PARENTAL SEPARATION AND ADULT PSYCHOLOGICAL DISTRESS: MATERIAL AND RELATIONAL PATHWAYS

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I, Rebecca Emily Lacey confirm that the work presented in this thesis is my own.

Where information has been derived from other sources, I confirm that this has been

indicated in the thesis.

Signature:_____.

Abstract

The association between parental separation occurring during childhood and adult psychological distress is well established, however the potential mechanisms involved in translating the experience of parental separation into the increased risk of reporting psychological distress is unclear and little investigated. Previous literature indicates that material and relational factors may be involved and that these two pathways are likely to be linked across the life course. The identification of the mechanisms involved in the association between parental separation and psychological distress will offer suggestions as to how families and children who undergo separation can best be supported in order to prevent long-term adverse consequences for psychological health.

The diversification of family forms since the mid-20th century and in particular the increased chances that a child experiences parental separation in more recent years stimulated the investigation of whether the association between parental separation and adult psychological distress, and the mediating material and relational pathways, has changed over time. It is thought that as separation becomes more common it will have less of an effect upon the children involved. There are few studies which have investigated this with respect to psychological distress and this thesis extends those which do exist methodologically.

Analysis of data from three British birth cohorts finds that parental separation is associated with increased chances of reporting psychological distress and this does not differ by gender, age of child or cohort. Examination of mediating pathways shows that both material and relational factors are involved, although material factors particularly so, and that these differ for men and women, and also by cohort. The inter-linkage of material and relational factors across the life course was found to be complex. These findings suggest a need to support separating families, particularly through their educational careers, in order to minimise the long-term consequences for children.

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List of abbreviations

CI	Confidence Interval
BCS70	British Cohort Study (1970 birth cohort)
GHQ	General Health Questionnaire
MAR	Missing At Random
MCA	Multiple Correspondence Analysis
MCAR	Missing Completely At Random
MI	Multiple Imputation
MNAR	Missing Not At Random
NCDS	National Child Development Study (1958 birth cohort)
NSHD	National Survey of Health and Development (1946 birth cohort)
ONS	Office of National Statistics
OR	Odds ratio
PCA	Principal Components Analysis
PSE	Present State Examination
RGSC	Registrar General's Social Class
RR	Risk ratio
SD	Standard deviation
WHO	World Health Organisation

BACKGROUND

Chapter 1 Introduction

1.1 Introduction

A significant amount of attention has been directed to the study of the long-term effects of parental separation, including whether parental separation occurring during childhood is associated with psychological distress in adulthood. 'Psychological distress', the outcome used in this project, is taken as a broad term encompassing both physical and emotional symptoms of anxiety or depression which may be the result of stress or some kind of stressor (Ridner 2003). The majority of these studies, which are discussed in greater detail in chapter 2, find that parental divorce occurring during childhood is associated with the increased reporting of adult psychological distress.

This thesis takes the view that it is not necessarily parental separation occurring during childhood which directly affects adult psychological distress, but that parental separation sets in motion a series of disadvantages across the life course which in turn increases the likelihood of reporting psychological distress in adulthood. This thesis supports the conclusion of a report from the Cabinet Office and Department for Children, Schools and Families (DCSF) which states that:

> *"...it is not separation itself that has a negative effect but the way it affects family processes and circumstances",* (Cabinet Office and Department for Children Schools and Families 2008) p.95

Despite the amount of research which has investigated the association between parental separation and adult psychological distress, little is known about why this association exists, whether this varies for men and women, has changed over time and/or varies by the age of the child at the time of separation. Many authors share the view that research into the long-term effects of parental separation on children should not solely focus upon the effect of the separation but upon its sequelae (Acock and Demo 1994; Hetherington and Stanley-Hagan 1999; Wallerstein 1991), something which this thesis strives to do.

1.2 Why is psychological distress important?

It is estimated that 1 in 4 people will suffer from depression (WHO 2007) and 1 in 10 will suffer from anxiety disorders (Royal College of Psychiatrists 2011) at some point in their lives. In 2004 unipolar depressive disorders ranked third in the World Health Organisation's leading causes of the burden of disease (WHO 2004). Psychological distress is a state which is characterised by the experience of depressive or anxiety symptoms and encompasses both mental illness as well as more short-lived negative states (Ridner 2003). Mental illness in general accounts for 20 per cent of the burden of disease in Europe (WHO 2007). Psychological distress has been linked to increased risk of physical illnesses, such as coronary heart disease (Stansfeld, Fuhrer, Shipley and Marmot 2002), stroke (Surtees et al. 2008) and respiratory disease (Robinson, McBeth and Macfarlane 2004) amongst others. It is therefore likely that the burden of psychological distress is larger due to these links with physical illness.

The public health burden of psychological distress is clearly high and in order to begin to reduce this, an understanding of the factors which are likely to increase risk is needed. Childhood adversities are one such group of risk factors known to threaten psychological health across the life course (Kessler, Davis and Kendler 1997; Kessler, Gillis-Light, Magee, Kendler and Eaves 1997; Levitan, Rector, Sheldon and Goering 2003). Despite this, relatively little is empirically known about why this association exists with regards to parental separation.

1.3 Why is parental separation important?

'Parental separation' used throughout this thesis refers to the breakdown in relationship between two parents regardless of whether they were married. This thesis looks at parental separation occurring during childhood (0-16 years). The nature of family disruption has changed substantially in the past century with parental loss increasingly being caused by divorce as opposed to death (Pryor and Rodgers 2001). Divorces have increased rapidly since the mid-20th century with the most marked increase occurring in the early 1970s (fig.1.1) following the introduction of the Divorce Reform Act of 1969 (further discussed in section 1.5.2). A peak in divorces also occurred immediately after the Second World War and this was likely due to problems in readjusting to family life, the breakdown of rushed marriages conducted immediately prior to the war and the breakdown of marriages through prolonged, involuntary absence (Pryor and Rodgers 2001). It is thought that divorces have rapidly increased since the mid-20th century due

to several factors: the change in law, the changing role of women, the erosion of the traditional male breadwinner role and the 'deinstitutionalization' of marriage[1] (Binner and Dnes 2001; Burgess and Locke 1953; Bynner, Ferri and Wadsworth 2003; Chafetz 1995; Cherlin 2004; Ermisch 1986; Gonzalez and Viitanen 2006; Haskey 1995; Heckert, Nowak and Snyder 1998; Kalmijn 2007a; Lewis 2001; Stevenson and Wolfers 2007; Teachman 2010; Wolfers 2003).

Fig. 1.1 – Trend in number of divorces, England and Wales, 1946-2009
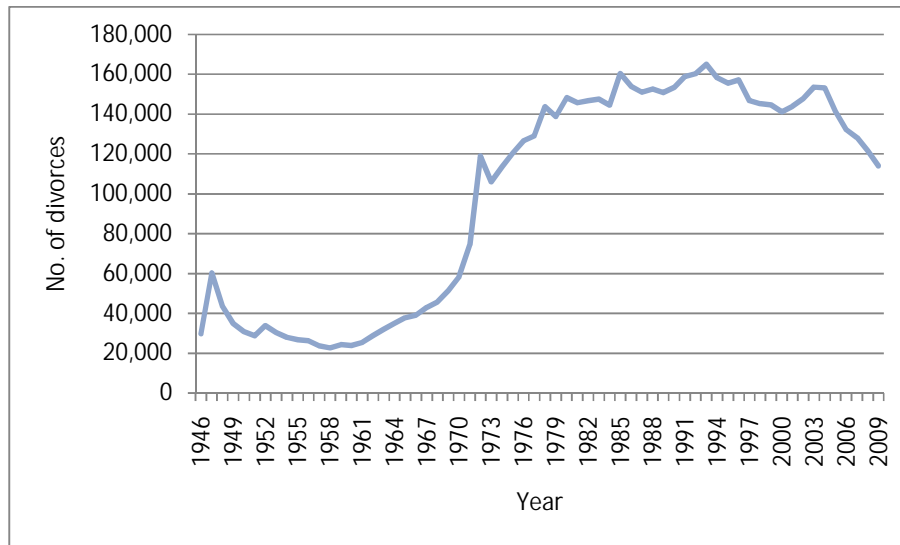
Source: Data taken from 'Divorces 1858-2003' (ONS 2006); 'Marriage, divorce and adoption statistics. FM2 No 35' (ONS 2010b)

Figure 1.1 only shows divorces and not the breakdown of relationships between unmarried couples. As a consequence the number of separations is likely to be much higher than that captured by official figures. Cohabitation has also increased over time, with the General Household Survey finding that between 1986 and 2006 the proportion of unmarried men and women cohabiting in Great Britain increased from 11 to 24 per cent and 13 to 25 per cent respectively (ONS 2008). Due to this increase it is likely that the underestimation of separation rates has increased over time, particularly as cohabitations are known to be less stable than marriages (Ferri and Smith 2003).

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[1] The 'deinstitutionalization' of marriage refers to the transition from marriage as an institution fulfilling social and religious obligations and responsibilities to becoming more about self-fulfilment, contentment and equality (termed the 'companionate marriage')

These changes have resulted in an increasing number of children experiencing separation (fig. 1.2) and therefore growing up in diverse family forms such as those headed by a single parent, unmarried parents, reconstituted[2] or step-families. For example the number of single parent families doubled between 1961-1985 covering part of the period of interest in this thesis (1946-1986; Eekelaar 1991). Three-fifths of these are women who experienced divorce and the remainder are those who never married. It should be noted that this figure only presents the number of children who are recorded at the time of divorce and therefore is a cross-sectional representation of the number of children with divorcing parents; the actual number of children who experience divorce will be much higher, accumulating over time.

Fig. 1.2 – Number of children with divorcing parents, England and Wales, 1957-2009
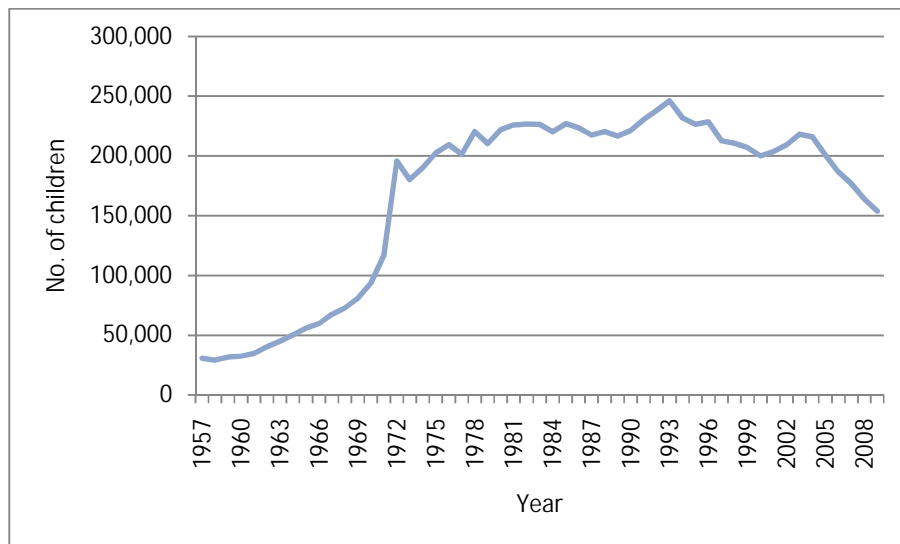
Source: Data taken from 'Children of divorced couples' (ONS 2010a)

1.4 The life course approach to epidemiology

The life course approach suggests that exposure to adverse social and environmental circumstances earlier in life may lead to poorer health outcomes in later life (Kuh and Ben-Shlomo 2004a). The impact of adverse life events or processes in childhood on psychological distress in adulthood is a current topic in psychiatric and life course epidemiological research (Gilman 2007). Studies taking a life course approach are likely

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[2] A reconstituted family is that consisting of two parents who have children from previous relationships

to be particularly fruitful in identifying pathways stemming from childhood adversities which ultimately shape the risk of psychological distress in adulthood, allowing for the targeting of early interventions which break these pathways of increased risk.

More than being about pathways linking one time point in a person's life to a later point, the life course approach is also about investigating the interplay between generations (for example the effect of the parental relationship on children) and with historical times (for example if societal divorce rates are higher will parental separation have less of an effect upon children?). These two aspects are two central themes of the life course paradigm as detailed by Elder (1994). An additional idea consistent with the life course approach, which this thesis investigates, is the timing of exposures. This thesis looks at whether the association between parental separation and adult psychological distress varies depending on its timing during childhood.

Life course epidemiology is well summarised as:

> '...more than the collection of longitudinal data or the use of a particular study design or analytical method. Rather it is a theoretical model where the temporal ordering of exposure variables and their inter-relationships with respect to a particular health or disease outcome are specified and then tested using life course data' (Kuh and Ben-Shlomo 2004b).

This is very much the approach taken in this thesis where pathways between parental separation and adult psychological distress involve temporally ordered factors, the age of the child when parental separation occurs is considered, the effect of changing societal divorce rates are investigated and analyses are conducted using longitudinal data from three of the British birth cohorts.

1.5 The importance of the social, legal and economic context

As individual life courses are embedded within societal and historical 'multilevels' (Mayer 2004), pathways linking parental separation and adult psychological distress are likely to be influenced by the social, economic and political environment surrounding families. This is illustrated in Bronfenbrenner's Ecological Systems Theory (fig.1.3) showing how aspects of the 'macrosystem', such as societal norms and attitudes, and the 'exosystem', such as legal systems, influence families and individuals across the life

course. This model is similar to the Social Determinants of Health model created by Dahlgren and Whitehead (1991), although one of the key strengths of the model presented here is the explicit 'chronosystem' which represents the importance of timing, both historical and timing during life, which are relevant to this project.

Fig. 1.3 – Bronfenbrenner's Ecological Systems Theory
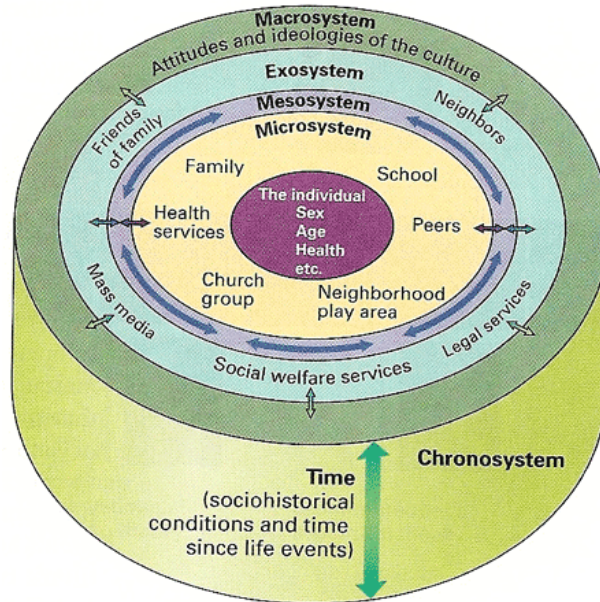
Source: (Longitudinal Study of Australian children 2009)

1.5.1 Social and economic context

As previously discussed in section 1.3 divorces increased rapidly in the mid-20th century and these changes are likely to be due to social and economic developments during this period. The 'Second Demographic Transition' (Van De Kaa 1987), of which increasing divorce rates constituted a part, is characterised by falling fertility rates, increases in cohabitation and increasing childbearing outside of marriage, meaning that children growing up during this period were experiencing much change in family life compared to previous generations (Hobcraft 2008). This means that when comparing information from three British birth cohorts, each born 12 years apart, a consideration of the wider socio-historical context is needed. For example the 1946 National Survey of Health and Development cohort members were born immediately after the Second World War during rationing, maybe with fathers who had been away at war, being born shortly

before the introduction of the National Health Service in 1948 (Blane 2010), shortly after the publication of the Beveridge report in 1942 (Beveridge 1942) and during a time when marriage was very much the norm (Wadsworth, Ferri and Bynner 2003). Members of the 1958 National Child Development Study were born during the 'golden age' of marriage (Reynolds and Mansfield 1999) when marriage was almost completely universal, being born before the 'Second Demographic Transition' was established, and therefore during a period of relative stability with regards to family life. The 1970 British Birth Cohort members were born into a period of changing attitudes and families, when the 'Second Demographic Transition' was more firmly established in the UK. With regards to cohort members forming their own relationships in adulthood, those in the youngest cohort were the most likely to be cohabiting (Ermisch and Francesconi 2000), to be a lone parent, to have children later and to have children outside of marriage. Despite this, material conditions in the later cohort were considerably better than in the earlier two cohorts and more young people were staying on in further or higher education however social inequalities appear to have widened (Hobcraft 2008).

1.5.2 Legal context

The legal context surrounding divorce is also important to consider as this is likely to reflect societal attitudes and behaviour, as illustrated in Bronfenbrenner's model (fig.1.3). It also reflects how children are treated during the separation process (Pryor and Rodgers 2001) and may therefore have implications for the pathways linking separation to adult psychological distress.

The major legal change during the period of interest is the Divorce Reform Act in 1969. Divorce reform was brought about as couples were able to separate but not divorce easily, an example of the law's failure to encompass reality (Eekelaar 1991; Halem 1980). This meant that separated individuals who wanted to re-partner and marry could not as they were still married to their previous spouses. This resulted in children living with unmarried parents who were not able to marry, a situation which was very stigmatising at the time (BBC 1963). Therefore the Divorce Reform Law was brought about using the grounds of 'irretrievable breakdown of the marriage' (Hansard 1969). Emphasis up to the mid-20th century has almost exclusively focused upon the marriage and matrimonial offences, and the Divorce Reform Act therefore heralded the introduction of the 'no fault' divorce. Couples were asked to prove at least one

condition which would demonstrate the breakdown of the relationship. These conditions were adultery, unreasonable behaviour, desertion, separation for at least two years with consent to divorce from both spouses or separation for five years (Hansard 1969). Not much emphasis was placed upon reconciliation but there was more enthusiasm for agreeing solutions to post-divorce arrangements, effectively meaning that there was more emphasis on saving costs rather than saving marriages (Gibson 1996). Divorce cases were transferred from High Courts to County Courts in order to save costs but this did not in fact happen, and the costs to the Legal Aid Fund increased dramatically (Eekelaar 1991).

In 1956 the Royal Commission on Marriage and Divorce paid attention to the impact of divorce upon children for the first time (Stone 1956). They stated that every divorce which involved children should only go ahead if the post-divorce arrangements regarding children were in their best interests and the court was completely satisfied with them (Eekelaar 1991). Previously children were not really acknowledged in divorce proceedings. Someone talking of their parent's divorce in 1955 said:

> *"In those days nobody ever thought of counselling the children or sorting out the huge problems of being adolescents in two households. We kept our agonies to ourselves and hardly dared discuss them with each other"* (Kynaston 2009) p. 560

Therefore it might be proposed that because of the near absence of considering children's wellbeing, divorce may have had a greater effect in earlier cohorts. In the 1980s and 1990s there was an increasing concern regarding the impact of parental separation upon children and this was manifested in the increasing availability of mediation and contact centres, and also self-help literature (Smart 1999). The changing association between parental separation and children's psychological distress in adulthood is tested in this thesis.

One other relevant legal change which might have affected children during the period of interest in this thesis is the Matrimonial and Family Proceedings Act of 1984. This changed the minimum number of years that couples could be married before they could apply for a divorce from 3 years to 1 year (Matrimonial and Family Proceedings Act

1984). This meant that couples who were having early marital problems were less likely to have children before they divorced than under the previous legal arrangement.

Children most often remain in the custody of the mother following divorce. In the ten years following the Divorce Reform Act only 18% of women with dependent children had incomes above 140% of the poverty line after divorce, but 46% of men did (Eekelaar and Maclean 1986). Also this study showed that reconstituted families were financially better off than single parent households but worse off than the original families. The impact of parental separation upon material conditions is investigated in this thesis.

1.5.3 Changing attitudes

Attitudes towards partnership forms and childbearing have changed significantly over the period of interest. Partnerships are very much linked to the 'value climate' of the society and the degree of institutionalisation of partnership types (Soons and Kalmijn 2009). Attitudes to partnership forms also reflect the context of the life course and the importance of taking into account embeddedness within the historical and societal setting (Mayer 2004).

One notable change in opinions has been the increase in support for childbearing outside marriage. Only 52.4% of people within the UK sample of Stevenson and Wolfer's European study agreed that "people who want children ought to get married". This is likely to be substantially lower than at the beginning of the period of interest in the post-World War II era (Stevenson and Wolfers 2007). From the same study 61.1% of UK participants believed that "divorce is usually the best solution when a couple can't seem to work out their marriage problems". This increase in support for divorce is likely to have been reflected by legal change in 1969 resulting in increasing numbers of couples divorcing (Stevenson and Wolfers 2007). Having divorced parents prior to the sharp increase in divorce rates in the early 1970s was potentially very stigmatising (Pryor and Rodgers 2001).

Attitudes towards marriage have also changed with women interviewed during the 1950s answering "you get married and have children because that is what you do" to the question "what is special about marriage?" (Yankelovich 1981), therefore reflecting marriage as previously being an institution or social obligation and less about personal

fulfilment as previously discussed in section 1.3. Since the mid-20th century options have very much opened up to young people with the emergence of greater diversity and acceptability of other partnership forms. For instance single life has become somewhat more attractive for attaining an independent lifestyle (Reynolds and Mansfield 1999).

To summarise section 1.5, table 1.1 provides a list of the salient social, economic and legal events or changes relevant to this thesis. Ages of participants of each of the three cohorts used in this study are also presented in the table in order to place them within their social, economic and legal context. Events prior to the birth of cohort participants are included as they are likely to influence the lives of their parents and the life and society in which participants were born into.

