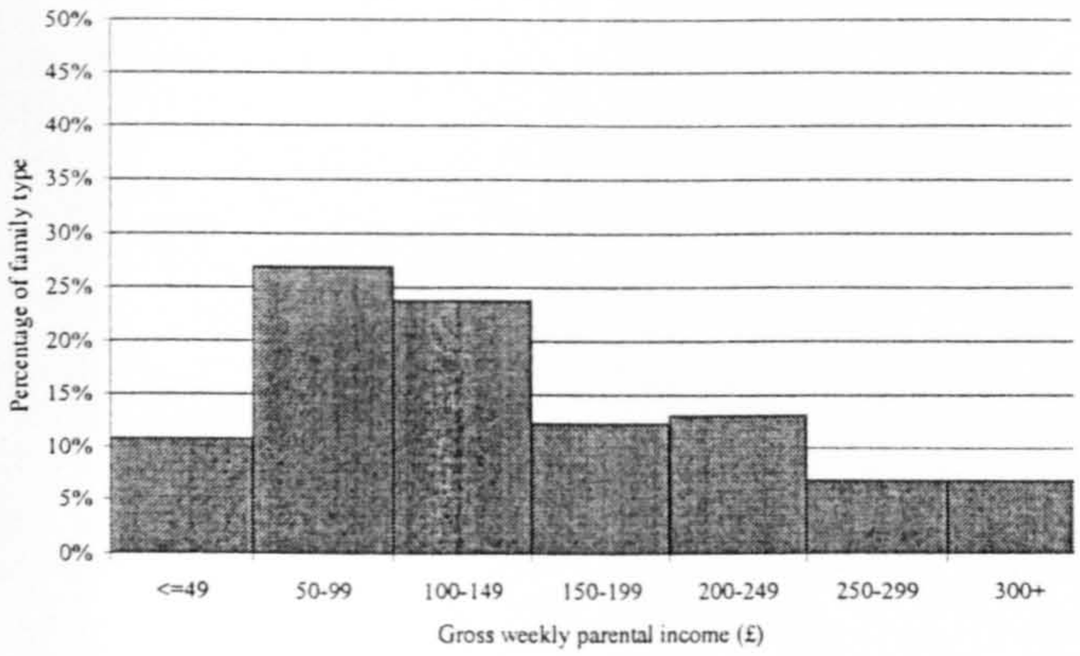


Figure III.8 Distribution of equivalised income, lone father at 16

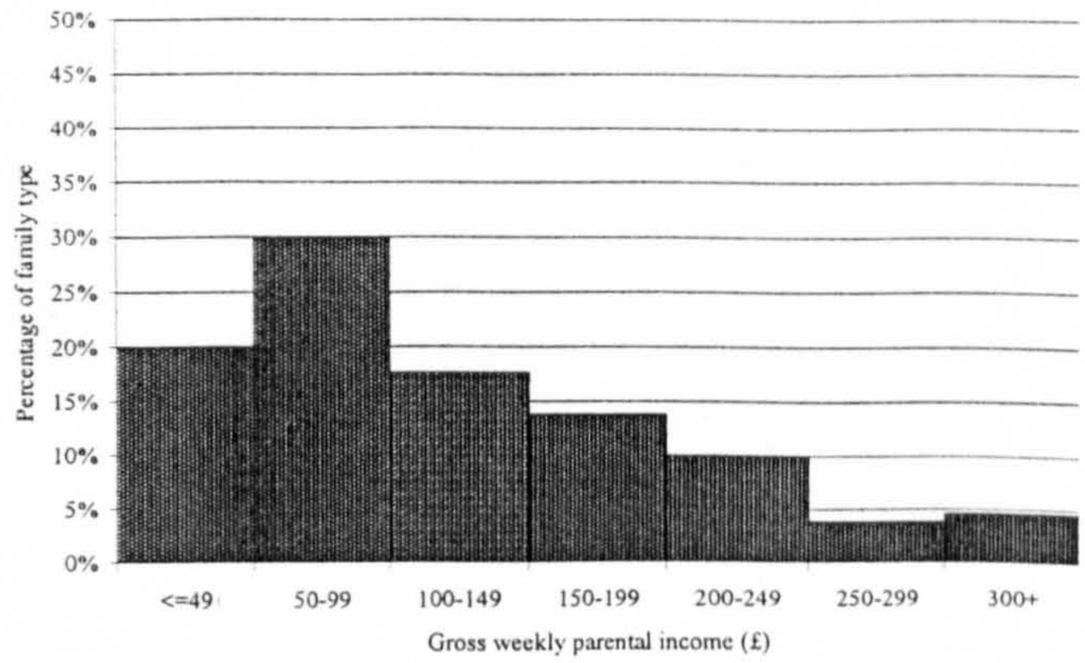


Figure III.9 Distribution of non equivalised income, father and stepmother at 16

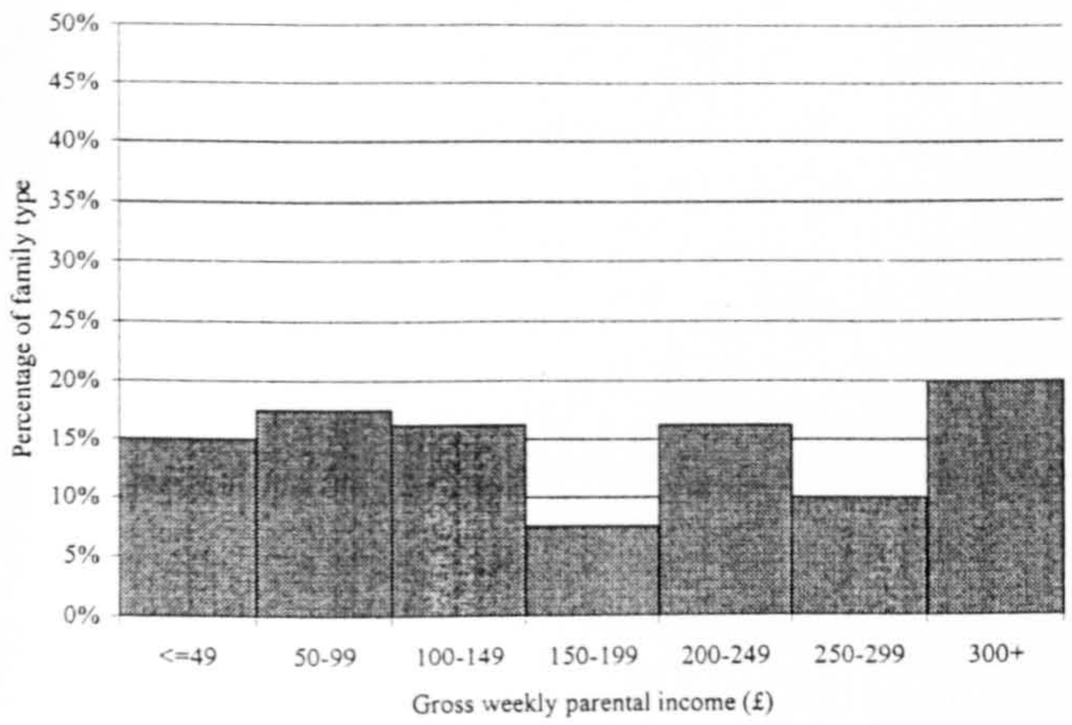
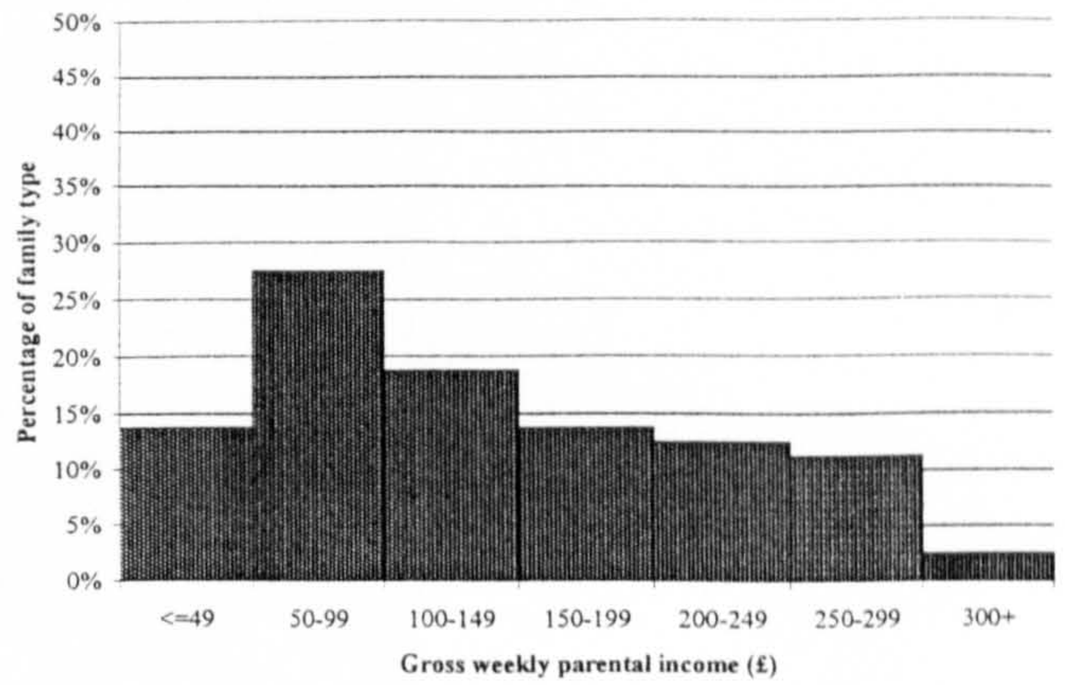


Figure III.10 Distribution of equivalised income father and stepmother at 16



Appendix IV Model building for multinomial logistic regression of unemployment

IV.1 Covariates used in the analysis

Table IV.1 Percentage distribution of measures of family transition used in the analysis of probability of unemployment in young adulthood
(weighted estimates)