Table 1.1 – Summary of relevant social, economic and legal events related to this thesis

Year		NSHD age	NCDS age	BCS age
1923	Matrimonial Causes Act came about so that women could petition for divorce due to adultery if proven and additional faults, such as rape or cruelty (previously women could not petition for divorce on this basis)			
1937	Matrimonial Causes Act amended to allow divorce to be applied for other causes such as drunkenness, desertion or mental illness			
1942	Publication of the Beveridge Report 'Social Insurance and Allied Services'			
1944	Education Act – introduction of 11 plus exam, increase in number of free grammar school places and free secondary education for all pupils			
1945	Election of Labour government headed by Clement Atlee			
	Family Allowance Act regularly paid mothers with more than one child (Family Allowance and Child Tax Allowance)			
1946	National Insurance Act establishes system of social security towards which all of working age paid a contribution	0		
1948	National Health Service started bringing free healthcare to all	2		
	Children's Act sets up residential children's homes and places care of children under Local Authorities	2		
1949	Legal Aid and Advice Act provides support for those wishing to take issues to court who otherwise could not afford to do so	3		
1951	Election of Conservative government headed by Winston Churchill	5		
	Introduction of GCE O-level and A-level qualifications	5		
1954	End of food rationing	8		
1955	Anthony Eden becomes prime minister upon resignation of Churchill	9		
1956	Royal Commission of Marriage and Divorce reports	10		
1957	Harold Macmillan becomes Prime Minister upon resignation of Eden	11		
1959	Crowther report published recommending raising school leaving age to 16 years (implemented 1972/3)	13	1	
1961	Oral contraceptive licenced	15	3	
1963	Alec Douglas Home becomes Prime Minister upon resignation of Macmillan	17	5	
1964	Labour government elected headed by Harold Wilson	18	6	
	Succession Act introduced payment of a periodical allowance to wives	18	6	
1967	Family Planning Act specifies local health authorities to provide family planning advice regardless of marital status	21	9	
	Abortion Law Reform Act allows abortion to be carried out under certain conditions	21	9	
1969	Divorce Reform Act (implemented in 1971) introduces 'no fault' system of divorce – divorces could be applied for base on irretrievable breakdown of marriage	23	11	

Year		NSHD age	NCDS age	BCS age
1970	Conservative government elected headed by Edward Heath	24	12	0
	Matrimonial Property and Proceedings Act introduced new property adjustment orders	24	12	0
	Local Authority Social Services Act required local authorities to set up a social services committee and to provide care to children and other vulnerable people	24	12	0
1972	Miner's strike	26	14	2
1974	Labour government elected headed by Harold Wilson	28	16	4
1975	Sex Discrimination Act – illegal to discriminate on basis of marital status or sex	29	17	5
1976	James Callaghan becomes Prime Minister upon resignation of Harold Wilson	30	18	6
1977	Rules regarding family home change after divorce and the sale of the house can be postponed until death, remarriage or cohabitation with someone else	31	19	7
1979	Conservative government elected headed by Margaret Thatcher	33	21	9
	Courts start to consider a 'clean break' for some divorcing couples where all ties are cut at the point of divorce	33	21	9
1980	Implication of a 'clean break' divorce for children is first considered by the courts	34	22	10
	Housing Act allows council tenants to buy their homes	34	22	10
1984	Matrimonial and Family Proceedings Act – couples could divorce after 1 year of marriage instead of 3 years	38	26	14
	Miners' strike	38	26	14
1986	Social Security Act amended with a move towards means testing (away from universal benefits)	40	28	16
	GCSE qualification introduced	40	28	16
	Sex Discrimination Act amended to be in line with European legislation	40	28	16
1989	Children's Act amended to recognise children's interests and parent's responsibilities rather than parental rights	43	31	19
1990	The courts start to prefer the 'clean break' approach to divorce if there are sufficient financial resources for both parties. The income of the wife or husband's partner is now taken into consideration if they are living together as a couple	44	32	20
	Poll tax riots in England	44	32	20
	Conservative government elected headed by John Major	44	32	20
	Taxation Act allows independent taxation of husbands and wives	44	32	20
1991	Child Support Act initiates child maintenance payments through the Child Support Agency	45	33	21
1996	Family Law Act reduces cost of divorce. Court moves away from what either side needs and looks instead to reasonable requirements for the future	50	38	26
1997	Labour government elected headed by Tony Blair	51	39	27
1998	Home Office publishes 'Supporting families' – first family policy document	52	40	28
	Surestart scheme initiated	52	40	28
1999	National minimum wage initiated	53	41	29

Year		NSHD age	NCDS age	BCS age
	Government pledge to halve child poverty by 2010 and eradicate it by 2020	53	41	29
2001	Courts start to work towards a fair split of a divorcing couple's finances, after a series of landmark divorces, whereby both party's finances are taken into account and the way of life they have been accustomed to living	55	43	31
2002	Adoption and Children Act allows adoption by a single person or same-sex couple	56	44	32
2003	'Every child matters' is published	57	45	33
2004	Civil Partnership Act allows the marriage of same-sex partners	58	46	34
	Educational Maintenance Allowance adopted	58	46	34
2005	Those in civil partnerships are allowed to dissolve their partnerships in the same way as married couples	59	47	35
2006	Law Commission recommends reform of law to protect financial interests of cohabiting couples. Couples are entitled to a share in property if they shared a home together.	60	48	36
2007	Gordon Brown becomes Prime Minister following resignation of Blair	61	49	37
2008	Banking crisis and economic recession	62	50	38
	Child Maintenance and Enforcement Commission replaces Child Support Agency	62	50	38
2010	Conservative/Liberal Democrat coalition government elected headed by David Cameron	64	52	40

Adapted from: (Coleman and Glenn 2009; Smith 1997; Wadsworth and Bynner 2011)

1.6 Structure of this thesis

This thesis follows a standard format presenting a review of the evidence surrounding the relationship between parental separation and adult psychological distress and why material and relational pathways are likely to be important in explaining this association (chapter 2). Following the presentation of the literature chapter 3 sets up and discusses the conceptual model which was tested in this PhD project. The aims, objectives and hypotheses of the study are then presented in chapter 4. The methods section of the thesis is split into four individual chapters. The three datasets are described in chapter 5 and a description and derivation of all variables used is given in chapter 6. As with any longitudinal study missing data are an issue and chapter 7 describes this within the context of the three datasets used and the methods employed to account for missing information in this project.

The results and corresponding statistical analysis methods are presented across five chapters the first of which (chapter 8) gives the descriptive results and the remaining

results are structured by objective (chapters 9-12). Chapter 13 gives a discussion of the results, methodological issues and discusses the results within the context of findings from the literature. Chapter 14 then includes conclusions and discusses the potential implications for policy and practice.

Chapter 2 Literature Review

2.1 Introduction

The first section of this review discusses the evidence pertaining to the association between parental separation occurring during childhood and adult psychological distress structured by study design. Secondly evidence on potential mechanisms which may be involved is presented and discussed in the following section. A section on demographic change is then given which looks at how the association between parental separation and adult psychological distress may have changed over time. Indications of differences by age of the child at the time of separation and gender are then discussed.

2.2 The association between parental separation and adult psychological distress

Research into the effects of parental separation began with studies of the effects of parental death, particularly as for the first time separation or divorce became a more common cause of parental loss than death in the mid-20th century (Pryor and Rodgers 2001). The research into parental separation partly arose from the findings that death of the mother before the age of 11 years was a risk factor for adult depression in women in Brown's Camberwell study of depression in women (Brown and Harris 1978). Since then there has been a general concern within the field of epidemiology about the origins of depression in adulthood, from which research into the association between parental separation and adult psychological distress has stemmed (McLeod 1991). Despite this, the majority of research which investigates the consequences of parental separation has focussed upon outcomes in childhood or adolescence, with a relatively smaller body of work considering longer-term consequences such as psychological distress in adulthood.

A larger body of research has been conducted using US and Scandinavian samples with a smaller, but not insignificant, body of research using UK samples. Parental separation has been investigated as a risk factor for many different adult mental health outcomes, although the majority have focussed on outcomes within the sphere of psychological distress, such as depressive symptoms. Only studies involving population samples rather than clinical samples are discussed within this section. This is because population samples are likely to pick up both diagnosed and sub-threshold psychological distress, which represents a larger burden to society. Research evidence from cross-sectional studies are first discussed followed by longitudinal studies, which are in the majority.

2.2.1 Cross-sectional studies

Evidence from cross-sectional studies suggests that parental separation occurring during childhood is associated with increased reporting of psychological distress in adulthood. For example the majority of US cross-sectional studies find that retrospectively-reported parental separation is linked to reduced psychological wellbeing (Glenn and Kramer 1985), anxiety disorders (Kessler, Davis, and Kendler 1997) and increased reporting of depression (Amato 1991; Anda et al. 2002; Maier and Lachman 2000; McLeod 1991). One study which compared two similarly-designed cross-sectional surveys conducted in 1957 and 1976 in the US found that parental divorce occurring before the age of 16 years was associated with increased psychological distress amongst adults, but only for men in the 1957 study and for neither gender in the 1976 study (Kulka and Weingarten 1979). This suggests that the association between parental separation and adult psychological distress may have changed over time. Further evidence for this will be discussed later in section 2.4.2.

These findings are also supported by evidence involving Scandinavian samples suggesting that parental divorce occurring in childhood is associated with lower scores in the 'Affect Balance Scale' in adulthood – a measure of affective wellbeing in the few weeks prior to the survey (Jonsson et al. 2000), increased depressive and anxiety disorders in women (Pirkola et al. 2005; Storksen, Roysamb, Gjessing, Moum and Tambs 2007) and depression in both men and women (Ross and Mirowsky 1999). Also a Belgian study using the seventh wave of the Panel Study of Belgian Households (PSBH) in 1998 found that parental divorce during childhood was associated with depression for both men and women (Wauterickx, Gouwy and Bracke 2006).

A couple of UK cross-sectional studies provide evidence for this association. A Norfolk study (Wainwright and Surtees 2002) found that parental divorce occurring prior to 17 years of age was related to an increased risk of current depression in adulthood (RR=2.10, 95% CI: 1.02, 2.33 - RR compares those with and without current depression). Also in a sample of 800 South London residents childhood separation caused by marital discord was associated with increased reporting of depressive and anxiety disorders in adulthood, but only if the separation occurred between the ages of 5 and 10 years (Tennant, Hurry and Bebbington 1982), perhaps pointing towards differences by the age of the child at separation. However this paper only used a sample

of those in a small geographical area, which may not be generalisable to other areas of the UK. Evidence for this is further discussed in section 2.6.

Conversely some cross-sectional studies suggest that there may not be an association between separation and adult psychological distress. A cross-sectional analysis of the Avon Longitudinal Study of Pregnancy and Childhood (ALSPAC) dataset found that after adjusting for age, parent's education and housing tenure, parental divorce experienced by the ALSPAC mothers was not a significant predictor of depression in adulthood (O'Connor et al. 1999). Also Gähler, using the 1991 Swedish Level of Living Survey, showed that children who had experienced parental divorce during childhood did not fare significantly worse than those who had grown up in intact families (Gahler 1998). However divorcees in Sweden may fare better than divorcees in other countries as Sweden has generous welfare provisions and this may limit the impact of parental divorce upon socioeconomic circumstances (Andress et al. 2004), which are likely to be involved in transmitting the effect of parental separation on adult psychological distress (see section 2.3.1.2) within this context. Also a study by Oakley Browne and colleagues using a sample of women in New Zealand found that parental loss due to divorce was not associated with current or lifetime depression in adulthood (Oakley Browne et al. 1995). This finding is also supported by Landerman and colleagues (1991) and Yagla Mack (2001); both these studies adjusted for socioeconomic factors and marital status, both of which are likely to be important intervening mechanisms between parental separation and psychological distress in adulthood. These are discussed in detail later in section 2.3.

Cross-sectional studies are far from ideal as they often rely upon retrospective measures, which are prone to recall bias and inaccuracy. The assessment of potential mechanisms between parental separation in childhood and psychological distress in adulthood is difficult in cross-sectional studies as the temporality of intervening factors is difficult to determine. Therefore longitudinal studies are likely to be more appropriate for determining whether an association between parental separation and adult psychological distress exists and further are more likely to be fruitful in determining the intervening mechanisms. The majority of UK research investigating the link between parental separation and psychological distress is longitudinal in design.

2.2.2 Longitudinal studies

The majority of evidence from longitudinal studies also suggests that parental separation is associated with increased psychological distress reporting in adulthood; for example two studies by Gilman and colleagues (2003a; 2003b) using the US National Collaborative Perinatal Project found that parental divorce occurring before the age of 7 years was associated with increased lifetime onset of depression. Also a retrospective cohort study by Chapman and colleagues (2004) found that parental separation was linked to an increase in the lifetime prevalence of depressive disorders for men (OR=1.1, 95% CI:1.0, 1.4) and women (OR=1.4, 95% CI: 1.2, 1.6).

Most of the other longitudinal studies use prospective measures of childhood family background and confounders, and therefore are less liable to recall bias. Kendler, Sheth, Gardner and Prescott (2002) found that parental loss due to divorce occurring before the age of 16 years was associated with the first onset of major depression. In addition this study looked at the decrease in relative hazard rates over time, finding that the risk of major depression increased sharply after the divorce occurred but returned slowly to the baseline by the age of 39 years (see figure 2.1). This figure also shows that there is a difference between separations due to maternal death and separations for other reasons and therefore that these loss events should not be treated in the same way; those individuals who experience maternal death have a very high peak in relative hazard rate immediately after the death occurred which subsides relatively quickly but those experiencing maternal non-death separations have a somewhat smaller but still large immediate increase in relative hazard rate which then takes many years to reduce back to 1, the level of no association. The key difference between death and non-death separations is the breakdown in family relations and increased family conflict surrounding the separation. These factors may contribute to a longer-lasting impact upon psychological health and death versus non-death separations are discussed further in section 2.3.2.

Amato and colleagues have been responsible for many of the US studies, both cross-sectional and longitudinal, investigating the associations of parental separation with adult outcomes, having published many articles from the early 1990s onwards. The majority of their work found that parental separation was a risk factor for increased psychological distress in later life. For example their longitudinal analyses using the 'Marital Instability over the Life Course' study (Amato, Spencer Loomis and Booth

1995; Amato and Booth 1991a), which was set up in order to investigate the antecedents and consequences of marital instability, provide evidence that those who experience parental separation in childhood are more likely to report depressive symptoms and lower levels of psychological well-being in adulthood.

Fig. 2.1 – Kendler et al (2002) time decay in hazard rate for maternal death and non-death separation and major depression
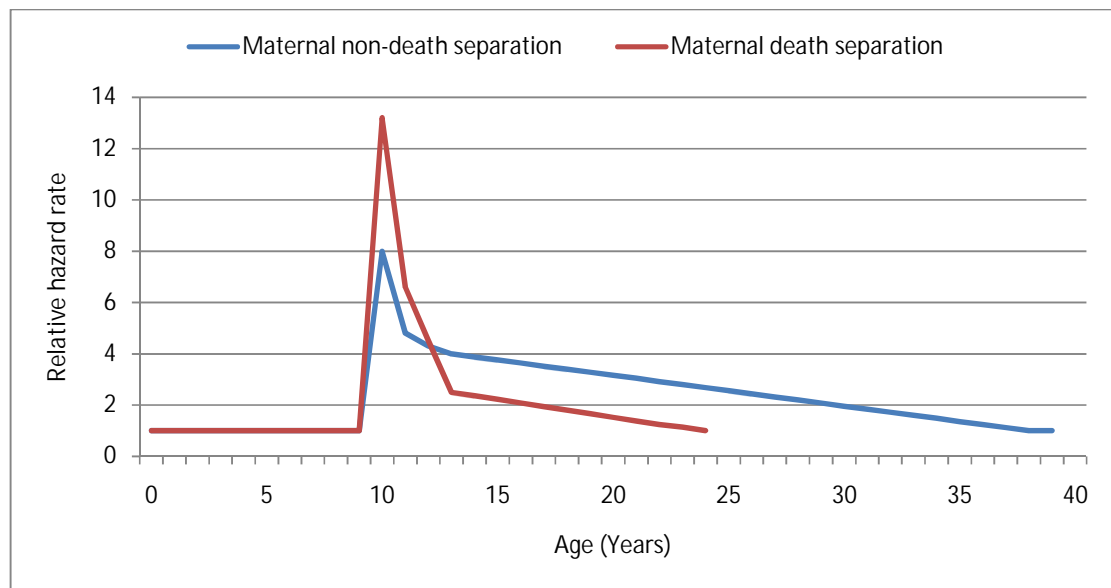
NB Data are based upon a hypothetical separation occurring at age 10 years; HRs refer to hazard of major depression i.e. HR=8 means that those who experienced parental separation at age 10 years were 8 times more likely to have major depression at the time of separation than those who did not experience separation.

The majority of Scandinavian longitudinal studies also found that parental separation was associated with poorer psychological health in adulthood, being linked to increased rates of hospitalisation for psychiatric disorders in a sample of men (OR=1.8, 95% CI: 1.6, 2.1 (Hansagi, Brandt and Andreasson 2000)), increased minor psychiatric disturbances as measured by the GHQ-12 (12-item version of the General Health Questionnaire) for women (Huurre, Junkkari and Aro 2006), increased depression as measured by the Beck Depression Inventory (Palosaari, Aro and Laippala 1996) and episodic depression at ages 22 and 32 years (Pelkonen et al. 2008).

As stated previously the smaller body of UK studies are predominantly longitudinal in design. This likely reflects the UK's wealth of longitudinal datasets. Analysis of the National Survey of Health and Development (NSHD) suggests that parental divorce is associated with an increase in adult affective disorders, as measured by the Present State Examination (PSE) at age 36 years, for women but not for men (Rodgers 1990) suggesting that gender differences may exist (further discussed in section 2.5). In addition this study investigated the age of the child at divorce, finding that parental divorce occurring prior to the age of 5 years had a particularly strong impact upon psychological health in adulthood, providing further evidence for variation by age of the child (section 2.6). The association between parental separation and poorer adult psychological health has been repeated using the NSHD in two other studies which corroborate the above findings (Kuh and Maclean 1990; Richards, Hardy and Wadsworth 1997).

Three articles use the 1958 National Child Development Study (NCDS). It was found that parental divorce occurring between the ages of 7 and 16 years was associated with an increased score in Rutter's Malaise Inventory, a measure of psychological distress, at age 23 years (OR=1.24, p<0.001), after adjusting for gender, economic status and social class at age 7 years (Chase-Lansdale et al. 1995). Similarly it was found that parental divorce occurring between the ages of 0 to 16 years was associated with increased Malaise Inventory scores at ages 23 and 33 years (Rodgers, Power and Hope 1997). A study by Cherlin, Chase-Lansdale and McRae (1998) used fixed-effects and growth-curve models to investigate change in emotional problems across the life course. They discovered that those experiencing parental divorce between ages 7 and 22 years already had emotional problems before the divorce occurred (Cherlin, Chase-Lansdale and Mcrae 1998), possibly as a consequence of raised conflict levels prior to divorce. Also parental divorce increased psychological distress in adulthood, controlling for the effects of parental social class and gender (β=0.10, p<0.001).

A more recent study using the NCDS extends the outcome of the study to age 45 years, using data from the biomedical sweep of data collection (Ford, Clark and Stansfeld 2011). The measure of psychological distress used is the Revised Clinical Interview Schedule (CIS-R), capturing affective and anxiety disorders in the six weeks prior to clinical interview. The findings suggest that those experiencing parental divorce by the age of 16 years were 73% more likely to have an anxiety or affective disorder than those

who did not. This association was also found by Clark and colleagues using the same dataset (Clark, Caldwell, Power and Stansfeld 2010). The association found in the paper by Ford and colleagues was not explained by present social support (confiding, emotional or practical support), social networks or negative aspects of close relationships all measured at the same point as the outcome at age 45 years. Social support was investigated as a potential mediator as it was thought that parental divorce would be associated with smaller, poorer quality networks and that this in turn would increase the risk of depression and anxiety (Ford, Clark, and Stansfeld 2011). Despite these analyses conducted using the British birth cohorts little is known about why this association may exist and whether the intervening pathways have changed over time or differ for men and women.

One longitudinal study found that parental divorce did not predict poorer adult mental health as measured by the Symptom Checklist (SCL-90) (Angarne-Lindberg and Wadsby 2009). However this study had a small sample size (n=96) perhaps suggesting there was insufficient statistical power to detect an association. Despite the findings of this study the overall evidence from longitudinal studies provides strong support for an association, suggesting that parental separation occurring during childhood is linked to the increased reporting of psychological distress in adulthood. This association appears to exist in US, UK and Scandinavian samples.

2.2.3 Reviews and meta-analyses

There are other notable studies which take the form of reviews or meta-analyses and are worthy of a mention in this literature review. A meta-analysis by Amato and Keith provides relatively strong evidence for an association between parental separation and adult psychological distress (Amato and Keith 1991). This study collated evidence from 37 studies investigating the association between parental divorce occurring during childhood and various measures of adult wellbeing, 23 of which investigated outcomes of adult psychological wellbeing. Some of these individual studies were discussed in the previous section. Parental divorce was found to be associated with poorer psychological wellbeing in adulthood. In addition this was found to vary by year of study, with a reduced negative effect being seen in more recent studies, suggesting that the association may have changed over time (see section 2.4.2 for further discussion of this). Similarly a narrative review by Coleman and Glenn, whilst mainly dealing with the effect of couple relationship breakdown on children, reports that a minority of

children experience long-term difficulties in various outcomes, which include behavioural and emotional health problems (Coleman and Glenn 2010). This paper not only considers research published in academic journals but also reports commissioned by, and written by, various government departments.

This section of the review suggests that parental separation is associated with increased reporting of psychological distress in adulthood. The association appears to be fairly well established, existing in UK, US and Scandinavian samples and across different study designs. Whilst a statistical association is shown in many settings and studies there is little evidence to suggest that parental separation *causes* psychological distress in adulthood (Ni Bhrolchain 2001). As previously mentioned, longitudinal studies are likely to be more fruitful than cross-sectional studies in testing this association and intervening pathways across the life course, and this is the approach taken by this project.