	Men	Women
	%	%
Family Structure At 16		
Both natural parents	77.8	76.1
Lone mother	9.8	11.2
Mother and stepfather	8.6	9.6
Lone father/Father and stepmother	3.0	2.2
Other guardians/ in statutory or foster care	0.7	0.9
Type of transitions		
Always natural parents	74.5	73.4
Natural parents-lone mother	6.0	6.3
Natural parents-mother/stepfather, no stepsiblings	4.9	5.1
Natural parents – mother/stepfather – lived with stepsiblings	1.5	1.5
Natural parents – lone father or father/stepmother	1.8	1.3
Lone mother at birth –all sequences	4.2	4.2
Either parent died	2.9	4.4
Ever in statutory/foster care	1.4	1.4
Other sequences	2.8	2.3
Number and timing of transitions		
No transitions	75.9	74.2
1 transition, complete by age 6	4.9	5.8
2+transitions, complete by age 6	2.5	2.2
1 transition, complete by age 11	3.5	3.5
2+ transitions, complete by age 11	5.1	5.6
1 transition, age 11+	4.5	5.1
2+ transitions, last transition age 11+	3.6	3.5
Timing and type of transition (selected sequences)		
Always natural parents	74.5	73.4
Transitions complete by age 6		
Natural parents-lone mother	1.5	1.5
Natural parents-lone mother-mother/stepfather	1.7	1.8
Transitions complete by age 11		
Natural parents-lone mother	2.0	2.0
Natural parents-lone mother-mother/stepfather	2.7	2.9
Transitions complete age 11+		
Natural parents-lone mother	2.5	2.8
Natural parents-lone mother-mother/stepfather	2.0	2.0
Weighted Total	*8544*	*7898*
Unweighted Total	*2499*	*3171*

Table IV.2 Percentage distribution of other background covariates tested for selection in model of unemployment
(weighted estimates)

Factor	Men %	Women %
1. Educational background		
Highest academic or vocational qualification		
None	7.2	5.8
CSE Grade 2-5	10.9	10.3
O level (or equivalent)	33.3	40.0
A level (or equivalent)	17.5	15.0
Higher	10.6	11.3
Degree	20.4	17.9
Year left full time education		
1986/7	55.0	49.3
1988-1990	16.4	22.6
1990 or later	20.8	19.8
Not known	7.8	8.4
2. Region		
North	7.5	6.8
Yorkshire and Humberside	7.3	6.6
North West	11.0	12.0
East Midlands	9.7	9.0
West Midlands	11.1	9.8
East Anglia	4.7	4.4
South West	11.1	11.1
Wales	6.6	5.2
London and the South East	21.8	25.4
Scotland	9.6	9.7
3. Ethnic Group		
White European/Other	94.6	96.0
African-Caribbean	2.4	1.5
Indian	1.3	0.8
Other Asian	1.6	1.8
4. Financial circumstances		
Equivalised household weekly net income (£)		
<=49	8.2	9.2
50-99	23.2	23.5
100-149	17.3	16.6
150-199	11.6	10.7
200-249	7.5	7.1
250+	8.2	7.1
Not known	24.0	25.6
Totals: Weighted	*8544*	*7898*
Unweighted	*2499*	*3171*

Factor	Men %	Women %
Family received means tested benefits in year before age 16 interview	22.2	22.8
Family experience of financial hardship in year before age 16 interview (parental self reported)	13.6	13.1
Social Class of head of household in 1986[25]		
I/II	26.8	27.6
IIINM	11.3	13.2
IIIM	42.2	42.8
IV/V	19.6	17.8
5. Family Relationships		
Relationship with parents		
Mostly positive responses	18.2	30.4
More positive than negative responses	17.4	18.8
Equal positive/negative responses	11.2	11.0
Mostly negative responses	6.8	9.1
Not known	46.3	30.7
Level of supervision and communication with teenager		
High/Moderately high	19.4	37.4
Low	14.8	18.6
Very low	17.8	12.2
Not known	48.0	31.8
Whether want to leave home at the earliest opportunity	0.6	1.3
6. Attitudes to school and work		
Considers truancy acceptable	10.2	10.3
Belief in the value of qualifications to get a good job		
Agree fully	26.5	28.3
Agree partly	19.0	30.0
Disagree	1.6	3.1
Not known	53.0	38.6
Totals: Weighted	*8544*	*7898*
Unweighted	*2499*	*3171*

[25] In a lone mother family this was the mother's occupational status but otherwise was the father figure's status. If parental occupation details were missing from age 16 the details were taken from the most recently available earlier stage of the survey.

Table IV.2 Continued

Factor	Men %	Women %
Whether want to leave school at the earliest opportunity		
Yes	14.4	18.6
No	82.4	76.1
Don't know	3.2	5.3
Whether believes no use planning a career	9.8	8.3
7. Non-response information		
Missing interview with teenager at 16	63.8	49.5
Totals: Weighted	***8544***	***7898***
Unweighted	***2499***	***3171***

Factor	Men %	Women %
8. Family Information at 26		
Partnership Status		
Single	49.7	34.0
Cohabiting	23.4	24.2
Married	23.1	34.5
Separated/Divorced/Widowed/ Remarried	3.8	7.2
Number of children in household		
0	80.5	68.5
1	13.0	17.9
2	5.3	11.0
3+	1.2	2.6
Totals: Weighted	***8544***	***7898***
Unweighted	***2499***	***3171***

IV.2 The impact of weighting on the analysis

The design effects for the key estimates from the models presented in Chapter 5 are given in Tables IV.3 and IV.4 as well as the results when the models were re-run using unweighted data. The purpose and method of these comparisons are described in Appendix III, Section III.3.

Table IV.3 Parameter estimates from weighted and unweighted logistic regression models of unemployment, men
Using covariates selected for Model 2, Tables 5.3 and 5.5-5.7

a) 4-11 months unemployment

Reference categories are underlined	Weighted $\hat{\beta}$	Weighted $se(\hat{\beta})$	Weighted deff	Unweighted $\hat{\beta}$	Unweighted $se(\hat{\beta})$
Table 5.3					
Family Structure At 16					
Both natural parents	0	-	-	0	-
Lone mother	-0.16	0.23	1.25	-0.03	0.20
Mother and stepfather	-0.02	0.23	1.32	-0.02	0.21
Lone father/Father and stepmother	-1.26***	0.42	0.90	-0.95**	0.42
Other guardians/ in statutory or foster care	-0.20	0.64	1.10	0.06	0.59
Table 5.5					
Type of transitions	0	-		0	-
Always natural parents	-0.46	0.29	1.21	-0.12	0.26
Natural parents-lone mother	0.01	0.28	1.28	-0.04	0.26
Natural parents-mother/stepfather, no stepsiblings	-0.18	0.51	0.08	-0.14	0.48
Natural parents – mother/stepfather – lived with stepsiblings	-0.91*	0.51	0.91	-0.70	0.50
Natural parents – lone father or father/stepmother	0.48	0.33	1.57	0.58*	0.32
Lone mother at birth –all sequences	-0.63	0.41	1.23	-0.69*	0.37
Either parent died	0.19	0.48	1.33	0.67	0.42
Any time in statutory/foster care	-0.48	0.38	1.43	-0.48	0.37
Other sequences					
Table 5.6					
Number and timing of transitions					
No transitions	0	-	-	0	-
1 transition, complete by age 6	-0.04	0.33	1.64	-0.11	0.31
2+transitions, complete by age 6	0.40	0.38	1.34	0.35	0.35
1 transition, complete by age 11	-0.62*	0.35	0.98	-0.46	0.32
2+ transitions, complete by age 11	-0.23	0.26	1.22	-0.18	0.26
1 transition, age 11+	-0.19	0.29	1.18	0.01	0.26
2+ transitions, last transition age 11+	-0.69*	0.37	1.13	-0.40	0.32
Table 5.7					
Timing and type of transition					
(selected sequences)					
Always natural parents	0	-	-	0	-
Transitions complete by age 6					
Natural parents-lone mother	-0.31	0.60	1.63	-0.09	0.56
Natural parents-lone mother-mother/stepfather	0.06	0.50	0.42	-0.07	0.45
Transitions complete by age 11					
Natural parents-lone mother	-0.63	0.46	0.97	-0.30	0.41
Natural parents-lone mother-mother/stepfather	-0.10	0.37	1.10	-0.09	0.35
Transitions complete age 11+					
Natural parents-lone mother	-0.42	0.39	1.17	-0.01	0.35
Natural parents-lone mother-mother/stepfather	-0.03	0.42	0.28	-0.02	0.39

* denotes significance difference at the 10% level
** denotes significance difference at the 5% level
*** denotes significance difference at the 1% level

Table IV.3 Continued

b) 12 or more months unemployment, men

Reference categories are underlined	Weighted $\hat{\beta}$	Weighted $se(\hat{\beta})$	Weighted deff	Unweighted $\hat{\beta}$	Unweighted $se(\hat{\beta})$
Table 5.3					
Family Structure At 16					
Both natural parents	0	-	-	0	-
Lone mother	0.40*	0.24	1.35	0.39*	0.22
Mother and stepfather	0.34	0.25	1.39	0.38*	0.22
Lone father/Father and stepmother	0.35	0.31	1.18	0.29	0.33
Other guardians/ in statutory or foster care	-1.42	1.06	0.94	-1.11	1.06
Table 5.5					
Type of transitions					
Always natural parents	0	-	-	0	-
Natural parents-lone mother	0.45	0.28	1.34	0.52*	0.26
Natural parents-mother/stepfather, no stepsiblings	0.11	0.29	1.05	0.22	0.29
Natural parents – mother/stepfather – lived with stepsiblings	0.67	0.54	0.25	0.58	0.46
Natural parents – lone father or father/stepmother	0.71*	0.36	0.24	0.54	0.39
Lone mother at birth –all sequences	1.33***	0.35	1.80	1.20***	0.32
Either parent died	0.22	0.44	1.32	0.17	0.36
Any time in statutory/foster care	-0.84	0.71	1.48	-0.62	0.67
Other sequences	-0.48	0.50	0.54	-0.55	0.45
Table 5.6					
Number and timing of transitions					
No transitions	0	-	-	0	-
1 transition, complete by age 6	0.85**	0.33	1.76	0.51*	0.30
2+transitions, complete by age 6	0.41	0.46	1.48	0.26	0.44
1 transition, complete by age 11	0.57	0.29	1.19	0.46	0.29
2+ transitions, complete by age 11	-0.13	0.32	1.31	0.01	0.29
1 transition, age 11+	0.46	0.31	1.26	0.61	0.27
2+ transitions, last transition age 11+	-0.10	0.35	1.27	-0.03	0.34
Table 5.7					
Timing and type of transition (selected sequences)					
Always natural parents	0	-	-	0	-
Transitions complete by age 6					
Natural parents-lone mother	0.97*	0.52	1.63	0.94*	0.51
Natural parents-lone mother-mother/stepfather	-0.07	0.56	1.42	0.00	0.52
Transitions complete by age 11					
Natural parents-lone mother	0.56	0.35	0.97	0.52	0.38
Natural parents-lone mother-mother/stepfather	0.48	0.37	1.10	0.46	0.35
Transitions complete age 11+					
Natural parents-lone mother	-0.01	0.44	1.17	0.32	0.37
Natural parents-lone mother-mother/stepfather	0.18	0.41	1.28	0.31	0.42