A major criticism of existing studies which use a longitudinal design is that the vast majority ignore missing data, consequently conducting complete case analyses. It is known that missing data in longitudinal studies is highly likely to be non-ignorable as those who are most disadvantaged are more likely to drop out (Matthews et al. 2001). If missing data are ignored it can result in bias in the results which is all too commonly overlooked. This thesis attempts to account for missing data in all of the cohorts used and therefore endeavours to provide less biased results. Also as there are relatively fewer studies which look at the association between parental separation and psychological distress in the Great Britain, this project aims to strengthen the evidence base by testing this association on three British longitudinal samples with prospective measures and additionally to look at potential pathways which link parental separation to increased risk of reporting psychological distress in adulthood.

2.3 Pathways between parental separation and adult psychological distress
As mentioned previously it is not thought that the relationship between parental separation and adult psychological distress is causal but that this is a correlation or association which is likely to be explained by intervening pathways, a view supported by Ni Bhrolchain (2001). Previous research into the pathways between parental separation and psychological distress can be grouped into two overall categories; socioeconomic and relational pathways. The role of psychosocial and material factors in

transmitting the effect of aspects of family of origin into health via a chain of events or disadvantage has been termed the 'unhealthy life career hypothesis' (Sweeting and West 1995). Some studies have treated socioeconomic or relational factors as confounders but this thesis argues that these are likely to lie on the causal pathway between parental separation and adult psychological distress and therefore should be treated as mediators rather than confounders. Evidence in the literature for socioeconomic pathways is first examined followed by evidence for relational pathways. The ways in which these two broad groups of mechanisms may interact across the life course is then discussed.

2.3.1 Socioeconomic pathways

Socioeconomic factors are likely to be involved both pre- and post-separation, as they are known to be risk factors for divorce as well as being a way in which the association between separation and psychological distress in adulthood is mediated. Socioeconomic influences as risk factors for parental separation are discussed first followed by a discussion of the way in which parental separation may be associated with socioeconomic factors post-divorce.

2.3.1.1 Socioeconomic factors as risk factors for parental separation

Previous studies have sometimes failed to account for socioeconomic circumstances prior to parental separation and consequently misleading conclusions could be made, particularly as socioeconomic circumstances of origin are known to predict poorer outcomes in various domains across the life course (Coleman and Glenn 2009; Kiernan 1997). It is known that divorcing couples are not a random selection of married couples in this respect (Ni Bhrolchain 2001). This project takes into account socioeconomic circumstances prior to parental separation in order to prevent this misinterpretation.

Social class has also been found to be associated with risk of relationship breakdown, with those in manual social classes being more likely to separate than those in non-manual classes (Haskey 1984). A link between different aspects of income and partnership dissolution has also been shown in many studies. For example studies, mainly from the US, have shown that divorce risk is higher amongst couples with lower incomes (Amato 1996; Greenstein 1995; Johnson and Booth 1990; Poortman 2005; Rosenblatt and Keller 1983; South 1995; White and Rogers 2000). Similarly analysis of the British Household Panel Study (BHPS) has shown that married or cohabiting couples who are in receipt of benefits and/or unemployed are more likely to experience

relationship breakdown than couples who were more advantaged (Kiernan and Mueller 1999). An early study by Conger et al shows that economic difficulties increase marital hostility and reduces supportive behaviours (Conger et al. 1990). However this study used just 11 couples and therefore the results are unlikely to be representative. Despite this, this study led on to the formulation of the Family Stress Model (Conger et al. 1992) which depicts how economic hardship is likely to impact adolescent children's adjustment through its effect upon the parent's marital relationship (fig. 2.2).

Fig. 2.2 – The Family Stress Model
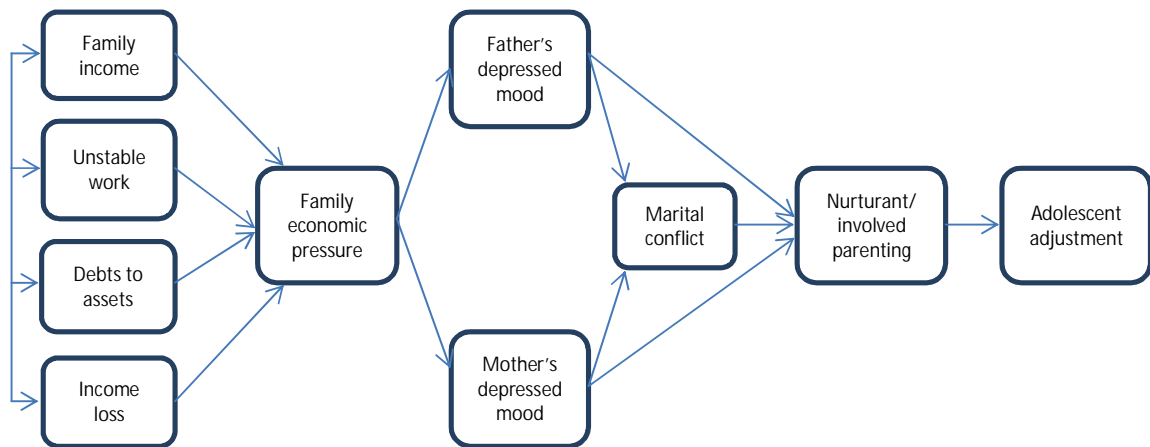
Source: Conger, R., Conger, K., Elder, G., Lorenz, F., Simons, R. and Whitbeck, L. (1992)

In addition previous research shows that there is an association between education and risk of divorce in both the NSHD and NCDS (the 1946 and 1958 British birth cohorts), with those possessing higher educational qualifications being less likely to divorce and those with no qualifications being more likely to divorce (Kiernan and Mueller 1999; Richards, Hardy, and Wadsworth 1997). It is possible that those who are less educated or in less advantaged socioeconomic groups marry when they are younger, having had less time to establish themselves in the labour market or been unable to participate in higher education. Indeed it has been shown that the graded association between education or social class and risk of divorce can be explained by age at marriage (Berrington and Diamond 1999; Kiernan and Mueller 1999; Murphy 1985). Age at marriage or partnership has been found to be a strong predictor of risk of divorce (Coleman and Glenn 2009). Both parental age and socioeconomic circumstances prior to separation are taken into account in this project.

2.3.1.2 Parental separation and socioeconomic circumstances

Educational attainment

There is much evidence to suggest that parental separation is linked to socioeconomic factors across the life course and it is known that:

> *"…an individual's chances of getting ahead economically are strongly influenced by family origin",* (Bowles 1973) p.3

A lot of previous work has focused upon education – both attainment and years spent in education (Pryor and Rodgers 2001). Ely and colleagues conducted a study which compared the relationship between parental separation occurring during childhood (0-16 years) and educational attainment using data from three of the British birth cohorts in order to assess whether this had changed over time (Ely, Richards and Wadsworth 1999). The findings show that parental separation was associated with reduced educational attainment in all three cohorts, with children who experienced parental separation doing less well in education than those children from 'intact' families. This association between parental divorce or separation and education is well established being found in many studies (Chase-Lansdale, Cherlin, and Kiernan 1995; Elliott and Richards 1991; Huurre, Junkkari, and Aro 2006; Kendler, Gardner and Prescott 2002; Kendler, Gardner and Prescott 2006; Kuh and Maclean 1990; Maier and Lachman 2000; McLeod 1991; Musick and Meier 2010; Ross and Mirowsky 1999).

Strong evidence for a relationship between parental separation and educational attainment comes from a meta-analysis which looks at several domains of adult well-being, one of which being educational attainment (Amato and Keith 1991). The authors find, when pooling data from 18 studies, that parental divorce is associated with poorer educational attainment. More specifically a Finnish study which looked at the likelihood of participating in university education, controlling for parent's education, found that 21.6% of participants from non-divorced families attended university in comparison with just 9.0% of those from divorced families (Huurre, Junkkari, and Aro 2006).

There are several possible reasons for this association; a study which involved in-depth qualitative interviews with 50 NCDS participants who experienced either parental loss as a consequence of divorce or death identified factors such as lower parental support, lack of support and understanding from schools, and the financial need for children to

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work rather than stay in education as being responsible for this (Gorell Barnes, Thompson, Daniel and Burchardt 1998).

Socioeconomic/material disadvantage across the life course

Many studies have found that parental separation in childhood leads to socioeconomic disadvantage in adolescence. For example it has been shown that parental separation is associated with a drop in living standards (DWP 2011; Elliott, Richards and Warwick 1993; Maclean and Eekelaar 1983; Pryor and Rodgers 2001; Sweeting and West 1995), with children being more likely to live in a household below the poverty line (Maclean and Eekelaar 1983; Sweet and Bumpass 1987) and be living in a household without basic amenities, such as cooking facilities or a hot water supply (Osborne, Butler and Morris 1984). This drop in living standards appears to be sustained over a long period of time (Holden and Smock 1991) and disproportionately affects female-headed households and those with children (Aassve, Betti, Mazzuco and Mencarini 2007; Burkhauser, Duncan, Hauser and Berntsen 1991; Finnie 1993; Jarvis and Jenkins 1999; Osborne, Butler, and Morris 1984; Smock 1994; Uunk 2004), particularly those headed by older mothers (Jansen, Mortelmans and Snoeckx 2009). Reasons for reduced family economic resources include the costs of running two households, legal fees, costs of moving house, one-parent income, reliance on benefits and, particularly relevant to the time period of interest in this project, the reduced earning power of women, due to increased time in domestic work or unequal pay in the workplace (Aassve, Betti, Mazzuco, and Mencarini 2007).

It is also possible that the relationship between parental separation and reduced educational attainment, evidence for which is given above, can be explained in part by the level of material disadvantage. For example it has been shown above that parental separation often leads to economic hardship which reduces the ability of parents to purchase educational toys and books, pay for school trips, internet and computer access, which are likely to impact upon the child's educational attainment (Amato 1994). In addition there is much evidence which shows that family income, which is likely to be lower in single parent headed households, is associated with children's reduced educational attainment (Blanden and Gregg 2004; Bratti 2002; Haveman and Wolfe 1995; Kim and Sharraden 2011; Nam and Huang 2009). It is also possible that because of economic hardship, the child may have to enter employment rather than stay on in full-time education (Gorell Barnes, Thompson, Daniel, and Burchardt 1998). Looking at

socioeconomic disadvantage in adulthood it is likely that childhood material disadvantage is associated with adult material disadvantage and that this continuity is largely transmitted through educational attainment, something which is investigated in this project.

2.3.1.3 Socioeconomic factors and psychological distress

There is much evidence that links socioeconomic or material factors to psychological distress in adulthood. For example increasing education level has been linked to reduced risk of depression, particularly for women (Ladin 2008; Miech and Shanahan 2000; Ross and Mirowsky 2006). Education determines opportunities in employment, income gained from employment and access to fulfilling work which has a higher probability of career progression. Similarly lower socioeconomic status, usually measured by education, income and employment, across the life course has been shown to be linked to poorer health (including depression) in adulthood in many studies e.g.(Everson, Maty, Lynch and Kaplan 2002; Gilman 2007; Laaksonen et al. 2007; Lorant et al. 2003; Lynch, Kaplan and Oliver 2004; Marmot,, Shipley, Brunner and Heminway 2001; Muntaner, Eaton, Miech and O'Campo 2004; Power and Manor 1992). It is therefore feasible that this last link in the chain of potential mediating material factors exists.

2.3.1.4 Socioeconomic or material factors as mediators

The fact that experiencing parental separation is associated with socioeconomic disadvantage and that this in turn is associated with increased risk of psychological distress in adulthood as shown in this review, suggests that the association of separation with psychological distress is likely to be partly mediated by socioeconomic factors. As already mentioned, this is in contrast to some previous studies which treat such factors as confounders despite there being much evidence that these factors may lie on the causal pathway.

Some studies have started to piece together the pathway between parental separation and adult psychological distress through socioeconomic factors. For example there is evidence from previous research to suggest that the association of parental separation with adult depression is partially mediated through education, occupational status and level of economic status (Ross and Mirowsky 1999). Similarly another US study found that the relationship between parental absence, as a result of divorce, and depression in later life was reduced substantially upon adjustment for educational attainment (Amato

1991). However both of these studies are cross-sectional in design and therefore some of the retrospective measures of childhood factors are likely to be misreported. Also there has been little investigation of the more material factors, such as material disadvantage, which may be involved. This project looks at material pathways using prospectively-collected longitudinal data.

2.3.2 Relational pathways

The second broad group of explanatory mechanisms involved in the association between parental separation and adult psychological distress involve relational factors. These relational factors mainly include parent-child relationships, peer relationships and adult partnerships.

2.3.2.1 Parental separation and relational factors

Parent-child relationships

It has often been noted by key authors in the field of family research that parental divorce cannot be seen as a single event but as a process. In relation to how parental separation affects family relationships, it is likely that the divorce process does not lead to the end of these relationships, but in a redefinition of boundaries and the definition of the family by shared relationships and often not by a shared residence (Emery and Dillon 1994; Wallerstein 1991). Parent-child relationships do not exist in isolation within the family unit but are likely to be affected also by parental relationships as shown in family systems theory (Belsky 1984; Shapiro and Cooney 2007; Sobolewski and Amato 2007). This has been referred to as the 'spillover dynamic' (Engfer 1988; Erel and Burman 1995) and is depicted in the Family Stress Model previously discussed (see fig. 2.2). There is evidence to suggest that this effect exists as it has been shown that parent-parent aggression is translated into reduced quality parent-child relations (Margolin, Gordis and Oliver 2004).

Often parent-child relationships deteriorate in quality, as a consequence of parental relationship breakdown and there is much evidence from previous studies which shows that parental separation is associated with poorer quality parent-child relationships (Acock and Demo 1994; Amato 1986; Amato and Booth 1991a; Amato and Booth 1996; Amato and Sobolewski 2001; Booth and Amato 1994; Cooney, Hutchinson and Leather 1995; Hines 1997; Pryor and Rodgers 2001; Wallerstein 1991; Wallerstein and Kelly 1980; White 1992; Woodward , Fergusson and Belsky 2000; Zill, Morrison and

Coiro 1993). It has also been shown that marital conflict is associated with reduced parental warmth (Belsky, Youngblade, Rovine and Volling 1991; Cox, Owen, Lewis and Henderson 1989; Hetherington et al. 1992; Holden and Ritchie 1991), parent-child conflict (Floyd and Zmich 1991; Holden and Ritchie 1991; Jouriles, Barling and O'Leary 1987) and increased parental negativity (Belsky, Youngblade, Rovine, and Volling 1991; Hetherington et al. 1992). However many of the studies cited above involve samples of young children and few have investigated whether parental separation affects the quality of parent-child relationships in adolescence.

There is also evidence to suggest that parental divorce is associated with reduced closeness to parents, particularly to the non-custodial parent (Darlington 2001; Sobolewski and Amato 2007), and this is likely to reflect reduced closeness to the father. It is known from previous studies that parental divorce is associated with a decrease in the quality and quantity of contact between children and fathers, particularly when fathers are the non-custodial parent (Ahrons 2006; Amato and Booth 1996; Amato and Keith 1991; Amato and Sobolewski 2001; Aquilino 1994; Cooney 1994; Cooney and Uhlenburg 1990; Furstenburg and Nord 1987; Kalmijn 2011; Shapiro and Lambert 1999; White, Brinkerhoff and Booth 1985). This may be due to dilemmas in loyalties between the child and their parents, on-going conflict between parents, geographic distance and time demands (Cooney 1994). It has also be suggested that where traditional gender roles exist, that fathers have less access to children following divorce as they have to negotiate access through the main child-carer, the mother (Kalmijn 2007b). Indeed it has been shown that in countries with more traditional gender roles, there is reduced father-child contact (Kalmijn 2011).

Bowlby's attachment theory (Bowlby 1969; Bowlby 1979) offers one approach to understanding the link between parental separation and quality in relationships of the child to its parents and, later on, to other adults. This theory describes how children form a bond with a person, often the mother, termed as the 'attachment figure' in infancy. The bond between attachment figure and child is known as the 'secure base' as it provides a sense of security from which the child can confidently explore their environment and capabilities – the Latin for security – *sina cura* – means 'without anxiety' (Ainsworth 1985; Ainsworth and Bowlby 1991). Attachment style is typically measured in childhood using the Ainsworth Strange Situation whereby the child is observed upon the mother's return after she has left the room for a short period. People

are typically classified as 'securely' or 'insecurely' attached[3]. Those who are insecurely attached can be 'dismissive' or 'preoccupied'[4]. In adolescence and adulthood attachment style is measured using validated questionnaires such as the Berkeley Adult Attachment Interview (AAI) (Waters, Hamilton, and Weinfield 2000a).

There is evidence to suggest that attachment style transfers across the life course, so that the type of bond formed between parent and child is translated into the type of bond formed in adult partnerships later in life (Hamilton 2000; Waters et al. 2000c). However it has also been shown that attachment style is subject to change in response to adverse events, such as parental divorce (Allen, Boykin McElhaney, Kuperminc and Jodl 2004; Bowlby 1973; Hamilton 2000; Waters, Hamilton, and Weinfield 2000a). Following parental separation it is likely that there is reduced contact between the child and their non-custodial parent which is likely to reduce the security, and consequently quality, of that relationship (Emery and Dillon 1994; Feeney and Monin 2008). Also the custodial parent may become less emotionally available to the child as they are likely to be emotionally distracted by the separation process and may be physically less available perhaps due to working increased hours in order to support the family on a single income (Davies and Cummings 1994; Emery 1982; Lewis, Feiring and Rosenthal 2000). There is evidence that divorced mothers have less positive interactions and communication with their children (Hetherington, Cox and Cox 1978) and display less sensitivity towards their children (Sutherland, Altenhofen and Biringen 2012). There is also more explicit evidence which links parental divorce to attachment security; it has been shown in a longitudinal study of attachment classifications across the life course that young adults who experience a stressful life event, which included parental divorce, were more likely to change attachment classification from secure to insecure than those children who had not had such an experience (Waters et al. 2000b). Because attachment bonds are thought to form very early in life one might hypothesise that parental separation occurring during early childhood might have a greater impact upon adult psychological distress. There is evidence to suggest that parental separation between 0-5 years of age is associated with reduced parent-child attachment (Woodward, Fergusson,

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[3] 'Securely' attached children are those who greet the mother on reunion. 'Insecurely' attached children are those who ignore the mother or who continue to be distressed upon being reunited with the mother.

[4] 'Insecure dismissive' refers to people who devalue relationships and often have a history of rejection experiences. 'Insecure preoccupied' refers to people who anxious to please others and who are preoccupied with their parents. See (Waters et al. 2000a) for more information

and Belsky 2000). This is the hypothesis taken in this study and will be further discussed in section 2.6.

A major criticism of attachment theory is that too much emphasis has been placed on the mother as the attachment figure and it has been subsequently argued that fathers are also attachment figures (Ainsworth 1985). There is evidence to suggest that maternal and paternal warmth are equally associated with attachment security in the Whitehall II study (Stansfeld, Head, Bartley and Fonagy 2008). It therefore follows that, if separation from the mother is associated with attachment anxiety, then separation from the father, a common outcome of parental divorce, can also result in problems for the child. This project looks at both mother- and father-child relationships where this is available in the datasets used.

Peer relationships

Whilst attachment between parents and children is still important in adolescence, this period of the life course is a time when adolescents are becoming increasingly attached to peers (Doyle and Moretti 2000; Dykas, Ziv and Cassidy 2008; Furman and Buhrmester 1985; Hetherington 1989; Hunter and Youniss 1982; Nickerson and Nagle 2005; West et al. 1998). There is substantially less evidence on the association between parental separation and peer relationships. That which does exist shows that children from divorced families were less popular, were more likely to be aggressive towards peers and be withdrawn from others (Hetherington 1989; Wallerstein 1991).

Parental separation, particularly at a time when this was not common, may have resulted in stigma which may have subsequently resulted in bullying or fighting. It is also possible that parental separation affects the availability of parental figures and consequently there may be poor monitoring or supervision of children, which has previously been linked to increased involvement in risk-taking behaviours which may include fights (Coleman and Hendry 1999), particularly amongst boys (Rodgers and Pryor 1998). Those with a 'disorganised' attachment classification have been found to have less ability to resolve conflict than those with a 'secure' classification (Lyons-Ruth and Jacobvitz 2008). It is also possible that adolescents who have experienced parental separation, which may have been accompanied by parental conflict, may be more likely to see conflict as a way of responding to relationship problems.

Children who experience parental separation may be more likely to be withdrawn from their peers. It is possible that parental separation disrupts the attachment style of the child's relationships with their peers. For example those who are insecurely attached may have more negative expectations of others, may be less trusting of others and may have problems communicating effectively with others, which ultimately may influence social functioning (Allen 2008). Also those with dismissing attachment styles may be dismissive of comfort gained from close relationships and may push away peers, resulting in unpopularity (Allen et al. 2007; Larose and Bernier 2001). In this project both parent and peer relationship quality will be investigated as potential relational mediators in the association between parental separation and adult psychological distress.

Adult partnerships

Moving on to look at relationships later in the life course, it has long been known that children who experience parental separation are themselves more likely to separate or divorce as adults (Amato 1993; Amato 1996; Amato and Booth 1991b; Diekmann and Engelhardt 1999; Dronkers and Harkonen 2008; Glenn & Kramer 1985; Greenberg and Nay 1982; Hayashi and Strickland 1998; Keith and Finlay 1988; Kiernan and Cherlin 1999; Kuh and Maclean 1990; Kulka and Weingarten 1979; Lyngstad and Engelhardt 2009; McLanahan and Bumpass 1988; Mueller and Pope 1977; Rodgers 1994; Ross and Mirowsky 1999; Tucker et al. 1997; Wauterickx, Gouwy, and Bracke 2006; Wolfinger 1999). Some authors have tried to explain this association and there are many explanations proposed. For example it has been found that parental divorce is linked to increased marital problems and disagreements (Booth and Edwards 1990). It has also been shown that parental divorce may foster more acceptance of divorce (Amato 1988; Amato and DeBoer 2001; Axinn and Thornton 1996). It is also possible that children who experience parental divorce may have less exposure to positive marital interaction as a child (Clarke and Berrington 1999), therefore making them less equipped to deal with marital problems as an adult.