* denotes significance difference at the 10% level
** denotes significance difference at the 5% level
*** denotes significance difference at the 1% level

Table IV.4 Parameter estimates from weighted and unweighted logistic regression models of unemployment, women
Using covariates selected for Model 2, Tables 5.8 and 5.10-5.12

a) 4-11 months unemployment

Reference categories are underlined	Weighted $\hat{\beta}$	Weighted $se(\hat{\beta})$	Weighted deff	Unweighted $\hat{\beta}$	Unweighted $se(\hat{\beta})$
Table 5.8					
Family Structure At 16					
Both natural parents	0	-	-	0	-
Lone mother	-0.18	0.20	1.16	-0.06	0.18
Mother and stepfather	0.28	0.23	1.25	0.22	0.20
Lone father/Father and stepmother	0.29	0.34	1.15	0.27	0.33
Other guardians/ in statutory or foster care	0.53	0.55	1.44	0.26	0.59
Table 5.10					
Type of transitions					
Always natural parents	0	-		0	-
Natural parents-lone mother	-0.22	0.24	1.15	-0.16	0.23
Natural parents-mother/stepfather, no stepsiblings	-0.12	0.30	1.23	-0.15	0.29
Natural parents – mother/stepfather – lived with stepsiblings	0.70	0.41	1.25	0.71*	0.39
Natural parents – lone father or father/stepmother	0.49	0.39	1.10	0.49	0.39
Lone mother at birth –all sequences	0.25	0.36	1.41	0.29	0.34
Either parent died	-0.16	0.26	1.10	0.04	0.27
Any time in statutory/foster care	0.57	0.45	1.49	0.55	0.44
Other sequences	-0.20	0.41	1.21	-0.03	0.38
Table 5.11					
Number and timing of transitions					
No transitions	0	-	-	0	-
1 transition, complete by age 6	0.03	0.26	1.32	0.14	0.24
2+transitions, complete by age 6	-0.58	0.48	1.58	-0.76	0.54
1 transition, complete by age 11	-0.04	0.31	1.22	0.06	0.30
2+ transitions, complete by age 11	0.09	0.25	1.27	0.14	0.23
1 transition, age 11+	0.20	0.22	1.07	0.27	0.22
2+ transitions, last transition age 11+	0.08	0.30	1.22	-0.01	0.29
Table 5.12					
Timing and type of transition (selected sequences)					
Always natural parents	0	-	-	0	-
Transitions complete by age 6					
Natural parents-lone mother	-0.79	0.61	1.28	-0.54	0.54
Natural parents-lone mother-mother/stepfather	0.23	0.43	1.29	0.21	0.45
Transitions complete by age 11					
Natural parents-lone mother	0.20	0.37	1.17	0.27	0.36
Natural parents-lone mother-mother/stepfather	0.08	0.35	1.24	0.11	0.33
Transitions complete age 11+					
Natural parents-lone mother	-0.32	0.32	1.10	-0.35	0.33
Natural parents-lone mother-mother/stepfather	0.10	0.42	1.17	0.02	0.38

* denotes significance difference at the 10% level
** denotes significance difference at the 5% level
*** denotes significance difference at the 1% level

Table IV.4 Continued

12 or more months unemployment - women

Reference categories are underlined	Weighted $\hat{\beta}$	Weighted $se(\hat{\beta})$	Weighted deff	Unweighted $\hat{\beta}$	Unweighted $se(\hat{\beta})$
Table 5.8					
Family Structure At 16					
Both natural parents	0	-	-	0	-
Lone mother	0.35	0.24	1.30	0.28	0.20
Mother and stepfather	0.89***	0.23	1.32	0.75***	0.21
Lone father/Father and stepmother	0.14	0.42	0.98	0.29	0.44
Other guardians/ in statutory or foster care	0.88	0.66	1.20	1.06	0.54
Table 5.10					
Type of transitions					
Always natural parents	0	-	-	0	-
Natural parents-lone mother	0.21	0.27	1.28	0.06	0.26
Natural parents-mother/stepfather, no stepsiblings	0.92***	0.28	1.32	0.76***	0.27
Natural parents – mother/stepfather – lived with stepsiblings	0.51	0.50	1.02	0.65	0.52
Natural parents – lone father or father/stepmother	0.12	0.57	0.97	0.25	0.55
Lone mother at birth –all sequences	1.49***	0.30	1.47	1.36***	0.31
Either parent died	0.50	0.32	1.26	0.49	0.30
Any time in statutory/foster care	0.20	0.58	1.27	0.63	0.49
Other sequences	0.04	0.47	1.21	-0.01	0.46
Table 5.11					
Number and timing of transitions					
No transitions	0	-	-	0	-
1 transition, complete by age 6	0.60**	0.26	1.42	0.50*	0.26
2+transitions, complete by age 6	0.29	0.38	1.34	0.30	0.42
1 transition, complete by age 11	0.44	0.34	1.31	0.45	0.33
2+ transitions, complete by age 11	0.04	0.33	1.33	0.06	0.29
1 transition, age 11+	0.68**	0.26	1.17	0.59**	0.25
2+ transitions, last transition age 11+	0.63*	0.32	1.24	0.46	0.31
Table 5.12					
Timing and type of transition (selected sequences)					
Always natural parents	0	-	-	0	-
Transitions complete by age 6					
Natural parents-lone mother	0.23	0.54	1.41	0.06	0.52
Natural parents-lone mother-mother/stepfather	0.79	0.46	1.29	0.74	0.47
Transitions complete by age 11					
Natural parents-lone mother	0.45	0.44	1.35	0.31	0.44
Natural parents-lone mother-mother/stepfather	0.80**	0.37	1.30	0.78**	0.35
Transitions complete age 11+					
Natural parents-lone mother	0.22	0.37	1.26	0.03	0.34
Natural parents-lone mother-mother/stepfather	0.85**	0.41	1.22	0.62	0.41