In addition, cohabitation prior to marriage is more common in children who have experienced parental divorce, although this is likely to change depending on the normative environment with regards to relationships (Cherlin, Kiernan and Chase-Lansdale 1995; Furstenberg and Teitler 1994); for example children who experience separation are more likely to be in partnerships which differ from the norm at the time

and there is evidence to suggest that this is the case as those who experienced parental separation are more likely to be cohabiting (Amato and Kane 2011; Martin, Mills and Le Bourdaise 2005; O'Connor et al. 1999; Ryan, Franzetta, Erin and Manlove 2009). Pre-marital cohabitation in turn is known to increase the risk of divorce (Bennett, Blanc and Bloom 1988; Booth and Johnson 1988; Stanley, Rhoades and Markman 2006) and therefore this may represent another mechanism linking parental divorce to the offspring's own divorce.

It has been suggested that children of divorce gain independence quicker than children who grow up in intact families and this may explain their propensity to marry or partner earlier (Hetherington 1989; Jonsson, Njardvik, Olafsdottir, and Gretarsson 2000; Keith and Finlay 1988; Kiernan 1992; Kiernan 1997; Kiernan and Hobcraft 1997; Sweeting and West 1995; Wolfinger 2003). Early marriage is another risk factor for divorce (Harkonen and Dronkers 2006). It is also likely that there is a link between the quality of parent-child relationships and adult partnership status. For example, where poor parent-child relations exist, adult children may be more likely to seek support in early marriage. This links to attachment theory which suggests that the type of attachment formed in childhood is translated to adult attachment figures, such as partners (Ainsworth 1985). For example relationships formed by adults with insecure attachment styles may be characterised by clingy or over-dependent behaviour, which may manifest in earlier marriage, for example. Also linking to attachment theory, it has been shown using Norwegian registry data that the age of the child at separation modifies the relationship between parental divorce and offspring's divorce (Lyngstad and Engelhardt 2009); those whose parents divorced when they were younger being more likely to split up than those whose parents divorced when they were older.

This project aims to look at parent-child and peer relationship quality, as well as adult partnership status as potential mediators in the relationship between parental separation and adult psychological distress. As shown in this review there are conceivable links between parental separation and the quality of the relationships the child forms with others. The next section looks at the evidence linking these factors to psychological distress in adulthood.

2.3.2.2 Relational factors and adult psychological distress

One of the key links in the relational pathway between parental separation and adult psychological distress is that between adult partnership status and the outcome. There is evidence from many studies to show that those who separate or divorce are more likely to be distressed than those who are married (Aseltine and Kessler 1993; Booth and Amato 1991a; Hope, Rodgers and Power 1999; Prince et al. 1999). In conjunction with the increasing rates of cohabitation in the UK there has been an interest in how cohabiting and married couples differ with regards to psychological distress. It has subsequently been found that those who are cohabiting are more likely to be depressed than those who are married (Brown, Roebuck Bulanda and Lee 2005; Kim and McKenry 2002) and this is thought to be due to greater relationship instability as mentioned above (Brown 2000). This difference between married and cohabiting couples is often referred to as the 'cohabitation gap' and applies to many outcomes, not just psychological distress. Several studies also find that those who are single, compared to those who are married, are more likely to report depression and this is particularly true for single men (Fuhrer, Stansfeld, Chemali and Shipley 1999; Murphy 2007). This is thought to be because marriage brings both emotional and financial support.

This project looks at adult partnership status as an important link in the relational pathway linking both parent-child relationships and peer relationships to adult psychological distress.

2.3.2.3 Relational factors as mediators

Previous research has found that the relationship between parental divorce and child behaviour is mediated through parent-child relationships (Amato and Sobolewski 2001; Neighbors, Forehand and Bau 1997; Palosaari, Aro, and Laippala 1996; Peterson and Zill 1986) and it has been shown that positive parent-child relations minimise the impact of the divorce on the child's behaviour (Hess and Camara 1979). Also studies which compare the relative associations of parental separation and parental death with adult psychological distress show that parental separation shows a greater association (Gorell Barnes, Thompson, Daniel, and Burchardt 1998; Kendler, Sheth, Gardner, and Prescott 2002; Wallerstein 1991; White, Brinkerhoff, and Booth 1985; Yagla Mack 2001), thereby pointing towards the breakdown in family relationships, such as the parent-child bond, as being responsible for this. There is also evidence to suggest that the relationship between parental separation and adult psychological distress may be

mediated through adult partnership status. For example a US study found that this was the case but only for women in their sample (Glenn and Kramer 1985). To the author's knowledge there have been no studies which explicitly model the way in which parent-child relationships and peer relationships lead to partnership status in adulthood as a pathway between parental separation and adult psychological distress.

There is evidence to suggest a link between parent-child relationships and adult partnership status – a path which is investigated in this project. The relationship between parental divorce and the breakdown of the child's own partnerships in adulthood was found to be mediated by parent-child relationships, attachment style and peer relationships (Armistead, Forehand, Beach and Brody 1995; Doucet and Aseltine 2003). Bowlby's attachment theory suggests that attachment style is transmitted across the life course so that the security of parent-child relationships is transferred to the security of adult partnerships (Ainsworth and Bowlby 1991; Waters and Cummings 2000; Weiss 1991). It could therefore be hypothesised that those who have high quality parent-child relationships are more likely to be married in adulthood. There is no evidence which links peer relationship quality to adult partnership status *per se* but in this study peer relationship quality is used as an indicator of the ability to form positive relationships and therefore the evidence linking parent-child relationship quality (an additional indicator of attachment security) is likely to apply.

2.3.3 Evidence for interlinking material and relational pathways

Whilst previous studies, which have investigated relational and socioeconomic pathways between parental separation and adult psychological distress, have tended to treat these pathways as two distinct mechanisms, it is likely that they interlink across the life course and it has been noted that there is a distinct paucity of work which attempts to disentangle these (Wauterickx, Gouwy, and Bracke 2006). There is evidence to suggest that material disadvantage is linked to the quality of parent-child relationships (Coleman and Glenn 2010; Conger et al. 1992; Stansfeld, Head, Bartley, and Fonagy 2008; Sweeting and West 1995) and also to the quality of peer relationships (Patterson, Griesler, Vaden and Kupersmidt 1992; Sabates and Dex, 2012). There is also evidence to suggest that parent-child relationships may affect educational attainment (Acock and Demo 1994; Coleman and Glenn 2009; Doyle, Moretti, Voss, and Margolese 2000; Kiernan 1997; Sanz-De-Galdeano and Vuri 2007) and this is likely due to reduced parental involvement (Amato 1993; Coleman and Glenn 2009). It has also been shown that education is linked to adult partnership status. For example it has been shown that

those who leave school earlier are more likely to marry younger (Marini 1978) and that those who do less well at school are more likely to get divorced (Kendler, Gardner, and Prescott 2002). It is therefore likely that material and relational factors are linked across the life course and this thesis will look at some of these linkages.

In many studies the analytical approach taken has been to conduct simple regression analyses and then to adjust for potential mediators to assess whether there has been a change in the original effect estimate. Whilst this approach gives an indication that a factor may be involved as a mediator, it does not take into account how several mediators are involved and how they link across the life course. This has been referred to as the "black box" by Gruber, who argues that more researchers need to delve within this to begin to unpick mechanisms which translate couple relationship breakdown into child outcomes (Gruber 2004). This thesis aims to go some way into looking at how material and relational pathways interact over the life course in the association between parental separation and psychological distress, using more appropriate statistical methods.

2.4 Demographic change

Some of the key demographic changes, such as those encompassed in the 'second demographic transition', have already been mentioned. In general families have become more diverse and this has included an increasing proportion of families experiencing divorce (fig. 1.1). It is likely that the relationship between parental separation and adult psychological distress, and the pathways involved, will change over time in response to broader societal changes – one of the key lines of enquiry in this thesis. This links to Bronfenbrenner's model presented in chapter 1 (fig. 1.3) showing the importance of recognising the changing social context of people's life courses which will likely shape their experience of parental separation and ultimately its consequences.

2.4.1 The changing experience of parental separation

Relatively little is known about the changing experience of parental divorce. Bronfenbrenner's model (fig. 1.3) shows how attitudes and ideologies of the culture ('macrosystem') exert an influence upon the family ('microsystem') and upon the individual. The version of the model shown in figure 1.3 also shows a time component to highlight that attitudes and ideologies are likely to change over time. This also links to the theories of Elder which suggest that the life course is a multi-level construct

whereby social institutions and organisations have links to individuals through social trajectories which change with life experiences and historical time (Elder 1994). As Elder suggests in his theories of the life course:

> *"Especially in rapidly changing societies, differences in birth year expose individuals to different historical worlds, with their constraints and options. Individual life courses may well reflect these different times",* (Elder 1994) p.5

Therefore it is likely that the experience of parental separation will have changed, particularly as families have changed substantially since the mid-20th century, and this is one aspect which will be investigated in this thesis.

In the mid-20th century the vast majority of couples with children were married. However later in the century, and in the early 21st century, marriage was still the most common partnership form but children were increasingly being born outside of marriage (fig. 2.3). Most children born outside of marriage were born within a partnership and their births were registered by two parents (Hunt 2009; ONS 2011a). Couples who cohabit are known to be more likely to separate than those who are married and therefore children have grown up since the mid-20th century against a background of increasing family fragility (Clarke and Berrington 1999; Hunt 2009). However despite the increases in family instability and subsequent research into divorce there is little evidence on the ways in which the experience of parental separation may have changed over time.

Fig. 2.3 – The proportion of births within and outside of marriage, 1946-2010, England and Wales
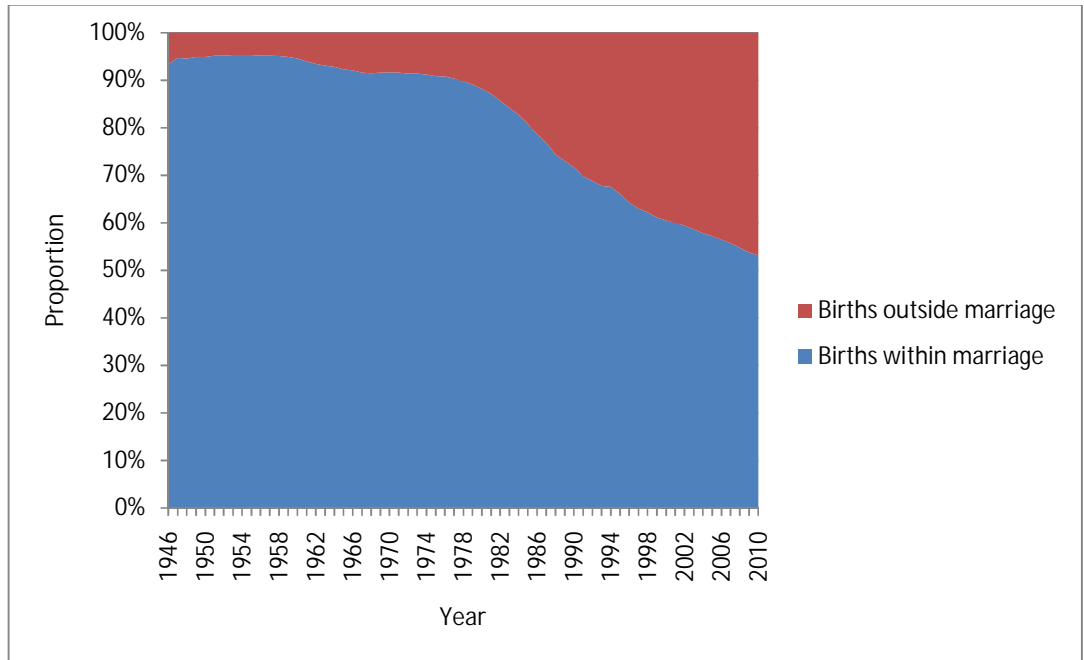
Source: Data taken from 'Birth summary tables, England and Wales, 2010' (ONS 2011a)

2.4.2 The 'reduced effect' hypothesis

It has been suggested by Ely and colleagues that as parental separation becomes more common, it will have less of an effect upon children ('reduced effect' hypothesis) (Ely, Richards, Wadsworth, and Elliott 1999). The 'reduced effect' hypothesis is thought to exist due to three reasons: (1) reducing stigma surrounding divorce, (2) increasing availability of services and (3) a greater awareness of maintaining contact between children and both parents following separation.

Firstly looking at reason (1) it is thought that divorces occurring earlier in the 20th century would be more stigmatising because it was a rarer event than in more recent times (Gerstel 1987). This links with the concept of 'off time' transitions which suggests that transitions may be more stressful when they occur at less common times (Pearlin, Schieman, Fazio and Meersman 2005; Turner and Schieman 2008), such as when divorce rates are low in society. Furstenburg (2005) uses the analogy of the ripples that one might see in a pond following an initial splash, suggesting that parental divorce is likely to show stronger associations with child outcomes when divorce is less

common but over time these associations decline. Qualitative interviews, conducted with a small sample of NCDS participants who experienced parental divorce, found that divorce was thought to be a private issue which shouldn't be discussed (Gorell Barnes, Thompson, Daniel, and Burchardt 1998). With regards to reasons (2) and (3) because divorce was much rarer in the 1960s there was less help available to separating couples, particularly that which aimed to help children to adjust. One aspect which was very different to recent times was the idea that a 'clean break' separation between the non-custodial parent, often the father, and children was better for them. Levels of father-child contact have increased substantially since the mid-1970s (Amato, Meyers and Emery 2009).

There is inconsistent evidence as to whether the effect of parental separation has reduced over time. In Ely and colleagues' study comparing the associations of parental divorce with children's educational attainment in three British birth cohorts (1946, 1958 and 1970) they found that the association remained constant over time. The authors attribute this to social changes acting in opposite directions: changes in social attitudes acting positively and increased relative financial hardship acting negatively (Ely, Richards, Wadsworth and Elliott 1999). Other authors have compared the association of parental divorce with psychological distress at age 30/33 years in the 1958 and 1970 cohorts finding that the association was not significantly different between cohorts with both showing that divorce had an adverse effect upon psychological health (Sigle-Rushton, Hobcraft and Kiernan 2005). However the authors do not formally test this, only looking at parental divorce between ages (5/7-10/11 years) in two cohorts and do not address missing data, factors which this thesis will address.

Despite this the 'reduced effect' hypothesis is supported by work which finds an association between parental divorce and psychological anxiety in a 1957 cross-sectional sample but not in a 1976 sample (Kulka and Weingarten 1979). Also a meta-analysis which investigated variation in effect sizes by year of publication found a greater association between parental divorce and adult psychological wellbeing for studies in the 1950s and 1960s, compared to studies from the 1980s (Amato and Keith 1991), suggesting that the impact of divorce has lessened over time. However it cannot be ignored that these apparent period changes may be due to changes in study methodology. An update of the meta-analysis found that more recent studies were more likely to have used large random samples, adjust for covariates and use multi-item

measures (Amato 2001). Therefore recent studies are more likely to be larger and more rigorous and so have greater statistical power to detect small effects.

It is thought that when looking at psychological outcomes the association with parental separation will have reduced over time as help in the form of mediation is likely to have increased children's adjustment to divorce (Pryor and Rodgers 2001). Given the inconsistent evidence cited here, there is a clear need to examine further the relationship between parental separation and adult psychological distress using data from three British birth cohort studies in order to assess whether this association has changed over time and to address methodological limitations of previous work using the same cohorts.

2.5 Gender differences

There is evidence to suggest that there may be gender differences both in the overall association between parental separation and adult psychological distress and in the pathways involved.

2.5.1 Gender differences in the association between parental separation and psychological distress

There have been many studies which look at the association between parental separation and adult psychological distress which examine gender differences, however the evidence is somewhat inconclusive as to whether it is men or women who are most affected or whether there is no difference.

There is evidence to suggest that the effects of parental separation do not differ by gender (Amato 1991; Amato and Booth 1991a; Amato and Keith 1991; Amato and Sobolewski 2001; Kendler, Sheth, Gardner, and Prescott 2002b; Kessler, Davis, and Kendler 1997a; Rodgers, Power, and Hope 1997; Wallerstein 1991; Zill, Morrison, and Coiro 1993). It has been suggested that gender differences are less likely to be apparent in later studies due to increasing involvement of both parents following separation (Hetherington and Stanley-Hagan 1999). For example Kulka and Weingarten found that there were gender differences in the association of divorce with psychological anxiety in a 1957 study, however no such differences were found in the 1976 study (Kulka and Weingarten 1979). This research project looks at gender differences over time.

A lot of research finds that women are more affected by parental separation than men. For example studies have found stronger associations between parental divorce and obsessive-compulsive disorder (Angarne-Lindberg and Wadsby 2009), depression (Angarne-Lindberg and Wadsby 2009; Chapman et al. 2004; Huurre, Junkkari, and Aro 2006; McLeod 1991; Pirkola et al. 2005; Rodgers 1990; Rodgers 1994), reduced happiness (Glenn and Kramer 1985) and anxiety disorders (Pirkola et al. 2005) for women. It is thought that girls may be more likely to assume a maternal role following parental separation and loss of a parental figure (Wauterickx, Gouwy, and Bracke 2006). They may also be more likely to emotionally support a parent which may affect their adjustment (Hetherington and Stanley-Hagan 1999). It is also possible that women are more likely to report psychological problems than men and to attribute early life experiences, such as parental separation, as causes of this (Pirkola et al. 2005).

Conversely in other studies it has been found that men may have increased psychological distress as a result of parental separation. For example, it has been proposed that men experiencing parental separation are more likely to report increased levels of depression (Maier and Lachman 2000; Richards, Hardy, and Wadsworth 1997) and psychological anxiety (Kulka and Weingarten 1979) than women. This is thought to be due to men being more likely to be raised in a family with no adult male role model, being more exposed to family conflict and receiving more inconsistent parenting than women (Amato 1994; Gahler 1998; Hetherington et al. 1992). This is often referred to as the 'gender role' hypothesis.

It has been proposed that parental separation may produce problems for men in one domain of life but that this domain may differ for women, therefore suggesting that it is not one gender or the other which is more adversely affected but that they are likely to be affected in different ways (Amato and Keith 1991; Videon 2002). For example different pathways may carry different weights for men and women. Similarly it has been suggested that the immediate psychological consequences of parental separation are similar for boys and girls but that this translates into differing adult outcomes (Rodgers 1990). It is therefore likely that gender differences are dependent upon the outcome of the study. In this study the outcome is psychological distress and the evidence appears to favour a stronger association between psychological distress and parental separation in women compared to men. However there has been little research

which looks at gender differences in the intervening pathways and over time – gaps which will be addressed by this research.

2.5.2 Gender differences in material pathways

The material pathways involved in the association between parental separation and adult psychological distress may differ according to gender, although there have been few studies investigating this. The research that has been conducted displays a substantial amount of discrepancy. Some studies have found no difference between men and women in the association of parental separation and educational attainment (Amato 1994; Amato and Keith 1991; Keith and Finlay 1988). Other studies have shown that parental separation is associated with poorer educational outcomes for women but not for men (Allison and Furstenburg 1989; McLanahan and Sandefur 1994). In contrast it has also been shown that parental loss in childhood shows greater associations with educational achievement of men (Kendler, Gardner, and Prescott 2006).

2.5.3 Gender differences in relational pathways

It has been found that girls report poorer parent-child relationships following parental separation than boys do (Amato and Sobolewski 2001; Videon 2002; West et al. 1998). It has been suggested that this may be because girls are more attachment-oriented than boys in adolescence (West et al. 1998). That is, they may be more conscious of the quality of relationship that they have with their parents and may rely more upon these. Parent-child relationship quality in this study is taken to be an indicator of attachment security and it has been found that there were no statistically significant gender differences seen in the association between parental separation and adolescent attachment (Woodward, Fergusson, and Belsky 2000). With regards to peer relationships, an additional indicator of attachment security in adolescence, it has been found that boys who experience parental separation may be more likely to have problems with peers (Allison and Furstenburg 1989; Guidubaldi 1988; Wallerstein 1991). To some extent this may represent boys' increased likelihood of responding to parental separation with externalising behaviours, such as fighting and bullying, than girls who are more likely to internalise (Pryor and Rodgers 2001).

Looking at adult partnerships it has been shown that women who experienced parental separation in childhood may be more likely to enter unhealthy marriages than men (Wallerstein 1991), which may be more likely to result in them experiencing their own

divorce. In fact it has been shown that women who experience parental separation are more likely to divorce (Keith and Finlay 1988).

The lack of evidence which looks at gender differences in material and relational pathways between parental separation and adult psychological distress clearly needs to be addressed and this study will investigate this.

2.6 Age of the child at time of separation

In addition to differences by gender, it is likely that the association between parental separation and adult psychological distress, and also intervening pathways, differ by the age of the child at the time of separation. As mentioned previously, Bowlby's attachment theory points towards early childhood as being a crucial time for the formation of an internal secure base that results from secure bonds with parents (Bowlby 1969). It could therefore be hypothesised that parental separation, which is likely to disrupt the secure bond formation, occurring during early childhood is likely to have more adverse consequences for the child. In life course research this is referred to as a sensitive period (Kuh and Ben-Shlomo 2004b; O'Connor 2003; Shapiro and Cooney 2007). There is also evidence to suggest that young children may view parental separation as personal rejection and to blame themselves, which may be less so for older children or adolescents who tend to be more peer-oriented (Amato 1994; Hetherington and Stanley-Hagan 1999).

A small number of studies have looked at age differences. Their evidence is mixed with some studies finding that separation in early childhood is particularly detrimental for children (Allison and Furstenburg 1989; Rodgers 1990; Wallerstein 1991; Woodward, Fergusson, and Belsky 2000), but others have suggested that divorce occurring between the ages of 5-10 years (Tennant, Hurry, and Bebbington 1982), or in later childhood and adolescence may have the greater effect (Chase-Lansdale, Cherlin, and Kiernan 1995) upon adult wellbeing. There is an obvious need for further research into age differences. The specific hypothesis to be tested here is that parental separation occurring during early childhood that will be more damaging to the security of attachment and will therefore have the greater effect upon adult psychological distress. Aside from the evidence from Bowlby's attachment theory those who experience parental separation in early childhood are likely to spend longer in a single parent family, experiencing greater levels of material disadvantage - linking to the life course idea of accumulation.