* denotes significance difference at the 10% level
** denotes significance difference at the 5% level
*** denotes significance difference at the 1% level

The deffs for both men and women range from 0.94 to 1.76. Therefore, the interpretation is much the same as for the models of educational outcomes. With only non-response bias to consider rather than survey design factors, such as clustering, these deffs are relatively small. The weighting has created a small loss of precision but has gone some way to correct the potential bias in the data caused by non-response without excessive loss of precision. Although there are some exceptions, the coefficients for the unweighted models are usually smaller than those achieved in the weighted model although all of the 95% confidence intervals around the weighted and unweighted estimates overlap indicating that we should be cautious in our support of either approach. The weighting for response probabilities at both 16 and 26 has compensated somewhat for the under-representation of possibly the more disrupted or disadvantaged among those experiencing family transitions who may be more likely to experience unemployment and less likely to be in the survey at 26.

Appendix V Model building for discrete time logistic regression model of young motherhood

V.1 Covariates used in the analysis

Table V.1 Percentage distribution of measures of family disruption used in analysis (weighted estimates)

	Original file	Expanded file
	%	%
Family Structure At 16		
Both natural parents	76.0	76.4
Lone mother	11.1	11.0
Mother and stepfather	9.6	9.5
Lone father/Father and stepmother	2.2	2.1
Other guardians/ in statutory or foster care	0.9	0.9
Type of transitions		
Always natural parents	73.2	73.7
Natural parents-lone mother	6.3	6.3
Natural parents-mother/stepfather, no stepsiblings	5.2	5.2
Natural parents – mother/stepfather – lived with stepsiblings	1.4	1.4
Natural parents – lone father or father/stepmother	1.3	1.3
Lone mother at birth –all sequences	4.3	4.2
Either parent died	4.3	4.3
Ever in statutory/foster care	1.6	1.4
Other sequences	2.3	2.2
Number and timing of transitions		
No transitions	74.1	74.6
1 transition, complete by age 6	5.9	5.8
2+transitions, complete by age 6	2.3	2.2
1 transition, complete by age 11	3.4	3.4
2+ transitions, complete by age 11	5.6	5.5
1 transition, age 11+	5.2	5.1
2+ transitions, last transition age 11+	3.3	3.3
Timing and type of transition (selected sequences)		
Always natural parents	73.2	73.7
Transitions complete by age 6		
Natural parents-lone mother	1.5	1.5
Natural parents-lone mother-mother/stepfather	1.8	1.8
Transitions complete by age 11		
Natural parents-lone mother	2.0	1.9
Natural parents-lone mother-mother/stepfather	2.9	2.8
Transitions complete age 11+		
Natural parents-lone mother	2.9	2.9
Natural parents-lone mother-mother/stepfather	2.0	1.9
Weighted Total	***8232***	***47986***
Unweighted Total	***3297***	***19291***

Table V.2 Percentage distribution of background variables tested for their association with young motherhood
(weighted estimates)

i) Circumstances at birth

Factor	Original %	Expanded %
1. Parental age		
Mother's age at first birth		
<=18	13.6	13.2
19-21	29.1	28.8
22-23	21.5	21.6
24+	35.7	36.5
Mother's age		
<=19	8.9	8.6
20-24	36.0	35.9
25-29	32.0	32.3
30-35	15.0	15.1
35+	8.0	8.1
Father's age		
<=19	2.9	2.9
20-24	20.7	20.6
25-29	28.4	29.7
30-34	20.7	20.8
35+	14.6	14.5
Not known	12.6	12.5
2. Parental education		
Mother's and Father's age at completing full time education		
Both at 15	49.4	49.0
Mother 16+, Father 15	12.2	12.3
Mother 15, Father 16+	11.8	11.9
Both 16+	21.5	22.0
Not known	4.9	4.8
Totals: Weighted	*8232*	*19291*
Unweighted	*3297*	*47986*