2.7 Summary and identification of gaps in literature

In summary this literature review has shown that the relationship between parental separation and adult psychological distress is relatively well established. However many studies look solely at the consequences of parental divorce and not also separations of unmarried couples – an increasingly common phenomenon (Amato 2010). In addition many studies have investigated the association between parental separation and psychological distress in early adulthood (early 20s) and less attention has been paid to mid-adulthood. Also relatively little is known about the mechanisms involved but existing evidence appears to show that material and relational pathways may be involved. As Doucet and Aseltine (2003) note, there has been a scarcity of studies which investigate the intervening pathways and this has largely been due to lack of good quality prospective data, something which may be overcome by the excellent longitudinal data resources which exist in Great Britain.

With regards to specific pathways – little attention has yet been paid to material pathways, involving factors such as material disadvantage, although it is plausible that these may be involved. In addition, there has been little investigation of attachment in adolescence as a mediator, particularly attachment at this stage of the life course involving both parent-child and peer relationships as a more appropriate measure, and how this links to factors known to partially mediate the association such as adult partnerships. As previously mentioned, material and relational mechanisms are unlikely to be discrete entities and therefore are likely to be interrelated, something which has not been tested with regards to the association between parental separation and adult psychological distress before.

In addition relatively little is known about how the association between parental separation and adult psychological distress has changed over time, whether this differs for men and women, and also by the age of the child at the time of separation. Finally few studies account for missing data, an important source of bias, which may have resulted in an underestimation in effect estimates and reduced statistical power as a consequence of reduced sample sizes.

Chapter 3 Conceptual Model

3.1 Parental separation and adult psychological distress

The conceptual model underlying this thesis is based upon material and relational pathways between parental separation occurring in childhood and the reporting of psychological distress in adulthood. This thesis looks firstly at the association between parental separation and adult psychological distress comparing results across three British birth cohorts. Linking to Bronfenbrenner's Ecological Systems Model it is thought that both the association between parental separation and adult psychological distress and the intervening pathways will have changed over time. This thesis aims to test this building methodologically on previous work involving the British cohort studies. In addition the outcome of psychological distress is investigated in adults in their early 30s as many previous studies have focussed upon the early 20s. Confounders which will be controlled for in analyses are those identified *a priori* from previous work, such as parental age, mother's psychological distress and mother's educational level. In addition a marker of material disadvantage prior to parental separation is taken account of as this is known to be a risk factor for separation which few studies have previously considered.

All three cohorts were used to assess the overall association between parental separation and psychological distress however only the two later cohorts were used in the assessment of pathways. This was because these were initiated most closely to the rapid increase in societal divorce trends (fig. 1.1) and also because the 1946 cohort was only offered to test cohort differences in the association between parental separation and adult psychological distress.

3.2 Material pathways

The main focus of this thesis is the pathways acting between parental separation and adult psychological distress (shown in fig. 3.1). Material pathways derive from the health inequalities literature which link socioeconomic disadvantage to adverse material and psychosocial exposures across the life course. There is much evidence to suggest that parental separation occurring during childhood is associated with increased material disadvantage in adolescence; the literature review reported that parental separation has previously been linked to a drop in living standards, poverty and a lack of basic household amenities. Educational attainment is an important way in which childhood

disadvantage is translated into adulthood outcomes (Gregg and Machin 1998). Material disadvantage is well known to influence educational attainment. It has been shown that children from lone parent families tend to spend fewer years in full-time education. The link between parental separation and educational attainment has been reported many times and this thesis additionally investigates this association independent of adolescent material disadvantage. Educational attainment is in turn strongly associated with adult material disadvantage. In particular, poor educational attainment represents a major hurdle for getting a good job which is well paid and being able to afford to buy one's home. The two cohorts most closely nested around the rapid increase in societal divorce rates following divorce reform are used to investigate whether material pathways have changed over time. For the children born in 1970 there is likely to have been greater awareness of financial and parental involvement of fathers following separation. It would therefore be expected that there was less of an effect of parental separation upon adolescent material disadvantage and educational attainment in this cohort than the earlier cohort of children born in 1958. All of the proposed pathways above are represented in the conceptual model in figure 3.1.

3.3 Relational pathways

Hypotheses involving relational pathways are based on attachment theory linking early relationships to both parents and peers with later adult relationships. The Family Stress Model, amongst other studies, acts as evidence for a connection between material and relational pathways. The literature review presented a plethora of studies which find a link between parental separation and parent-child relationships, showing that those who experience separation tend to report poorer quality relationships with parents. Parent-child relationship quality is thought to be an indicator of attachment security and this thesis argues that to adequately measure attachment in adolescence it may also be appropriate to look at quality of peer relationships, a relational factor that this thesis also investigates. Adolescence is a major transitional phase of life and this can be applied to the attachments formed with others (Allen 2008). Adolescents become less reliant upon parents as attachment figures, moving towards becoming attachment figures in their own right to their own children and to their partners (Allen et al. 2004; Allen 2008). It has been shown that children who have experienced separation are more likely to be aggressive, to bully others or to be withdrawn. Therefore in this project the peer relationship quality aspects that will be investigated are whether the child fights or

bullies others, whether the child is liked by other children and whether the child prefers to be alone.

Attachment security is thought to transfer across the life course and it is plausible that the types of relationship formed with parents and peers are likely to influence partnership type in adulthood. Additionally there has been much evidence which suggests an association between parental separation and adult partnership status; those who experience separation in childhood are more likely themselves to divorce or separate in adulthood and this is thought to be due to less favourable attitudes towards marriage, more liberal attitudes towards divorce and reduced marital quality. Adult partnership status is therefore included on the relational pathway representing an important link between parent-child and peer relationship quality and adult psychological distress. With respect to change over time it is thought that because of increasing awareness of maintaining contact between both parents and children that associations between parental separation and relational factors will be less in the later cohort as separation is less likely to have disrupted the parent-child and peer-child bond.

3.4 Interlinking material and relational pathways

There is a lack of studies which investigate both material and relational pathways and the way in which these interrelate across the life course. This thesis aims to rectify this gap by investigating how the material and relational factors investigated are interlinked. There is evidence from the Family Stress Model (Conger et al. 1992) and subsequent work which empirically tests this (Leinonen et al. 2002; Parke et al. 2004; Solantus, Leinonen and Punamaki 2004; Yoder and Hoyt 2005) showing that material disadvantage in adolescence impacts upon the quality of parent-child relationships. There has also been research conducted, although considerably less, which shows that material disadvantage may affect peer relationships also. These two aspects are tested in this thesis (see figure 3.1 for corresponding pathways). Also there is evidence to suggest that the quality of parent-child relationships is linked to how well the child does at school and this is mainly thought to be due to parental involvement. It is also likely that peer relationships are linked to educational attainment as children who have more disruptive behaviour as a result of parental separation are less likely to be focussed in the classroom and to do well. These pathways are also tested (see figure 3.1). The final interlinking pathway is that between educational attainment and adult partnership status.

Those who have a lower level of educational attainment are more likely to marry at a younger age and are subsequently more likely to be divorced.

3.5 Moderating factors

Attachment theory points to the importance of the age at which a child loses a secure relationship with one parent and there is scant evidence which investigates the importance of the age of the child in the relationship between parental separation and adult psychological distress. Attachment theory suggests that it is parental separation occurring during early childhood which has the greatest adverse effect upon the psychological health of the child because it is thought to disrupt the formation of the secure base between parents and child. For this reason it is also thought that the age of the child will modify the relationship between parental separation and relational factors. Age of the child is thought also to affect material pathways as children experiencing separation in early childhood are likely to spend longer in material disadvantage, which is likely to have ramifications for educational attainment, adult material disadvantage and consequently adult psychological distress

There is little consensus in the literature as to whether there are gender differences in the association between parental separation and adult psychological distress. Research conducted thus far suggests that women may be more adversely affected than men. As mentioned in the literature review little is known about the roles of gender differences in the proposed material pathways. However the evidence which does exist again appears to point to women being more adversely affected than men. Regarding gender differences in relational pathways there is some suggestion that women may be more adversely affected with regards to parent-child relationships and adult partnerships, and men may be more affected with regards to peer relationships as they are more likely to display externalising behaviours.

Fig. 3.1 – Conceptual model to be tested in this thesis
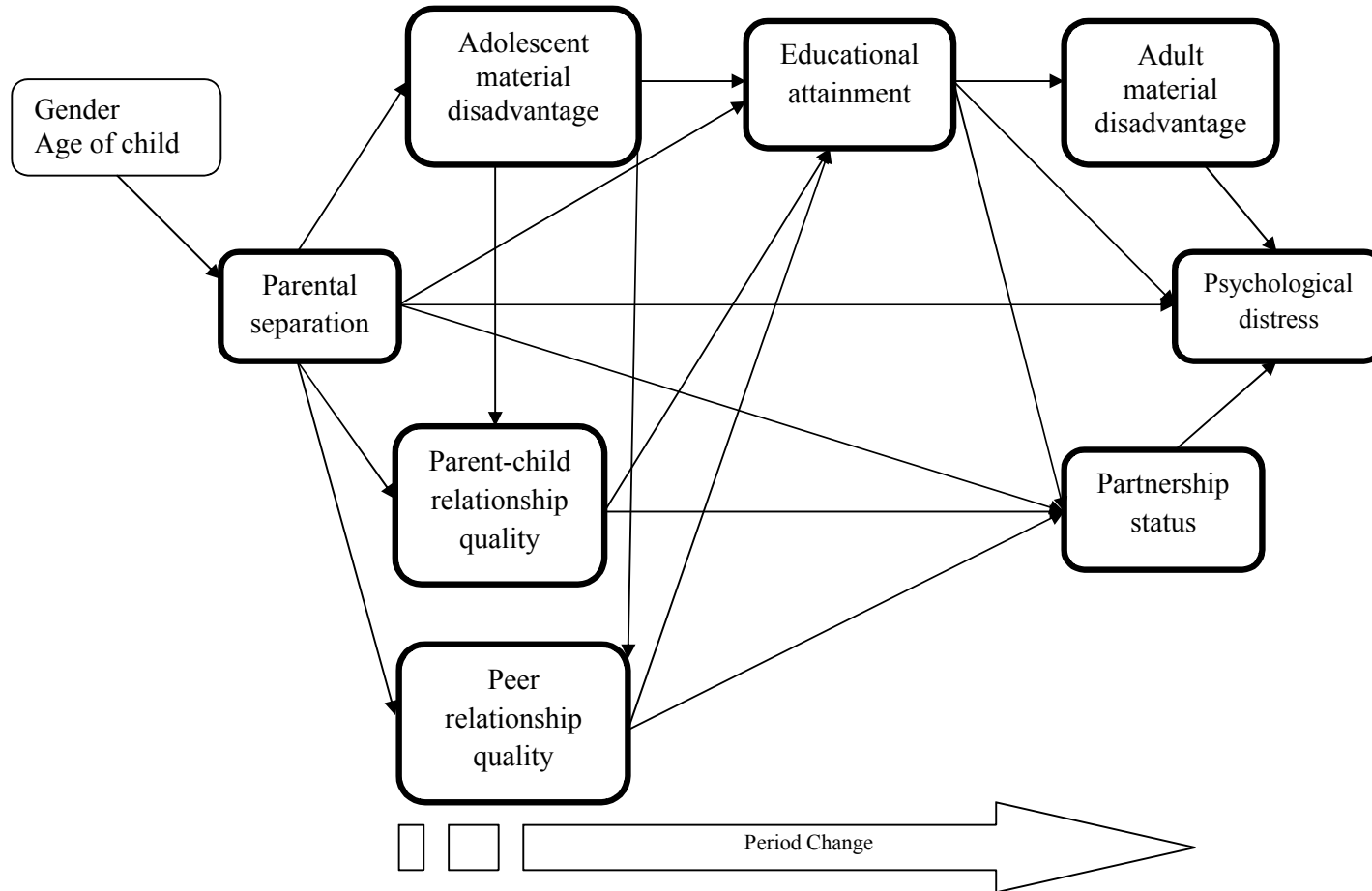
Chapter 4 Aims, Objectives and Hypotheses

4.1 Aim

The aim of this PhD is to investigate the association between parental separation occurring between the ages of 0-16 years and psychological distress in adulthood (early 30s), focussing upon material and relational pathways. Modification by gender, age of the child at separation and cohort will also be assessed.

4.2 Objectives

In order to meet the above aim the following objectives will be undertaken:

Using NSHD, NCDS & BCS70

1. To test the association between parental separation occurring between 0-16 years and adult psychological distress (30 years in BCS70, 33 years in the NCDS and 36 years in the NSHD) by using data from three of British birth cohort studies – the 1946 National Survey of Health and Development (NSHD), the 1958 National Child Development Study (NCDS) and the 1970 British Cohort Study (BCS70). Modification by cohort, gender and age of the child at time of separation will also be investigated.

Using NCDS & BCS70

2. To examine the role played by material factors – material disadvantage in adolescence at age 16 years, educational attainment by 23/26 years and adult material disadvantage at 30/33 years – in the association between parental separation and adult psychological distress, and whether this differs by age of child at time of separation, gender and cohort.

3. To examine the role played by relational factors – the quality of parent-child and peer relationships at age 16 years and adult partnership status at age 30/33 years – in the association between parental separation and adult psychological distress, and whether this differs by age of child at time of separation, gender and cohort.

4. To explore whether these material and relational factors are interlinked across the life course and whether there is modification by cohort, gender and age of child at time of separation.

4.3 Hypotheses

The following hypotheses correspond to the objectives given above with each objective having several hypotheses. It is thought that:

1   a) Parental separation occurring during childhood (0-16 years) will be associated with increased psychological distress in adulthood at age 30/33/36 years in all three cohorts.

b) There will be gender differences, with a greater association seen for women compared to men.

c) Separations occurring in early childhood will have a greater negative effect upon psychological distress than at later ages.

d) The association between parental separation and adult psychological distress will have reduced over time.

Using NSHD, NCDS & BCS70

2   a) Those experiencing parental separation will be more likely to experience material disadvantage in adolescence, lower educational attainment and higher levels of adult material disadvantage in comparison to those from intact families, and consequently higher psychological distress in adulthood.

b) Material pathways will be more important for women than for men.

c) Parental separation occurring during early childhood (0-5/7 years) will have more of an effect upon material factors.

d) Parental separation will have a greater effect upon material factors in the NCDS than in the BCS70.

Using NCDS & BCS70

3   a) Those experiencing parental separation will experience reduced parent-child relationship quality and poorer peer relationships in adolescence (16 years), and will differ in their partnership status in adulthood (30/33 years), being likely to have been separated/divorced themselves compared to those from intact families, and consequently will experience higher psychological distress in adulthood.

b) Relational pathways will be more important for women than for men.

c) Parental separation occurring during early childhood (0-5/7 years) will have more of an effect upon relational factors in line with attachment theory.

d) Parental separation will have a greater effect upon relational factors in the NCDS than in the BCS70.

4   Material and relational pathways between parental separation and adult psychological distress will be linked. In particular it is thought that:

- Material disadvantage in adolescence will reduce the quality of parent-child and peer relationships
- High parent-child and peer relationship quality will nurture a higher level of educational attainment.
- Higher educational attainment will be associated with being less likely to be divorced or separated in adulthood

Using NCDS & BCS70

METHODS

Chapter 5 Datasets

Britain has a wealth of good quality longitudinal datasets which are appropriate for testing the hypotheses of this thesis and which were identified in the literature review as being required to advance knowledge in this field. Three longitudinal datasets have been used in this thesis which have followed a sample of people from birth, the studies starting 12 years apart – the 1946 National Survey of Health and Development, the 1958 National Child Development Study and the 1970 British Cohort Study. Each of these cohorts is described with reference to its history, design, sample and data collection.

5.1 National Survey of Health and Development
5.1.1 Introduction and history of the study

The National Survey of Health and Development is the oldest of the three birth cohorts used in this thesis being initiated in 1946, the year following the end of the Second World War. The study was set up to find out why fertility rates in the UK were declining and also to assess the supply of obstetric services and their effectiveness in the prevention of perinatal mortality (Wadsworth, Kuh, Richards and Hardy 2006). The study was initially funded by the Nuffield Foundation and the National Birthday Trust Fund. Following this initial study the sample have been followed up at many points across their lives and are still being followed up (see section 5.1.3). Data are available from the MRC Unit for Lifelong Health and Ageing.

5.1.2 Sample

The initial study aimed to recruit all people born during one week in 1946 in England, Wales and Scotland (N=16,695, achieved sample N=13,687, 82.0%). The flowchart in fig. 5.1 shows the sample of the study and how they were selected[5]. Attrition in the study has remained relatively low and by age 36 years (the outcome stage used in this thesis) the achieved sample was 3,322, representing 86% of the target sample in that year[6]. The sample has remained broadly representative of the population of a similar age (Wadsworth et al. 2003a), particularly as the participants have aged, and therefore is an

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[5] Please note that only birth and age 36 year sweep information is given as these are the only sweeps used in this thesis for this cohort (this cohort is only used in objective 1)

[6] 'Target sample' refers to the sample available after accounting for deaths, emigrations and refusal

appropriate study to use in this thesis to give an indication of how parental separation affected people born around a similar time.

Fig. 5.1 The sample of the relevant sweeps of the National Survey of Health and Development (NSHD)

Births registered in relevant week of 1946

(n=16,695)

↓

Sample of initial maternity study (1946)

(n=13,687)
82.0% of total births

↓

Study followed up sample of all singleton babies born to married women with husbands in non-manual and agricultural work and ¼ of all comparable births to women with husbands in manual employment

(n=5,362)

↓

Follow-up to age 36 years (outcome stage of this study), 1982

(n=3,322)
86% of eligible sample

Adapted from (Wadsworth, Kuh, Richards, and Hardy 2006)

5.1.3 Data collection

The study is multidisciplinary in nature, collecting information on medical, developmental, psychological, social and economic aspects of participants' lives. The table below shows the relevant sweeps of data collection conducted in the study and the methods of data collection used (see table 5.1). Alongside the main study of the NSHD cohort members there have been two sub-studies running which have collected data on

70

the first born child of NSHD cohort members from 1965 onwards (age 19 years) and also a women's health study for NSHD women from 1993 (age 47 years). This thesis uses data from birth through to age 36 years collected on the original NSHD cohort members.

Table 5.1 – NSHD sweeps of data collection and methods used

Year	Age	NSHD members: collection method	NSHD 1st born children: collection method
1946	0	Health Visitor Midwife Obstetrician	
1948	2	Health Visitor	
1950	4	Health Visitor	
1952	6	School Doctor	
1953	7	Health Visitor/School Nurse	
1954	8	Health Visitor/School Nurse Teacher	
1955	9	Health Visitor/School Nurse Teacher	
1956	10	Teacher	
1957	11	Health Visitor/School Nurse School Doctor Teacher	
1959	13	Teacher	
1961	15	Health Visitor/School Nurse Teacher	
1965	19	Health Visitor	Interviewer
1966	20	Postal Questionnaire	Interviewer
1967	21		Interviewer
1968	22	Postal Questionnaire	Interviewer
1969	23	Postal Questionnaire	Interviewer
1970	24		Interviewer
1971	25	Postal Questionnaire	Interviewer
1972	26	Interviewer	
1977	31	Postal Questionnaire	
1982	36	Research Nurse	

Adapted from: (Kuh et al. 2011; Wadsworth, Kuh, Richards, and Hardy 2006)

5.2 National Child Development Study

5.2.1 Introduction and history of the study

Similar to the NSHD the National Child Development Study (NCDS) began as a largely medical study in 1958 known as the 'Perinatal Mortality Study' and was initially funded by the National Birthday Trust Fund. This study aimed to investigate why stillbirths were not decreasing around this time specifically looking at the impact of social and

obstetric factors (Butler and Bonham 1963). Participants were retraced at age 7 years and a longitudinal study set up which has followed participants across their lives and still continues to collect data on them (see section 5.2.3). This cohort study is currently managed by the Centre for Longitudinal Studies at the Institute of Education and data are available through the UK Data Archive.

5.2.2 Sample

Like the NSHD the NCDS aimed to recruit all babies born in England, Wales and Scotland during a single week in 1958. Of the 17,733 births occurring during this week, 17,414 (98.2%) were recruited into the Perinatal Mortality Study (the birth sweep of the NCDS). Of these children 15,568 (92.2% of the eligible sample[7]) were retraced at age 7 years and recruited into the longitudinal study (Shepherd 1995). The outcome stage of this thesis is age 33 years (the nearest comparable age to the NSHD age 36 years) where, of the target sample of 15,600, 11,407 (73.1%) provided at least some data (Shepherd 1995), giving a large sample size – therefore addressing a disadvantage of many previous studies examining the effects of parental separation. A further discussion of missing data is given in chapter 7. Figure 5.2 summarises the sample size for each relevant sweep of the study used in this thesis (there are additional sweeps and these are summarised in section 5.2.3).

5.2.3 Data collection

Again the NCDS is a multidisciplinary study collecting information on educational, developmental, medical, economic and social domains of participants' lives from multiple sources (Power and Elliott 2005). It is therefore a very appropriate dataset for use in this thesis in order to assess both the relationship between parental separation and adult psychological distress and also the importance of material and relational mechanisms. This thesis uses data from birth through to age 33 years (1991). Table 5.2 summarises the relevant waves of data collection and methods employed.