Factor	Original %	Expanded %
3. Parents' Occupations		
Family social class		
I/II	17.9	18.2
IIINM	13.3	13.5
IIIM	47.3	47.1
IV/V	21.4	21.1
Mother's occupational status before birth of cohort member		
Working I/II	7.9	8.1
Working IIINM	26.3	26.6
Working IIIM	4.4	4.3
Working IV/V	17.1	18.3
Not working	27.4	27.9
Not known	16.1	15.5
4. Birth Order		
Position in Birth Order		
First born	38.9	39.1
Second	33.4	33.7
Third	15.7	15.6
Fourth or later born	11.9	11.7
5. Ethnic Origin		
Ethnic Group		
White	96.1	96.1
African/Caribbean	1.4	1.4
Asian	2.5	2.5
6. Parents' marital status		
Not married	6.2	6.0
Married less than 1 year	7.4	7.4
Married 1 year or more	78.9	79.1
Not known	7.6	7.5
Totals: Weighted	*8232*	*19291*
Unweighted	*3297*	*47986*

cont/d.....

Table V.2 Continued

ii) Early Childhood Factors (age five and 10 survey)

Factor	Original %	Expanded %
1. Socio Economic Circumstances		
Father figure unemployed in year before age 5 interview	4.5	4.4
Reason for mother working		
Not working/Reason not known	80.2	80.0
Necessity	9.1	9.3
Other (career/social contact)	10.6	10.6
Receipt of free school meals		
No	77.7	78.1
Yes	11.2	10.7
Not known	11.1	11.1
Ever lived in council housing	29.6	29.0
Density of household (age 10)		
<1.00 person per room	71.6	72.0
1.00 – 1.49 persons per room	2.5	2.5
1.50+ persons per room	0.3	0.3
Type of neighbourhood (age 5) Interviewer rated		
Poor urban	5.0	4.9
Average urban	36.7	36.5
Well to do urban	17.8	18.1
Rural	15.7	15.9
Not known	24.7	24.6
2. Educational Scores at 5		
Copying Ability		
High	21.5	21.2
Medium	26.5	26.6
Low	29.7	30.0
Not known	22.2	22.1
Picture Vocabulary Score		
Top quartile	15.0	19.5
Second quartile	17.3	18.2
Third quartile	18.4	17.5
Fourth quartile	19.7	15.2
Not known	29.6	29.5
Totals: Weighted	***8260***	***7774***
Unweighted	***2429***	***3132***

Factor	Original %	Expanded %
3. Parental interest in child's education (age 10)		
Teacher's rating of interest		
Both very interested	26.5	27.0
Only mother or father very interested	17.9	18.0
Neither very interested	36.4	35.9
Not known	19.1	19.1
Parents' expectation of when child will leave school (age 10)		
16	31.6	31.1
17+	51.5	52.0
Not known	16.9	17.0
4. Child's behaviour		
Top 10% of anti-social behaviour scores (age 5)	4.7	4.6
Whether child believes useless to try in school (age 10)l	7.1	6.9
Whether child does not believes in planning ahead (age 10)	23.3	23.4
5. Parenting Characteristics		
Level of authoritarian parenting		
Top quartile (high)	17.9	17.9
Second	19.5	19.5
Third	20.3	20.4
Fourth	20.2	20.3
Not known	22.0	21.9
Father's involvement in childcare		
Equal or higher than mother	43.2	43.2
Less than mother	32.1	32.2
Very low involvement	6.7	6.6
Not known	18.1	18.0
Mother's attitude to gender equality		
More traditional attitudes	33.5	33.2
Neither traditional or egalitarian	51.7	51.8
Mainly egalitarian attitudes	14.8	14.9
6. Other transitions		
Number of house moves by 10		
0	29.2	29.3
1	36.6	36.7
2	19.8	19.8
3+	14.4	14.2
Totals: Weighted	***8260***	***7774***
Unweighted	***2429***	***3132***

cont/d....

ii) Early Childhood Factors (age five and 10 survey) – interactions

Factor	Original %	Expanded %
Age * Parental interest in education		
18*Only mother or father interested	n/a	3.0
18*Neither very interested		6.0
18*Not known		3.2
19*Only mother or father interested		2.9
19*Neither very interested		5.7
19*Not known		3.1
20*Only mother or father interested		2.8
20*Neither very interested		5.6
20*Not known		3.0
Totals: Weighted	*8260*	*7774*
Unweighted	*2429*	*3132*

Table V.2 Continued

iii) Factors at 16

Factor	Original %	Expanded %
1. Financial situation		
Equivalised household weekly net income (£)		
<=49	9.4	
50-149	40.3	
150-249	17.7	
250+	6.9	
Not known	25.6	
Family received means tested benefits in last year	23.2	22.6
Financial hardship in last year (self reported by parents)	13.5	13.0
2. Family Environment		
Relationship with parents		
Mostly positive responses	30.2	30.6
More positive than negative responses	18.4	18.4
Equal positive/negative responses	10.8	10.8
Mostly negative responses	9.1	9.0
Not known	31.5	31.1
Level of supervision and communication with teenager		
High/Moderately high	36.6	37.2
Low	18.1	18.4
Very low	12.0	11.8
Not known	32.8	32.4
Amount of time spent in joint family activities		
High	13.3	13.4
Moderately High	12.9	12.9
Low	13.4	13.6
Very Low	12.8	12.8
Not known	47.6	47.2
Totals: Weighted	***8232***	***47986***
Unweighted	***3297***	***19291***

Factor	Original %	Expanded %
Teenager wants to leave home at earliest opportunity	1.2	1.1
3. Teenager's attitude to education and work		
Considers truancy acceptable	10.1	10.0
Teenage wants to leave school at earliest opportunity	18.4	18.3
Belief in the value of qualifications to get a good job		
Agree fully	27.8	28.1
Agree partly	29.4	30.0
Disagree	3.6	3.1
Not known	39.4	39.0
Whether believes no use planning a career	8.2	8.2
4. Other family characteristics		
Total sibling size (step and bio)		
0/1	48.0	48.6
2/3	41.2	41.2
4+	10.7	10.1
5. Educational outcomes		
Whether still in education 2 years earlier		
Age 17 or younger	n/a	99.9
Age 18		98.8
Age 19		65.5
Age 20		53.0
O level/CSE attainment		
None	4.5	3.9
CSEs Grade 2-5	15.5	15.4
1-4 O levels	31.7	31.6
5+ O levels	44.3	43.3
Not known	6.0	5.7
Totals: Weighted	***8232***	***47986***
Unweighted	***3297***	***19291***

V.2 Comparing weighted and unweighted results

Table V.3 Parameter estimates from weighted and unweighted discrete-time models of a birth between ages 15 and 20

Using covariates selected for Model 3, Tables 6.2 to 6.5

Reference categories are underlined	Weighted			Unweighted	
	$\hat{\beta}$	$se(\hat{\beta})$	deff	$\hat{\beta}$	$se(\hat{\beta})$
Table 6.2					
Family Structure At 16					
Both natural parents	0	-	-	0	-
Lone mother	0.20	0.17	1.29	0.23	0.16
Mother and stepfather	0.28	0.17	1.33	0.30*	0.16
Lone father/Father and stepmother	0.61*	0.32	1.12	0.74**	0.30
Other guardians/ in statutory or foster care	0.40	0.41	1.04	0.72*	0.41
Table 6.3					
Type of transitions					
Always natural parents	0	-	-	0	-
Natural parents-lone mother	0.11	0.22	1.17	0.15	0.21
Natural parents-mother/stepfather, no stepsiblings	0.10	0.24	1.27	0.13	0.23
Natural parents – mother/stepfather – lived with stepsiblings	0.85**	0.35	1.27	0.84**	0.33
Natural parents – lone father or father/stepmother	0.56	0.39	1.06	0.66*	0.38
Lone mother at birth –all sequences	0.53**	0.24	1.44	0.56**	0.22
Either parent died	0.24	0.26	1.26	0.38	0.27
Any time in statutory/foster care	1.91***	0.50	1.09	2.17***	0.53
Other sequences	0.46	0.33	1.42	0.47	0.31
Interaction					
Any time in care*Manual Social Class	-1.00	0.62	1.22	-1.28**	0.64
Table 6.4					
Number and timing of transitions					
No transitions	0	-	-	0	-
1 transition, complete by age 6	0.00	0.25	1.40	0.01	0.24
2+transitions, complete by age 6	0.34	0.33	1.51	0.29	0.32
1 transition, complete by age 11	0.19	0.39	1.26	0.30	0.28
2+ transitions, complete by age 11	0.56***	0.20	1.35	0.56***	0.20
1 transition, age 11+	0.34	0.22	1.14	0.41**	0.21
2+ transitions, last transition age 11+	0.69***	0.23	1.19	0.73***	0.22

Table V.3 (continued)

Reference categories are underlined	Weighted			Unweighted	
	$\hat{\beta}$	$se(\hat{\beta})$	deff	$\hat{\beta}$	$se(\hat{\beta})$
Table 6.5					
Timing and type of transition					
(selected sequences)					
Always natural parents	0	-	-	0	-
Transitions complete by age 6					
Natural parents-lone mother	-0.36	0.54	1.24	-0.22	0.52
Natural parents-lone mother-mother/stepfather	-0.19	0.44	1.42	-0.20	0.43
Transitions complete by age 11					
Natural parents-lone mother	0.39	0.36	1.28	0.37	0.36
Natural parents-lone mother-mother/stepfather	0.38	0.28	1.27	0.43	0.27
Transitions complete age 11+					
Natural parents-lone mother	0.11	0.29	1.08	0.15	0.29
Natural parents-lone mother-mother/stepfather	0.55*	0.32	1.19	0.50	0.31

* denotes significance difference at the 10% level
** denotes significance difference at the 5% level
*** denotes significance difference at the 1% level

The design effects varied from 1.04 to 1.51. The range is smaller than found in the analysis of educational outcomes or unemployment, mostly because non-response was less of a problem among women. Looking at the coefficients produced, the unweighted estimates are either very similar, or sometimes larger than the weighted ones, although all the 95% confidence intervals derived from the standard errors for the estimates overlapped. The final fitted models contained many variables, such as mother's age at first birth, family social class, parental education level and early educational test scores that were used to derive the weights. It is arguable that in this case, weighting created a loss of precision but did not compensate for non-response bias when factors associated with non-response were already controlled for in the model.

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