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[7] The 'eligible sample' of the NCDS at age 7 years includes original Perinatal Mortality Study members plus immigrants and other children who were also born during the relevant week and were traced through their schools (Power and Elliott 2005)

Fig. 5.2 – The sample of the relevant sweeps of the National Child Development Study (NCDS)

```
┌─────────────────────────────────────────┐
│   Births registered in relevant week     │
│            of 1958                        │
│                                           │
│            (n=17,733)                     │
└─────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────┐
│  Sample of Perinatal Mortality Study      │
│            (1958)                         │
│                                           │
│            (n=17,415)                     │
│   98% of total births in relevant week    │
└─────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────┐
│  Children retraced at age 7 years (1965)  │
│            NCDS1 sweep                     │
│                                           │
│            (n=15,568)                     │
│        92% of eligible sample             │
└─────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────┐
│       Age 11, NCDS2 sweep (1969)          │
│                                           │
│            (n=15,503)                     │
│        92% of eligible sample             │
└─────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────┐
│          Age 16, NCDS3 (1974)             │
│                                           │
│            (n=14,761)                     │
│        87% of eligible sample             │
└─────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────┐
│          Age 23, NCDS4 (1981)             │
│                                           │
│            (n=12,537)                     │
│        76% of eligible sample             │
└─────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────┐
│          Age 33, NCDS5 (1991)             │
│                                           │
│            (n=11,407)                     │
│        73% of eligible sample             │
└─────────────────────────────────────────┘
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Adapted from (Shepherd 1995) - taken from figure 2

Table 5.2 – NCDS sweeps of data collection and methods used

Year	Age	NCDS members: collection method	Sub-studies
1958	0	Mother Medical records	
1965	7	Parental interview School questionnaire Cohort member tests Medical examination	
1969	11	Parental interview School questionnaire Cohort member tests Cohort member questionnaire Medical examination	
1974	16	Parental interview Cohort member questionnaire School questionnaire Medical examination Cohort member tests Census	
1976	18		Handicapped School Leavers
1978	20	Exam scores from schools/colleges	Smoking Survey
1981	23	Cohort member interview Census	
1991	33	Cohort member interview Partner interview Child interview[8] Child's mother questionnaire	

Adapted from (CLS 2010; Power and Elliott 2005; Shepherd 1995)

5.3 1970 British Cohort Study

5.3.1 Introduction and history of the study

Like the two previous birth cohorts the 1970 British Cohort Study (BCS70) also started life as a largely medical study entitled the 'British Births Survey' funded by the National Birthday Trust. This initial survey aimed to investigate perinatal morbidity (Elliott and Shepherd 2006). A longitudinal study was initiated and children were followed up again from the age of 5 years onwards and are still being followed up now (see section 5.3.3). As well as the NCDS the BCS70 is currently managed by the Centre for Longitudinal Studies at the Institute of Education and the data are freely available through the UK Data Archive for academic use.

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[8] This was only for the children of 1 in 3 cohort members

5.3.2 Sample

Similar to the previous two studies the BCS70 aimed to recruit all babies born during a week in 1970 in England, Scotland, Wales and Northern Ireland[9]. Of the 17,287 births occurring during this week, 16,571 (95.9%) babies were recruited into the 'British Births Survey'. 13,071 children were traced at age 5 years (77.8% of the target sample[10]). The outcome stage of this thesis is age 30 years, comparable to the years used in the previous two cohorts. The sample size at this sweep was 11,261 participants (66.0% of the target sample of 17,050). Figure 5.3 summarises the sample size for each sweep of the cohort which is used in this thesis. Additional sweeps are summarised in section 5.3.3.

The reduced sample size and response rate in the age 16 sweep of data collection ('Youthscan') is due to the teacher's strike of 1986 (questionnaires were administered through the schools) (Plewis et al. 2004). In addition the lower response rate of the age 26 sweep is likely to be due to the use of a postal questionnaire and also to the reduced funds for tracing and following up participants in this sweep (Elliott and Shepherd 2006). This is not likely to adversely affect the analysis undertaken in this thesis as only one measure was taken from this sweep (educational attainment) and data have been imputed to account for missing values at all sweeps.

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[9] Northern Ireland sample later dropped from the study
[10]The 'target sample' of the BCS70 at age 5 years included original 'British Births Survey' participants less those from Northern Ireland (who were dropped from the study) plus immigrants and other children who were subsequently identified as having being born during the target week in 1970.

Figure 5.3 – The sample size of relevant sweeps of the British Birth Cohort (BCS70)

Births registered in relevant week of 1970

(n=17,287)

↓

Sample of British Births Survey (1970)

(n=16,571)
96% of total births in relevant week

↓

Children retraced at age 5 years (1975)
BCS1

(n=13,071)
78% of eligible sample

↓

Age 10, BCS2 sweep (1980)

(n=14,874)
86% of eligible sample

↓

Age 16, BCS3 (1986)

(n=11,621)
66% of eligible sample

↓

Age 26, BCS4 (1996)

(n=9,003)
52% of eligible sample

↓

Age 30, BCS5 (2000)

(n=11,261)
66% of eligible sample

Adapted from (Elliott and Shepherd 2006)

5.3.3 Data collection

The BCS70 is also a multidisciplinary study collecting information on many aspects of participants' lives therefore making it appropriate for the testing of the hypotheses of this thesis. Data have again been collected from multiple sources (see table 5.3). This thesis uses data from all sweeps between birth and age 30 years.

Table 5.3 – BCS70 sweeps of data collection and methods used

Year	Age	BCS70 members: collection method	Sub-studies
1970	0	Mother Medical records	
1972	2		22-month Survey South-West region Survey
1974	4		42-month Survey
1975	5	Parental interview Medical records Cohort member tests	
1977	7		Seven-year Survey
1980	10	Parental interview School questionnaire Cohort member tests Medical examination Cohort member interview	
1986	16	Parental interview Cohort member questionnaire School questionnaire Medical examination Cohort member tests	
1991	21		21-year Sample Survey
1996	26	Postal questionnaire	
2000	30	Cohort member interview	

Adapted from (CLS 2009; Elliott and Shepherd 2006)

5.4 Benefits of these datasets

The literature review highlighted the need for good quality prospective data as cohort members' reports of aspects such as parent-child relationships and material disadvantage may not be accurately remembered or their levels may depend upon the psychological health of the participant at the time of recall. One of the other major strengths of these data is the longitudinal design which allows for the temporal ordering of factors thought to lie on the pathway between parental separation in childhood and adult psychological distress. In addition the sweeps at which data were collected and the

measures used are largely comparable (see chapter 6). These three cohorts are particularly relevant for assessing change over time in the association between parental separation and adult psychological distress and the intervening mechanisms through material and relational factors.

These cohorts of people were born 12 years apart and were therefore exposed to differing social worlds, particularly those regarding the family. These three datasets are used in this thesis to tap into a narrative of social change in which quantitative cross-cohort comparisons are conducted to examine how changing levels of parental separation affect psychological distress in adulthood (Elliott 2008). As stated in chapter 1, divorces in England and Wales increased rapidly during this period; figure 5.4 shows the situation of the childhoods (0-16 years as constrained by the data) of the three cohorts used within the context of societal divorce trends. As mentioned previously these figures represent an underestimation of separations in society as they are only able to capture marital dissolutions and not breakdown in non-marital partnerships which have also increased over this period and are likely to be particularly relevant to the parents of BCS70 participants. For this reason the dissolution of non-marital partnerships are considered in the NCDS and BCS70. This is not possible to do in the NSHD as only children born to married mothers were followed up in the cohort (see figure 5.1).

In addition these datasets involve British samples and this will therefore go some way to addressing the relatively smaller body of evidence regarding the association between parental separation and adult psychological distress within this population. These studies also allow for the investigation of differences by gender and also by the age of the child at separation, the latter of which has seldom been possible in other datasets. Also each study has a relatively large sample size unlike many of the studies discussed in the literature review. In order to maintain this large sample size and to reduce the bias associated with missing data, missing values have been imputed in all three cohorts. As all three cohorts are broadly representative of the population of similar ages who have grown up in Great Britain, particularly after conducting multiple imputation, the results are likely to be generalisable to the population born between 1946 and 1970.

Fig. 5.4 - Situation of childhoods of the NSHD, NCDS and BCS70 against societal divorce levels in England & Wales, 1946-2009
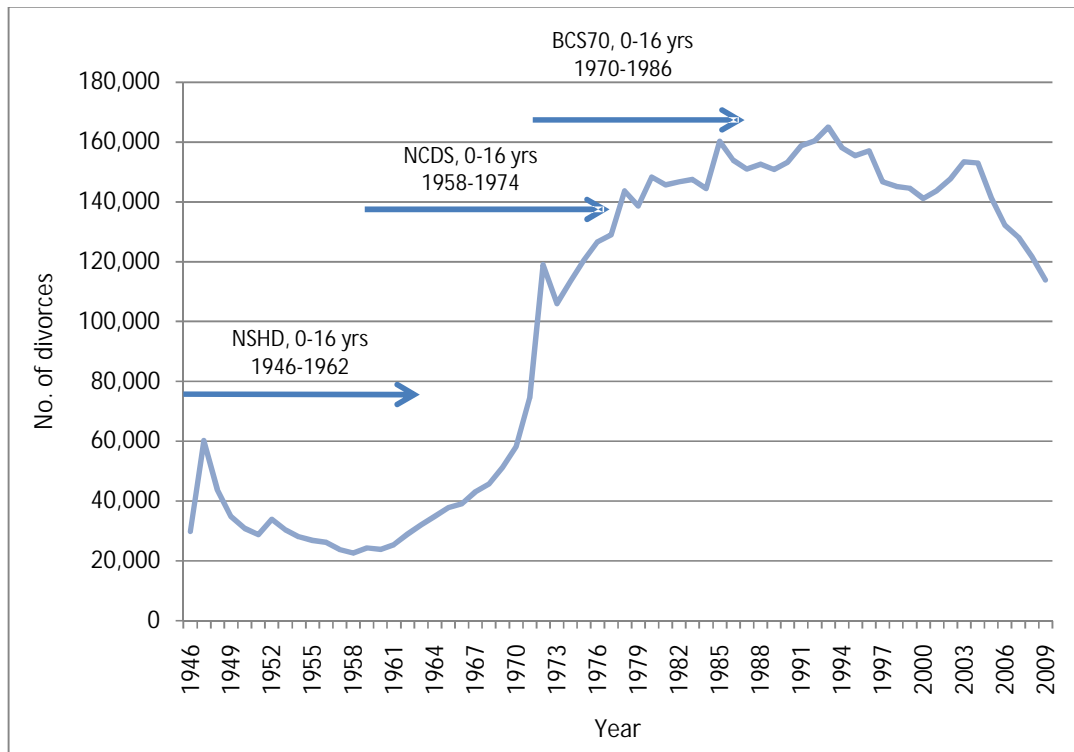
Source: Data taken from 'Divorces 1858-2003' (ONS 2006); 'Marriage, divorce and adoption statistics. FM2 No 35' (ONS 2010b)

5.5 Ethical considerations

Whilst this project has involved the use of secondary data sources and the author has not had direct contact with study participants, ethical issues are still important to consider. These issues mainly fall under two broad categories – issues of consent and issues in the storage and use of data. Firstly regarding consent, people involved in the running of the three birth cohorts used have ensured that informed consent was gathered at each sweep of data collection and this was collected from the cohort member, the cohort member's parent or other person, where appropriate.

Secondly regarding the security of data, the NSHD data are kept securely by the MRC Unit for Lifelong Health and Ageing and have to be applied for with a detailed proposal of the project to be undertaken; they are not available through the UK Data Archive. Once data were available to the author, they were stored on the UCL network in the

author's password-protected private drive area which is firewall protected. This was also the case with the NCDS and BCS70 which are available through the UK Data Archive to researchers and were stored securely in the same way once downloaded. User agreements were adhered to for all three cohorts.

All three datasets store an individual's data in an anonymous format whereby all individuals have a study identification number, generated by the managing institutions, which is used to merge records. No information is available to researchers about participant's names, specific addresses or date of birth and therefore the individuals in the three cohorts used are unidentifiable.

Chapter 6 Variables

This chapter describes the variables and measures used in this project, their derivation and distribution. The process of deriving the exposure of parental separation in all three cohorts is first described, followed by an explanation of the measures used for the outcome of psychological distress. A description of the material and relational pathway variables is then given followed by a discussion of covariates.

6.1 Parental separation

Parental separation was taken from the childhood sweeps of all three cohorts between birth and age 16 years. The cut-off point at age 16 years was due to the corresponding sweeps of data collection, particularly in the NCDS and BCS70 where no information was collected between age 16 years and early adulthood (early 20s). It was felt that a major strength of the design of this project, which would address limitations of previous work, was the use of prospective measures of parental separation and the period of childhood at which it occurred. Retrospective measures of parental separation were available in all three cohorts in adulthood but it was felt that measuring parental separation prospectively between ages 0 and 16 years obtained from the mother or mother figure of each cohort member was less likely to introduce recall bias and therefore this approach was taken.

This project was interested in the association between the experience of parental separation and later adult psychological distress and therefore it had to be ensured that separation had occurred at some point since the birth of the child and not prior. In addition the follow-up sample of the NSHD, beyond the birth sweep, were only those children who were born to married mothers. For these reasons the mother's marital status at birth was used to restrict the NCDS and BCS70 samples to those parents who were either married or in a relationship at this time[11].

Consequently there were 5,362 children in the NSHD sample who were followed up beyond birth. The NCDS sample was 16,734, as 671 participants had mothers who were not married or in a stable union and for 1,153 participants mother's marital status was missing. For the BCS70 the sample was 15,914, as 1,262 participants had mothers who

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[11] Available categories of marital status in the NCDS were: married, stable union, unmarried, twice married, separated, widowed or divorced. In the BCS70 the categories were: married, single, widowed, divorced or separated.

were not married, and the mother's marital status was missing for 1,553 participants. Using this method in the NCDS and BCS70 encompasses both divorce and the dissolution of cohabiting relationships. Unmarried couples were included as this has become an increasingly common partnership form into which children are born (fig. 2.3) and it is thought that the breakdown of these partnerships also affects the life courses of children involved. However it is not possible to investigate the differential effect of the breakdown of married and unmarried partnerships in these cohorts.

A few studies on parental separation have been conducted using the birth cohorts, particularly the NCDS and BCS70. However authors who have conducted such studies have typically derived a single divorce variable at age 16 years which indicates whether a divorce or separation has ever occurred at any point during the cohort member's childhood or whether the cohort member's parents were still together e.g. (Ely, Richards, Wadsworth, and Elliott 1999; Sigle-Rushton, Hobcraft, and Kiernan 2005). In this project it is intended that the investigation of parental separation will extend such previous work to look at whether the timing of separation is important, in keeping with the life course perspective and the concept of a sensitive period effect.

In order to look at both parental separation and the importance of the timing of separation during different periods of childhood two parental separation variables were derived for each of the cohorts:

1. A binary variable for parental separation occurring between the ages of 0 and 16 years (0=no separation, 1=separation)
2. A 'separation timing' variable with 4 categories for those whose parents separated (0=no parental separation, 1=separation between sweeps 0-1, 2=separation between sweeps 1-2, 3=separation between sweeps 2-3)

6.1.1 Parental separation in the NSHD

In the NSHD this was derived from the variable which was provided regarding the age at which the child experienced parental separation. This information was derived from parental marital status across all childhood sweeps (Cooper, Mishra, Hardy and Kuh 2009). Only 2 participants did not have this information. This variable was collapsed into the two required variables detailed above. The distribution of parental separation in the NSHD is given in table 8.1 in chapter 8.

6.1.2 Parental separation in the NCDS

In the NCDS separation variables were derived from many different variables from the childhood sweeps. At age 7 years a health visitor assessed variable was used which asked "under which categories would you list the problems of this family?" and the response of "divorce, separation or desertion" was available. In the age 11 and 16 year sweeps information on who parental figures were and the reasons for this were used. If the reason was "separation" or "divorce" then these participants were coded as having experienced parental separation. If reason for change was given as "separation" or "divorce" but the response to the parental figures question was missing these people were also coded as having experienced parental separation[12]. Figure 6.1 shows a flow diagram for the derivation of the parental separation variables accounting for all 18,558 participants who were part of the NCDS sample at some stage. The table below (6.1) shows the distribution of all 18,558 participants in the NCDS with regards to parental separation. Many participants are missing information on at least one item or sweep and therefore parental separation is imputed (discussed further in chapter 7). This means that the final numbers of those who did and did not experience separation will vary based on the results of the imputation and other sample restrictions[13].

Table 6.1 - Parental separation in the NCDS between 0-16 years

	N (%)
No separation	9,834 (53.0)
Parental separation 0-7 yrs	497 (2.7)
Parental separation 7-11 yrs	320 (1.7)
Parental separation 11-16 yrs	319 (1.7)
Mother not married at birth	671 (3.6)
Mother marital status missing at birth	1,153 (6.2)
No separation 0-11 yrs, 16 yrs missing	2,611 (14.1)
No separation 0-7 yrs, 11-16 yrs missing	944 (5.1)
Mother married but 7-16 yrs missing	1,740 (9.4)
7 yrs missing, 11 yrs no separation, 16 yrs missing	469 (2.5)
Total	**18,558 (100)**

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[12] This was the case for 2 participants in the age 11 sweep who reported "broken marriage" as a reason but no change in father figure between 7-11 years, 4 participants in the age 16 sweep who reported "separation" but no change in mother figure between 11-16 years and 7 participants also in the age 16 sweep who reported "separation" but no change in father figure between 11-16 years.

[13] Analysis is only on those with complete data on psychological distress

Fig. 6.1 Derivation of parental separation variables in the NCDS

Birth sweep	N
Mother married, in stable union or twice married[14]	16,734
Missing mother's marital status	1,153
Mother not married	671
Total	**18,558**

Age 7 sweep (NCDS1)	N
Parental separation	497
No separation	12,553
Missing some items	1,291
Missed sweep	2,393
Total	**16,734**

Age 11 sweep (NCDS2)	N
Parental separation	320
No separation	12,006
Missing some items	1,281
Missed sweep	2,630
Total	**16,237**

Age 16 sweep (NCDS3)	N
Parental separation	319
No separation	9,834
Missing some items	2,376
Missed sweep	3,388
Total	**15,917**

[14] The shaded cells represent the sub-sample of participants who were considered in the following sweep

6.1.3 Parental separation in the BCS70

A similar process as that used in the NCDS was used to derive parental separation in the BCS70 with the exception that, in all childhood sweeps beyond birth (age 5, 10 and 16 years), information on who parental figures were at each sweep and reasons for any change was used. Figure 6.2 shows a flowchart for the derivation of parental separation in the BCS70. Again like the NCDS if a reason for a change in parental figures was given as divorce or separation but no change in figures reported then this was coded as a separation.[15] Table 6.2 shows the distribution of all BCS70 participants with regards to parental separation.

Table 6.2 - Parental separation in the BCS70 between 0-16 years

	N (%)
No separation	6,444 (34.4)
Parental separation 0-5 yrs	309 (1.7)
Parental separation 5-10 yrs	1,070 (5.7)
Parental separation 10-16 yrs	513 (2.7)
Mother not married at birth	1,265 (6.8)
Mother marital status missing at birth	1,553 (8.3)
No separation 0-10 yrs, 16 yrs missing	4,885 (26.1)
No separation 0-5 yrs, 10-16 yrs missing	748 (4.0)
Mother married but 5-16 yrs missing	1,945 (10.4)
Total	**18,732 (100)**

In all cohorts those children who were living with their natural or adoptive married parents in one wave, who then experienced divorce but then the mother remarried before the next wave of data collection were recorded as having experienced parental separation. The distribution of parental separation in the variables used in the analysis in this thesis are given later.

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[15] At age 5 years 2 participants reported parental divorce but no change in mother figure and 16 participants reported parental divorce but no change in father figure. At age 10 years 5 participants reported that their parents had separated and 16 reported their parents had divorced but no change in mother figures was given. Also age 10 years 7 participants reported that their parents had separated and 73 participants reported that their parents had divorced but indicated no change in father figures. At age 16 years 5 people reported parental separation and 3 people reported parental divorce but no change in parental figures.

Fig. 6.2 - Derivation of parental separation variables in the BCS70

Birth sweep	N
Mother married[16]	15,914
Missing mother's marital status	1,553
Mother not married	1,265
Total	**18,732**

Age 5 sweep	N
Parental separation	309
No separation	11,717
Missing some items	11
Missed sweep	3,877
Total	**15,914**

Age 10 sweep	N
Parental separation	1,070
No separation	10,683
Missing some items	875
Missed sweep	2,977
Total	**15,605**

Age 16 sweep	N
Parental separation	513
No separation	6,444
Missing some items	2,170
Missed sweep	5,408
Total	**14,535**

---

[16] The shaded cells represent the sub-sample of participants who were considered in the following sweep

6.2 Psychological distress

Psychological distress, the outcome in this project, was measured when members of all three cohorts were in their early 30s. Relatively little is known about how parental separation affects psychological health at this stage of the life course as much research has focussed upon early adulthood and therefore this period was chosen in order to address this gap in knowledge.

6.2.1 Psychological distress in the NSHD

In the NSHD the measure of psychological distress available at age 36 years (1982) was a shortened version of the Present State Examination (PSE; see appendix 1). This is known to be a reliable measure of psychological distress in population samples, capturing symptoms of anxiety and depression in the past month (Rodgers and Mann 1986). This is comprised of 52 items of the original 140-item PSE, three items regarding affect over the previous year and an item regarding treatment seeking for 'nerves'. The index of definition (ID) of this measure was used (a measure of severity of psychological distress which was derived by Wing using a complex computer algorithm (Wing and Sturt 1978)). This measure ranges from 1 to 7 points with a higher score indicating greater severity. Those who scored 5-7 points were classified as being psychologically distressed in line with other studies (Banks 1983; Cooper et al. 1988; Friedman 1989; Gath, Cooper and Day 1982; Rodgers 1990; Rodgers and Mann 1986; Wing, Nixon, Mann and Leff 1977). This cut-off is known to correlate well with GP consultation for mental health problems and self-reports of 'nervous or emotional trouble or persistent depression' (Rodgers and Mann 1986) and to be indicative of the presence of moderately severe key affective symptoms (Wing, Mann, Leff and Nixon 1978; Wing 1980).

Data were missing on 2,040 participants who were not in the study in 1982 and 29 participants did not have information on the PSE during this sweep. Figure 6.3 shows the distribution of ID scores for the remaining participants (3,293). In general women were more likely to experience higher levels of psychological distress than men and the majority of participants were not psychologically distressed. The proportion of participants scoring above the threshold of 5 points was 6.3%.

Fig. 6.3 - Distribution of Present State Examination index of definition in the NSHD
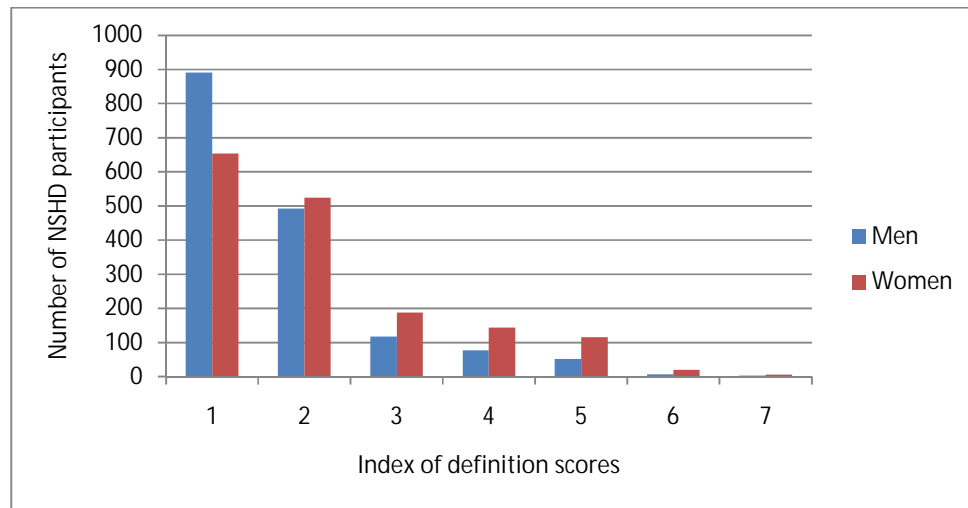
6.2.2 Psychological distress in the NCDS and BCS70

In the NCDS at age 33 years and the BCS70 at age 30 years Rutter's Malaise Inventory is available[17]. This was derived from the Cornell Medical Index Health Questionnaire (Brodman et al. 1949). This measure is also known to have a better level of specificity for identifying psychiatric disorder than the General Health Questionnaire (GHQ) which is available at later sweeps in adulthood (Sacker and Wiggins 2002). The Malaise Inventory is comprised of 24 items (yes/no responses) which cover disturbance and somatic symptoms (Rutter 1970) (see appendix 2). Cronbach's alpha for the 24-item scale was found to be 0.80 in both cohorts, representing a reasonable level of internal consistency. The Malaise Inventory is sometimes used as two factors – one psychosomatic and one emotional – however this has been found to be no better at differentiating those with psychiatric disorder than the full 24-item scale (Rodgers et al. 1999). Therefore the total affirmative answers were summed giving a score out of 24. The distribution of total scores in the NCDS and BCS70 are given in figures 6.4 and 6.5. 11,192 participants in the NCDS and 11,101 participants in the BCS70 had complete information on the Malaise Inventory at age 33 and 30 years respectively.

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[17] Please note that the full Malaise Inventory was not available in the BCS70 at age 34 (the sweep closest in age to the NCDS at age 33) and this is why the BCS70 age 30 sweep was chosen as the outcome wave. The age 34 sweep only contains a reduced 9-item version of the Malaise Inventory as opposed to the full 24-item version

Fig. 6.4 – Distribution of Malaise Inventory Scores in the NCDS
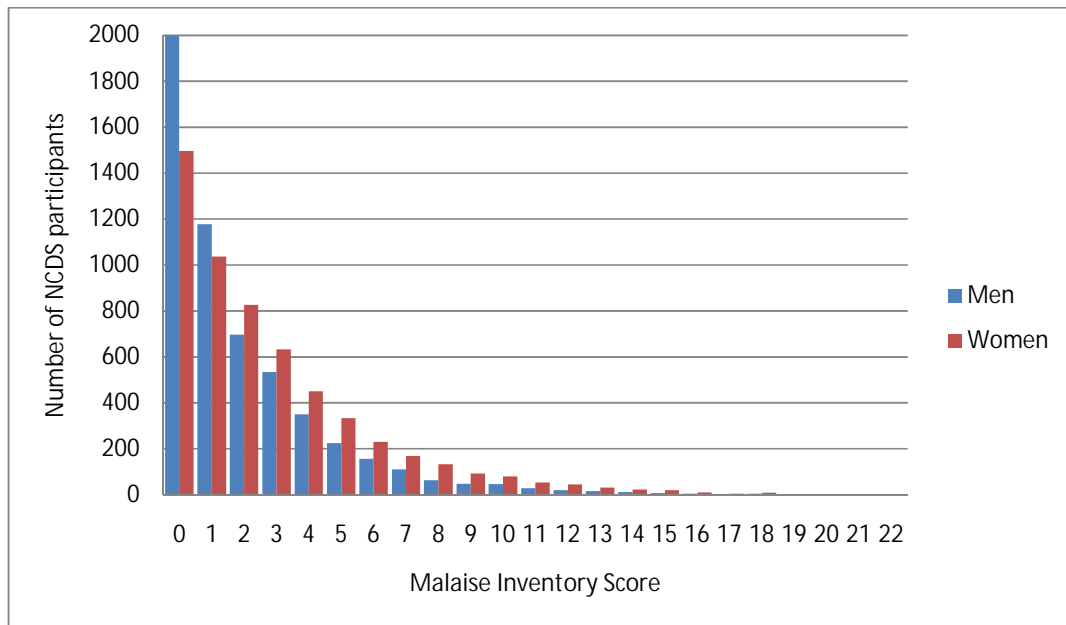
Fig. 6.5 – Distribution of Malaise Inventory Scores in the BCS70
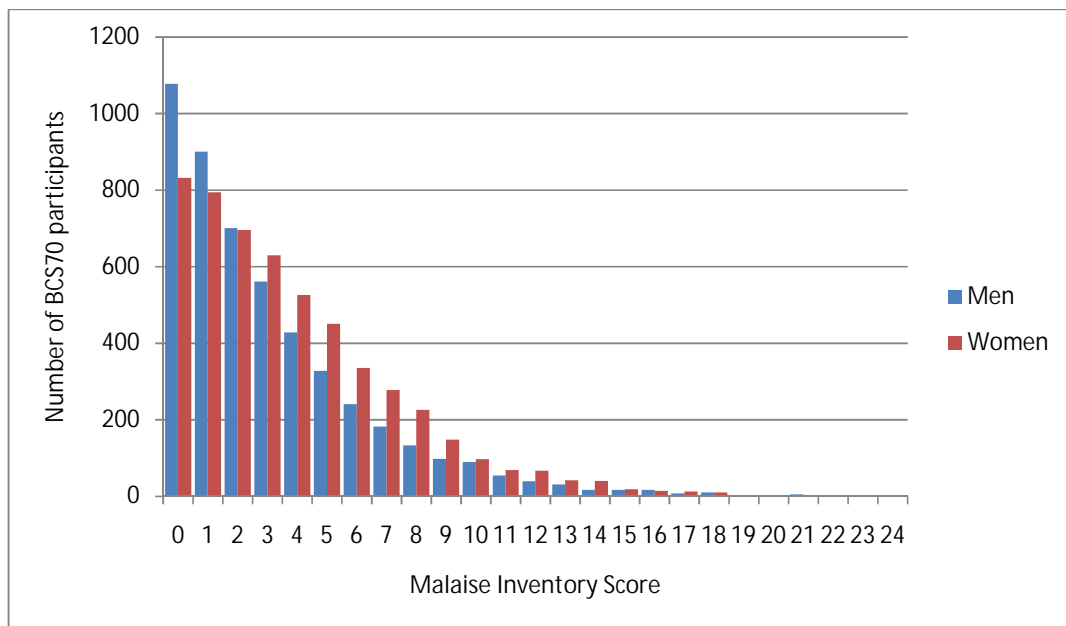
Malaise scores ranged from 0 to 22 in the NCDS (nobody scored 23 or 24 points across the scale) and from 0 to 24 in the BCS70. Again it can be seen that women are more likely than men to have higher scores and therefore are more likely to be psychologically distressed in both cohorts. In addition it appears that psychological distress is higher in the BCS70 than in the NCDS and this is shown more clearly in the descriptive statistics table (see chapter 8, table 8.2). Malaise scores in both cohorts were highly positively skewed and in light of this distribution and the comparability with the NSHD it was decided that a binary score indicating psychological distress would be most appropriate. As used in previous studies a score of 0-7 on the Malaise Inventory indicated no psychological distress and 8-24 indicated psychological distress (Rodgers et al. 1999). In addition it would have been good to have investigated the continuous score however this would have involved the use of zero-inflated regression which was not a possibility in combination with multiple imputation. Whilst the comparability of measures may be a concern between the NSHD and the two later cohorts these three measures of psychological distress have previously been used in comparative cohort work (Wadsworth et al. 2003b). One of the limitations of secondary data analysis is the restricted availability of measures (this is discussed further in chapter 13).

6.3 Material pathways

As previously mentioned the material pathway in this thesis is thought to act through three factors – adolescent material disadvantage, educational attainment and adult material disadvantage. The derivation of each of these is described in turn.

6.3.1 Adolescent material disadvantage

The first variable thought to lie on the material pathway is adolescent material disadvantage. This is measured at age 16 years following parental separation and is comprised of 7 variables in the NCDS and 5 variables in the BCS70. It has been suggested that a combination of subjective and objective measures of economic circumstances is required in studies investigating the impact of disadvantage on the family (White and Rogers 2000) and hence this approach is taken in this project.

Material and relational pathways were only investigated in the NCDS and BCS70 as the NSHD data were only offered for use of testing cohort differences in the association between parental separation and adult psychological distress. In the NCDS housing tenure, overcrowding, access to household amenities, financial hardship, free school

meal receipt, benefit receipt and whether the child shared a bed with others were all used to derive a single measure of material disadvantage. In the BCS70 the same indicators were used, with the exception of free school meal receipt and whether the child shares a bed with others, which were not available.

In both cohorts housing tenure was coded as follows: 0=owns, 1=rent-free, 2=council-rented, 3=privately-rented, 4=other. Overcrowding was measured by calculating the persons to room ratio. Those households with a ratio greater than 1.5 were coded as "overcrowded" in line with the definition of overcrowding for Great Britain (Office of the Deputy Prime Minister 2004) and that previously used in other studies (Congdon et al. 2001; Essen, Fogelman and Head 1978; Williams and Lloyd 1990). For access to household amenities a score was created by summing responses for individual amenities (access to bathroom, indoor lavatory and hot water supply) coded as 0=sole use, 1=shared use or none. The total score in this variable therefore ranges from 0 for sole use of all amenities to 3 for no access or shared access to all.

Financial hardship is a subjective measure of disadvantage. Whether the family had experienced financial hardship in the past 12 months was asked as part of the parental interview and responses were coded 0=no and 1=yes. Information on free school meal receipt and whether the child shares a bed with others was also collected in this way in the NCDS and was coded similarly.

In order to be able to compare benefit receipt between cohorts where different benefits were available, a summary binary variable was created whereby those receiving benefits associated with disadvantage were coded as 1 and others coded as 0 (i.e. not inclusive of universal benefits, such as child benefit). Benefits associated with disadvantage at age 16 years in the NCDS were:

- Supplementary benefit
- Unemployment benefit
- Disability pension
- Family Income Supplement

In the BCS70 those coded as receiving benefits associated with disadvantage were in receipt of the following:

- Supplementary benefit

- Unemployment benefit

- Housing benefit

- Rent or rates rebate

- Disability pension

- Attendance allowance

- Family Income Supplement

6.3.1.1 Derivation of a single measure of material disadvantage

The distribution of all the components of the material disadvantage scores are shown in chapter 8. All of these indicators of material disadvantage were combined into a single measure using multiple correspondence analysis (MCA). This data-reduction method was used as it is able to reduce various types of variables, including nominal categorical variables such as housing tenure, into a single measure and therefore is more appropriate than principal components analysis (PCA) which was designed to deal with continuous variables (Booysen et al. 2008; Howe, Hargreaves and Huttly 2008). The first component before rotation was taken as this accounts for the vast majority of the variance in either cohort (see below). The derived weights from MCA are shown below for the NCDS and BCS70. Each component of the index contributes towards the material disadvantage measure; those with positive values reflect lower material disadvantage and those with negative values reflect higher material disadvantage. Material disadvantage scores were then divided into a binary variable (50:50 split) in order to assist with comparisons between cohorts and to overcome the high degree of negative skew present (see chapter 8).

Table 6.3 – Material disadvantage variables and weights obtained from MCA in the NCDS

Variable	Categories	Weights
Overcrowding	No crowding (<1.5 ppr)*	0.340
	Overcrowded (≥1.5 ppr)	-2.262
Child shares bed	No	0.204
	Yes	-2.720
Financial hardship	No	0.373
	Yes	-3.733
Free school meals	No	0.394
	Yes	-4.411
Housing tenure	Owner occupied	0.878
	Tied to occupation	-2.185
	Council rented	-1.083
	Privately-rented	0.305
	Other	-0.564
Benefit receipt	No	0.420
	Yes	-3.426
Household amenities (score)	0	-0.012
	1	0.247
	2	-0.214
	3	0.361
Variance explained = 84.63; Mean=-0.09; Median=0.19; Range: -7.22, 1.15		

*Persons per room ratio

Table 6.4 – Material disadvantage variables and weights obtained from MCA in the

BCS70

Variable	Categories	Weights
Overcrowding	No crowding (<1.5 ppr)*	0.125
	Overcrowded (≥1.5 ppr)	-3.163
Financial hardship	No	0.465
	Yes	-2.902
Housing tenure	Owner occupied	0.639
	Tied to occupation	0.861
	Council rented	-2.453
	Privately-rented	-0.612
	Other	-2.100
Benefit receipt	No	0.750
	Yes	-2.279
Household amenities (score)	0	0.023
	1	-1.202
	2	-2.284
	3	-1.003
Variance explained = 84.45; Mean=-0.08; Median=0.68; Range: -4.57, 1.27		

*Persons per room ratio

6.3.2 Educational attainment

Educational attainment was measured as the highest qualification achieved by age 23 years (1981) in the NCDS and age 26 years (1986) in the BCS70. This variable is coded as follows: 0 "no qualification", 1 "CSE 2-5/O-level/NVQ1-2", 2 "A-level/NVQ3", 3 "higher qualification or above/NVQ4+". The distributions of this variable in the different cohorts are given in chapter 8.

6.3.3 Adult material disadvantage

Two indicators of adult material disadvantage were used at age 33 years (1991) in the NCDS and 30 years (2000) in the BCS70 – adult occupational social class (RGSC) and housing tenure. Participant's own social class was coded as follows: 0 "professional (I)", 1 "managerial/technical (II)", 2 "skilled non-manual (IIINM)", 3 "skilled manual (IIIM)", 4 "semi-skilled manual (IV)" and 5 "unskilled manual (V)", and referred to their current or most recent job. For those participants who reported that this was "not applicable" the current or most recent social class of their partner was used where the participant was partnered and this information available. Housing tenure was coded as 0 "owns or has a mortgage", 1 "social housing", 2 "privately-rented" and 3 "other". Descriptive statistics on these variables are given in chapter 8.

6.4 Relational pathways

The relational factors thought to be involved in the association between parental separation and adult psychological distress are parent-child relationship quality, peer relationship quality and adult partnership status. These are each considered in turn.

6.4.1 Parent-child relationship quality

In the NCDS two Likert-scale variables are available at age 16 years (1974) regarding the quality of parent-child relationships: "I get on well with my mother" and "I get on well with my father". The two variables were combined to create a mean score of parent-child relationship quality. Where the score for the mother was missing the score for the father was taken if a father figure was present and vice versa. The score ranges from 1 "very good" to 7 "very poor".

In the BCS70 a wider range of questions regarding parent-child relationships were included in the age 16 year sweep (1986) of the BCS70, some of which are based upon the Parental Bonding Instrument (Parker, Tupling and Brown 1979; Parker 1990). Many

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of the items of the Parental Bonding Instrument were developed with attachment security in mind and are therefore appropriate for use in this thesis. The items in the BCS70 which are thought to relate to parent-child relationship quality are:

- My parents are understanding
- My parents are loving/caring/look after me
- My parents are helpful/good in a crisis

Exploratory factor analysis was undertaken to see whether these three variables could be combined into a latent variable capturing parent-child relationship quality. The results of this analysis identified a single factor with an eigenvalue of 1.10. Orthogonal rotation was conducted because there was a low level of correlation between variables and the resulting factor loadings are as a follows: my parents are understanding (0.63), my parents are loving (0.55) and my parents are helpful in a crisis (0.63). Parent-child relationship quality scores were divided into tertiles with increasing categories relating to poorer quality parent-child relations (see chapter 8).

6.4.2 Peer relationship quality

In order to tap into the concept of attachment security at age 16 years a measure of peer relationship quality was used in addition to parent-child relationship quality. The Rutter behaviour scale is available in both the NCDS and BCS70 at age 16 years. In both cases it is available in the scale A format (form completed by a parent during a home interview) and consists of 18 items in the NCDS and 19 items in the BCS70 (the extra item is "sometimes takes things belonging to others"). This scale is intended to measure psychosocial difficulties and is usually taken as a whole with a high score indicating psychosocial problems. Certain items of this instrument deal with peer relationships and these were extracted for use in this thesis. These items are as follows:

- Frequently fights or is extremely quarrelsome with other children
- Not much liked by other children
- Tends to do things alone, rather solitary
- Bullies other children

With regards to comparability of the Rutter behaviour scales between cohorts there is some slight difference in the wording of questions (see appendices 2 and 3) but the

ordering of the items is the same in both cohorts. There has been some change in the wording of the response categories over time but the response categories are the same at age 16 years – 0 "does not apply", 1 "applies somewhat" and 2 "certainly applies". For the purposes of this project categories 1 and 2 have been combined as there were very few participants in the latter category.

An exploratory factor analysis was undertaken in order to see how well these four variables would work together as a single variable. The results suggest that these items don't work particularly well together (eigenvalue in the NCDS=0.64; eigenvalue in the BCS70=0.80). Consequently it was decided to use these as four separate items which capture different aspects of peer relationship quality. Table 8.5 in chapter 8 gives the descriptive statistics of these variables.

6.4.3 Adult partnership status

Participant's partnership status was taken at age 33 years in the NCDS (1991) and age 30 years (2000) in the BCS70. This variable was derived from the participant's legal marital status and cohabitation status. This allowed for the identification of those who were cohabiting or separated which legal marital status does not cover. Adult partnership status was coded as follows: 0 "cohabiting", 1 "single", 2 "married (1st marriage)", 3 "remarried" and 4 "separated/divorced". Those who were widowed by this point were included in the category of married as this form of partner loss was not caused by relationship breakdown (NCDS: n=21; BCS70: n=6).

6.5 Covariates

As previously mentioned, it is likely that socioeconomic or material disadvantage may precede parental separation (see section 2.3.1.1). The cohorts used in this thesis were all initiated as medical studies (see chapter 5) and therefore did not collect much information on social or economic factors. The only comparable measure available at birth in all three cohorts was father's social class. This was measured using the RGSC schema and in the NCDS and BCS70 is coded as follows: 0 "professional (I)", 1 "managerial/technical (II)", 2 "skilled non-manual (IIINM)", 3 "skilled manual (IIIM)", 4 "semi-skilled manual (IV)" and 5 "unskilled manual (V)". In the NSHD father's social class at birth is only available as 0 "non-manual" and 1 "manual". Those who were reported as being "unemployed or sick" in the NCDS (n=5) and "other" in the BCS70 (n=471) were included in social class V as they are likely to be disadvantaged.

Several *a priori* confounders were included in this study. The first was the age of mother at the time of birth of the cohort child. Having young parents is likely to indicate a young age at partnership or marriage (the sample of parents in this study are all married or in a stable relationship) which is known to be associated with increased risk of divorce (see section 2.3.1.1). In addition having young parents is likely to increase the risk of psychological distress as it is a marker of disadvantage (Berrington et al. 2005; Levine, Pollack and Comfort 2001; Marshall and Joyce 2007; Pogarsky, Thornberry and Lizotte 2006). Only mother's age was used as father's age was not available in all three cohorts. Mother's education at the time of birth of the cohort child was also controlled for in the analysis as education is known to be correlated with divorce risk (see section 2.3.1.1) and again is a marker of disadvantage in childhood which is correlated with psychological distress (Amato and Booth 1991a; Amato and Sobolewski 2001; Shaw et al. 2007). This variable was coded as: 0 "stayed at school beyond minimum school leaving age" and 1 "left school at or before minimum leaving age".

Mother's psychological distress was also controlled for in this project in order to control for genetic associations between maternal depression and offspring depression (Eaves et al. 1997), and this has been done in previous studies (Gilman, Kawachi, Fitzmaurice, and Buka 2003a; Gilman, Kawachi, Fitzmaurice, and Buka 2003b). In the NSHD the Maudesley Personality Inventory was used when the child was aged 15 years (the earliest age when a measure of mother's psychological distress was available). This has a range of 0-6 and was self-reported by the mother. In the NCDS information on the mother's psychiatric illnesses was taken as part of the parental interview at age 11 years and in the BCS70 the mother's score on the Malaise Inventory from the age 10 sweep was taken. The Malaise Inventory at this sweep took a different form to that used as the outcome at age 30 years. Instead mothers were asked to mark on a horizontal line, as part of the maternal self-completion questionnaire, the frequency with which they experienced each symptom of the Malaise Inventory. An example of this is given in figure 6.6 below. The position along each line was then translated into a score from 0 "seldom or never" to 100 "most of the time" by the survey's coders. The total sum of these scores across all items was taken and then divided by 100 in order to provide a scale which was approximate to that used as the outcome in both the NCDS and BCS70 when participants were in their 30s. The same cut-off points were then used to the outcome stages (0-7 "not distressed", 8-24 "distressed"). This approach has been taken

by others before and is thought to give a good approximation to the alternative response mode more frequently used (such as for the outcome in this project) (Nicholls and Viner 2009; Viner and Hotopf 2004).

Fig. 6.6 – Mother's Malaise Inventory response mode in the BCS70 1980
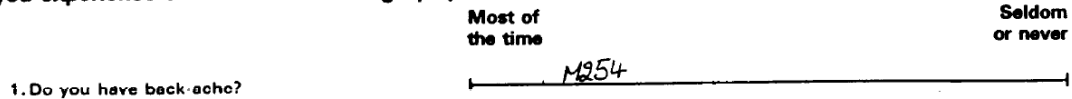
Source: (CLS 1980), p. 10

As mentioned these factors are all *a priori* confounders and many previous studies investigating the association between parental separation and adult psychological distress have controlled for these factors (Amato 1991; Amato, Spencer Loomis, and Booth 1995; Amato and Booth 1991a; Amato and Sobolewski 2001; Gahler 1998; Gilman, Kawachi, Fitzmaurice, and Buka 2003a; Gilman, Kawachi, Fitzmaurice, and Buka 2003b; Glenn and Kramer 1985; Huurre, Junkkari, and Aro 2006; McLeod 1991; O'Connor et al. 1999; Ross and Mirowsky 1999; Yagla Mack 2001).

Gender is also used in this project and this was taken as the sex of the child at birth as this was the most completely observed of those available. This was coded as 0 for men and 1 for women. In the NCDS the gender of the child was missing for 3 participants. These 3 participants dropped out of the study after the birth sweep and so this information could not be taken from later sweeps. In the BCS70 the gender of the child was recorded as "not stated" for 3 children and "not known" for 7. Only one individual with a missing gender value remained in the study after the birth sweep and this allowed for a gender value to be taken from a later sweep for this participant.

A flag variable has been created to indicate those with complete data on all variables used in this analysis (coded 0) and those excluded from the analysis (coded 1). This variable is used to formally test how representative a complete cases analysis would be (see section 7.1). A cohort variable was also created which coded NSHD participants as

0, NCDS participants as 1 and BCS70 participants as 2 allowing for all three cohorts to be pooled together to test the first objective of this thesis (testing changes in the association between parental separation and psychological distress over time) and for the NCDS and BCS70 cohorts to be pooled to test later hypotheses.

Chapter 7 Missing data

Missing data is potentially a major problem in longitudinal studies, such as the cohorts used in this thesis. People may miss sweeps ('sweep non-response') or may not answer individual items included in a sweep ('item non-response'). If an individual drops out of the study and does not return this is described as a 'monotonic' pattern of missingness. It is also possible in a study, such as the birth cohorts, that individuals come and go and this is described as 'non-monotonic'. In the datasets used in this study missing data is due to a combination of both sweep and item non-response and also a mixture of monotonic and non-monotonic patterns.

7.1 A comparison of complete and incomplete cases

Missing data is a particular problem for longitudinal studies where the probability of missingness increases with each successive sweep of data collection (Abraham and Russell 2004). In studies such as this which, in the case of the NCDS and BCS70, utilise six sweeps of data collection (sweeps 0-5) there is likely to be a large proportion of missing data, particularly if many variables are used. This accumulation of missing data can lead to a significantly reduced number of participants with complete data who differ from those excluded and may therefore result in bias and reduced representativeness. If missing values were ignored in this thesis and a complete cases analysis[18] carried out, this would result in a reduced sample of participants who differ from all those who would be excluded by such an analysis. These differences were investigated by cross-tabulating each analysis variable with the flag variable. Chi-squared tests were used where the analysis variable was binary or categorical, t-tests were used where the analysis variable was continuous and normally distributed, and Wilcoxon rank-sum tests were used where the variable is continuous and not normally distributed.

If a complete case analysis was conducted in the NSHD for objective 1, testing the association between parental separation and adult psychological distress, only 2,574 (48.0%) participants would be used (see table 7.1). The table shows that those with observed data on each variable are unlikely to be representative of the whole sample as they were found to be less likely to have experienced parental separation, those who did experience parental separation were more likely to do so in later childhood, were more

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[18] A complete case analysis only uses those participants who have complete data on every variable used in a study and is a common approach taken in epidemiological research (van der Heijden et al. 2006)

likely to be female and were more likely to be from a manual social class of origin. These results would therefore suggest that a complete case analysis would be inappropriate as the sample of participants with complete and incomplete data differ.

Table 7.1 – NSHD analysis variables by those included and excluded by complete case analyses

Variable	Observed cases N(%)	Excluded sample* N(%)	p value**
Exposure variables			
Parental separation (0-16 yrs)			
No	2,450 (95.2)	2,599 (93.3)	0.003
Yes	124 (4.8)	187 (9.7)	
Age of child at separation (0-16 yrs)			
No separation	2,450	2,599	0.011***
0-7 years	69 (55.7)	133 (71.1)	
8-11 years	23 (18.6)	28 (15.0)	
12-16 years	32 (25.8)	26 (13.9)	
Outcome variable			
Psychological distress (36 yrs)			
No (ID 1-4)	2,413 (93.8)	676 (94.0)	0.787
Yes (ID 5-7)	161 (6.3)	43 (6.0)	
Other variables			
Gender			
Male	1,281 (49.8)	1,534 (55.0)	<0.001
Female	1,293 (50.2)	1,254 (45.0)	
Father's social class (0 yrs)			
Non-manual	1,401 (54.4)	1,591 (57.1)	0.052
Manual	1,173 (45.6)	1,197 (42.9)	
Mother's education (0 yrs)			
Stayed beyond minimum age	235 (9.1)	144 (8.2)	0.261
Left prior to or at minimum age	2,339 (90.9)	1,623 (91.9)	
Mother's age (0 yrs)			
Mean yrs (min, max)	29.0 (16, 48)	29.1 (15, 46)	0.664
Mother's psychological distress			
Median (min, max, IQR†)	1 (0, 6, 3)	1 (0, 6, 3)	0.973

*Excluded sample refers to those participants who have missing data on one or more analysis variables and who would therefore be excluded in a complete case analysis; **p value refers to test of differences in complete cases and excluded sample (chi-square test); ***p value refers to chi-square test only testing age categories (not including the category of "no separation"); †IQR = interquartile range

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A complete case analysis for the NCDS and BCS70 across all objectives would involve 4,390 (26.2%) and 1,749 (11.0%)[19] respectively of the total sample of children whose mothers were partnered at the time of cohort child's birth[20]. Table 7.2 shows the cross-tabulations between the flag variable and all analysis variables in the NCDS and BCS70 which are used across all objectives, and the results of test for differences between these two sub-samples. This shows that those participants who would be included in a complete case analysis in the NCDS and BCS70 differ on almost every analysis variable used in this project compared to those who would be excluded. The direction of bias indicates that those who would be included in a complete case analysis are more advantaged and are more likely to be female. In addition the sample size which would be available for use is substantially reduced in both cohorts and particularly so in the BCS70 where only 11.0% of the sample are available if those with complete data are used. This is far from ideal as it is likely to reduce statistical power and limit planned analyses, such as stratification by gender or by the age of child at time of separation. Therefore this project accounts for missing data with the aim of increasing statistical power and generalisability and reducing bias of the findings of this thesis.

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[19] This particularly high rate of missing data in the BCS70 is likely to be in part due to the schools strike which affected the age 16 data collection phase (see section 5.3.2)

[20] NCDS: N=16,734; BCS70: N=15,914

Table 7.2 – NCDS and BCS70 analysis variables by those included and excluded by complete case analyses

Variable	NCDS Observed cases N(%)	Excluded cases* N(%)	p value**	BCS70 Observed cases N(%)	Excluded cases* N(%)	p value**
Exposure variables						
Parental separation (0-16 yrs)						
No	4,116 (93.8)	5,718 (86.9)	<0.001	1,569 (89.7)	4,875 (74.0)	<0.001
Yes	274 (6.2)	862 (13.1)		180 (10.3)	1,712 (26.0)	
Age of child at separation (0-16 yrs)						
No separation	4,116	5,718	<0.001***	1,569	4,875	<0.001***
Sweep0-sweep1	87 (31.8)	410 (47.6)		22 (12.2)	287 (16.8)	
Sweep1-sweep2	82 (29.9)	238 (27.6)		70 (38.9)	1,000 (58.4)	
Sweep2-sweep3	105 (38.3)	214 (24.8)		88 (48.9)	425 (24.8)	
Outcome variable						
Psychological distress (30/33 yrs)						
No	4,146 (94.4)	5,460 (92.4)	<0.001	1,610 (92.1)	6,902 (86.7)	<0.001
Yes	244 (5.6)	451 (7.6)		139 (8.0)	1,061 (13.3)	
Material factors						
Overcrowding (16 yrs)						
Not crowded (<1.5 ppr)	3,878 (88.3)	5,179 (84.6)	<0.001	1,708 (97.7)	6,187 (95.5)	<0.001
Overcrowded (≥1.5 ppr)	512 (11.7)	945 (15.4)		41 (2.3)	290 (4.5)	
Financial hardship in past yr (16 yrs)						
No	4,054 (92.4)	5,286 (88.1)	<0.001	1,604 (91.7)	5,174 (83.8)	<0.001
Yes	336 (7.7)	712 (11.9)		145 (8.3)	997 (16.2)	
Child shares a bed with others (16 yrs)						
No	4,098 (93.4)	5,608 (91.7)	0.001	-	-	-
Yes	292 (6.7)	510 (8.3)				
Child has free school meals (16 yrs)						
No	4,093 (93.2)	5,412 (88.4)	<0.001	-	-	-
Yes	297 (6.8)	708 (11.6)				

Variable	NCDS Observed cases N(%)	Excluded cases* N(%)	p value**	BCS70 Observed cases N(%)	Excluded cases* N(%)	p value**
Access to hot water supply (16 yrs)						
Sole use	4,301 (98.0)	5,997 (96.7)	<0.001	1,720 (98.3)	6,297 (97.6)	0.067
Shared use/none	89 (2.0)	203 (3.3)		29 (1.7)	154 (2.4)	
Access to bathroom (16 yrs)						
Sole use	4,275 (97.4)	5,993 (96.0)	<0.001	1,719 (98.3)	6,346 (97.7)	0.107
Shared use/none	115 (2.6)	249 (4.0)		30 (1.7)	153 (2.4)	
Access to indoor lavatory (16 yrs)						
Sole use	4,218 (96.1)	5,807 (94.9)	0.004	1,719 (98.3)	6,239 (97.5)	0.050
Shared use/none	172 (3.9)	314 (5.1)		30 (1.7)	161 (2.5)	
Gets benefit associated with disadvantage (16 yrs)						
No	3,968 (90.4)	5,342 (86.2)	<0.001	1,458 (83.4)	4,727 (71.5)	<0.001
Yes	422 (9.6)	853 (13.8)		291 (16.6)	1,886 (28.5)	
Housing tenure (16 yrs)						
Owner occupied	2,375 (54.1)	2,902 (46.5)	<0.001	1,525 (87.2)	4,658 (71.7)	<0.001
Tied to occupation	15 (0.3)	21 (0.3)		25 (1.4)	91 (1.4)	
Council rented	1,830 (41.7)	3,062 (49.0)		37 (2.1)	141 (2.2)	
Privately rented	163 (3.7)	230 (3.7)		155 (8.9)	1,563 (24.1)	
Other	7 (0.2)	31 (0.5)		7 (0.4)	45 (0.7)	
Educational attainment (23/26 yrs)						
No qualifications	416 (9.5)	965 (17.8)	<0.001	28 (1.6)	390 (6.9)	<0.001
CSE 2-5/O-level/NVQ1-2	2,195 (50.0)	2,663 (49.1)		885 (50.6)	3,414 (60.6)	
A-level/NVQ3	837 (19.1)	867 (16.0)		237 (13.6)	553 (9.8)	
Higher qual/degree/NVQ4	942 (21.5)	928 (17.1)		599 (34.3)	1,280 (22.7)	

Variable	NCDS Observed cases N(%)	Excluded cases* N(%)	p value**	BCS70 Observed cases N(%)	Excluded cases* N(%)	p value**
Social class (30/33 yrs)						
I	226 (5.2)	253 (4.7)	<0.001	156 (8.9)	341 (5.4)	<0.001
II	1,464 (33.4)	1,554 (29.0)		729 (41.7)	2,079 (33.1)	
IIINM	1,096 (25.0)	1,215 (22.7)		505 (28.9)	1,475 (23.5)	
IIIM	816 (18.6)	1,186 (22.2)		209 (12.0)	1,452 (23.1)	
IV	635 (14.5)	856 (16.0)		124 (7.1)	742 (11.8)	
V	153 (3.5)	290 (5.4)		26 (1.5)	194 (3.1)	
Housing tenure (30/33 yrs)						
Owner occupied	138 (3.1)	153 (3.0)	<0.001	1,327 (75.9)	5,060 (63.4)	<0.001
Social housing	509 (11.6)	907 (17.6)		83 (4.8)	1,260 (15.8)	
Privately rented	3,702 (84.3)	4,059 (78.7)		198 (11.3)	927 (11.6)	
Other	41 (0.9)	40 (0.8)		141 (8.1)	738 (9.2)	
Relational factors						
Parent-child relationship quality (16 yrs)						
1 (very good)	1,319 (30.1)	1,832 (29.1)	0.007	-	-	-
1.5	536 (12.2)	705 (11.2)				
2	1,622 (37.0)	2,281 (36.3)				
2.5	403 (9.2)	637 (10.1)				
3	321 (7.3)	514 (8.2)				
3.5	113 (2.6)	161 (2.6)				
4	55 (1.3)	111 (1.8)				
4.5	5 (0.1)	27 (0.4)				
5 (very poor)	16 (0.4)	20 (0.3)				
Parent-child relationship quality (16 yrs)						
Mean (min, max)	-	-	-	-0.09 (-0.78, 1.28)	0.02 (-0.78, 1.28)	<0.001
Child frequently fights others (16 yrs)						
Does not apply	3,969 (90.4)	5,374 (86.3)	<0.001	1,630 (93.2)	5,123 (87.6)	<0.001
Applies	421 (9.6)	850 (13.7)		119 (6.8)	724 (12.4)	

Variable	NCDS Observed cases N(%)	Excluded cases* N(%)	p value**	BCS70 Observed cases N(%)	Excluded cases* N(%)	p value**
Child bullies others (16 yrs)						
Does not apply	4,196 (95.6)	5,817 (93.4)	<0.001	1,683 (96.2)	5,421 (92.3)	<0.001
Applies	194 (4.4)	412 (6.6)		66 (3.8)	455 (7.7)	
Child is not much liked by others (16 yrs)						
Does not apply	4,282 (97.5)	5,932 (95.6)	<0.001	1,694 (96.9)	5,395 (93.3)	<0.001
Applies	108 (2.5)	274 (4.4)		55 (3.1)	388 (6.7)	
Child prefers to be alone (16 yrs)						
Does not apply	2,597 (59.2)	3,678 (59.1)	0.909	1,051 (60.1)	3,485 (60.1)	0.978
Applies	1,793 (40.8)	2,551 (41.0)		698 (39.9)	2,318 (39.9)	
Adult partnership status (33 yrs)						
Cohabiting	250 (5.7)	306 (5.3)	<0.001	369 (21.1)	1,760 (21.8)	0.017
Single	342 (7.8)	903 (15.7)		453 (25.9)	2,277 (28.3)	
Married	3,084 (70.3)	3,386 (59.0)		804 (46.0)	3,359 (41.7)	
Remarried	296 (6.7)	423 (7.4)		24 (1.4)	131 (1.6)	
Separated/divorced	418 (9.5)	720 (12.6)		99 (5.7)	533 (6.6)	
Other variables						
Gender						
Male	2,067 (47.1)	6,605 (53.5)	<0.001	734 (42.0)	7,541 (53.3)	<0.001
Female	2,323 (52.9)	5,736 (46.5)		1,015 (58.0)	6,617 (46.7)	
Mother's education (0 yrs)						
Mother stayed beyond minimum age	1,223 (27.9)	2,973 (24.2)	<0.001	812 (46.4)	4,729 (33.7)	<0.001
Mother left at or before minimum age	3,197 (72.1)	9,325 (75.8)		937 (53.6)	9,306 (66.3)	
Mother's age (0 yrs)						
Mean yrs (min, max)	27.5 (16, 47)	27.6 (16, 48)	0.625	26.4 (16, 46)	26.2 (16, 52)	0.169
Mother's psychological distress (10/11 yrs)						
No distress	4,326 (98.5)	9,501 (98.3)	0.319	1,585 (88.7)	8,424 (90.8)	0.006
Psychological distress	64 (1.5)	163 (1.7)		203 (11.4)	858 (9.2)	

Variable	NCDS Complete cases N(%)	Excluded cases* N(%)	p value**	BCS70 Complete cases N(%)	Excluded cases* N(%)	p value**
Father's social class (0 yrs)						
I	226 (5.2)	520 (4.3)	<0.001	132 (7.6)	682 (4.8)	<0.001
II	638 (14.5)	1,490 (12.4)		275 (15.7)	1,606 (11.4)	
IIINM	454 (10.3)	1,129 (9.4)		311 (17.8)	1,574 (11.2)	
IIIM	2,223 (50.6)	6,109 (50.9)		761 (43.5)	6,589 (46.8)	
IV	509 (11.6)	1,469 (12.3)		196 (11.2)	2,197 (15.6)	
V	340 (7.7)	1,275 (10.6)		74 (4.2)	1,429 (10.2)	

*Observed sample refers to those participants who have missing data on one or more analysis variables and who would therefore be excluded in a complete case analysis; **p value refers to test of differences in complete cases and excluded sample (chi-square test); ***p value refers to chi-square test only testing age categories (not including the category of "no separation");

7.2 Mechanisms of missingness

In order to account for missing data an investigation of the mechanisms of missingness is first needed. Data can be missing according to three mechanisms:

1. Missing completely at random (MCAR) – cases are randomly missing from the data, i.e. the reason the data is missing is not due to observed or unobserved data, and we can assume that those missing do not differ from those who were present.

2. Missing at random (MAR) – cases are missing because of some reason which is captured by other variables we have observed and is described fully by variables in the dataset. For example, a cohort member may have a missing value for Malaise Inventory score in sweep 5 which may be because they are psychologically distressed, therefore Malaise Inventory score at sweep 4 would be expected to predict missingness at sweep 5.

3. Missing not at random (MNAR) – data are missing because of some unmeasured phenomenon. This is a difficult situation as the missing data is dependent upon events or variables which have not been recorded (Wayman 2003).

In this thesis the MAR assumption is used given firstly the example of others undertaking similar analyses on the birth cohorts (Ford, Clark, and Stansfeld 2011) and secondly the large amounts of multidisciplinary information collected in these datasets which, if included when accounting for missing data, make this assumption the most plausible (that is, the missingness is likely to depend upon aspects captured by the available variables in the datasets). Although we cannot be certain that the mechanism is entirely MAR (the assumption underlying methods such as multiple imputation), covering as much of the mechanism as possible is likely to produce the most unbiased results (Wayman 2003; White and Carlin 2008) and is likely to be better than those produced by a simple complete case analysis. Also it is better to go with an assumption of MAR rather than MCAR which is highly unlikely to be true in longitudinal studies.

7.3 Methods for dealing with missing data

The identification of the missingness mechanism is important for determining the method which should be used to account for missing data. For example a complete case analysis may be appropriate where the data are MCAR, however this was shown in section 7.1 not to be the case, therefore this approach would not be suitable and may result in the production of biased estimates and reduced statistical power to detect an effect (Klebanoff and Cole 2008).

Where the data are not MCAR, such as in the datasets to be used in this thesis, then imputation methods may be more suitable as results from complete case analyses are likely to be biased and this needs to be corrected in order to draw valid conclusions about the target population. Some simple imputation methods exist whereby a mean or median value for the population as a whole is imputed for every missing value. This is not ideal as it underestimates the true variance in that variable (Perez et al. 2002).

'Hot deck' imputation is sometimes used, whereby subsets of comparable individuals are identified and the mean of the variable is calculated and then imputed for comparable individuals with missing data on that variable. The main limitations of this approach are that a large number of classification variables are likely to be required for which there is complete information and this method assumes that data are MCAR (Perez et al. 2002). Linear regression can also be used to impute missing values on an outcome variable, by including all available predictor variables into a regression model to provide a predicted outcome value which is then imputed. This approach also results in underestimation of variances (Olinsky, Chen and Harlow 2003). One very simple method which is often done in epidemiology is 'last observation carried forward' whereby a value from the previous sweep is imputed for a missing value at the next (Twisk 2007). This method relies upon the MCAR assumption and stability in the observed variable over time (Molnar, Man-Son-Hing, Hutton and Fergusson 2009). A more appropriate, commonly used method is used where there are missing values in several variables called multiple imputation is further described in the next section.

7.4 Multiple imputation

In multiple imputation the missing values of a particular variable are imputed using existing data from other variables. Multiple imputation is relatively easy to carry out in statistical packages, such as STATA. The main difference between multiple imputation

and more simple imputation methods is that it produces several imputed datasets as opposed to a single imputed dataset. This method is particularly appropriate for use in this thesis as it allows one to impute values for a number of variables with missing data simultaneously. There are three steps involved in multiple imputation (Carpenter and Plewis 2011):

1. Creation of M imputed datasets with different representations of the data

2. Statistical analysis conducted on each imputed dataset

3. Combination of results of these analyses to give a single estimate (effectively takes the mean of the estimates produced in step 2) using 'Rubin's rules' (Rubin 1987). This stage is done automatically in STATA, one of the statistical programmes used in this project.

The multiple imputation process is represented by the diagram in figure 7.1.

Multiple imputation typically gives more reliable estimates than the methods described above as it incorporates the uncertainty caused by estimating missing data and consequently this is reflected in the standard errors (UCLA 2011a). This is a more appropriate reflection of the uncertainty introduced by missing values. One of the main strengths of the multiple imputation approach is this combined variance which is greater than the variance which is given by a single imputation method. It has also been shown to provide adequate results in datasets with large proportions of missing data (Abraham and Russell 2004; Wayman 2003). There are a few assumptions underlying multiple imputation. The first of these is that data are MAR (see below for discussion of predictors of missingness). Secondly the multiple imputation uses a multivariate normal model when carrying out the imputation (Abraham and Russell 2004).

Fig. 7.1 – Illustration of the multiple imputation technique
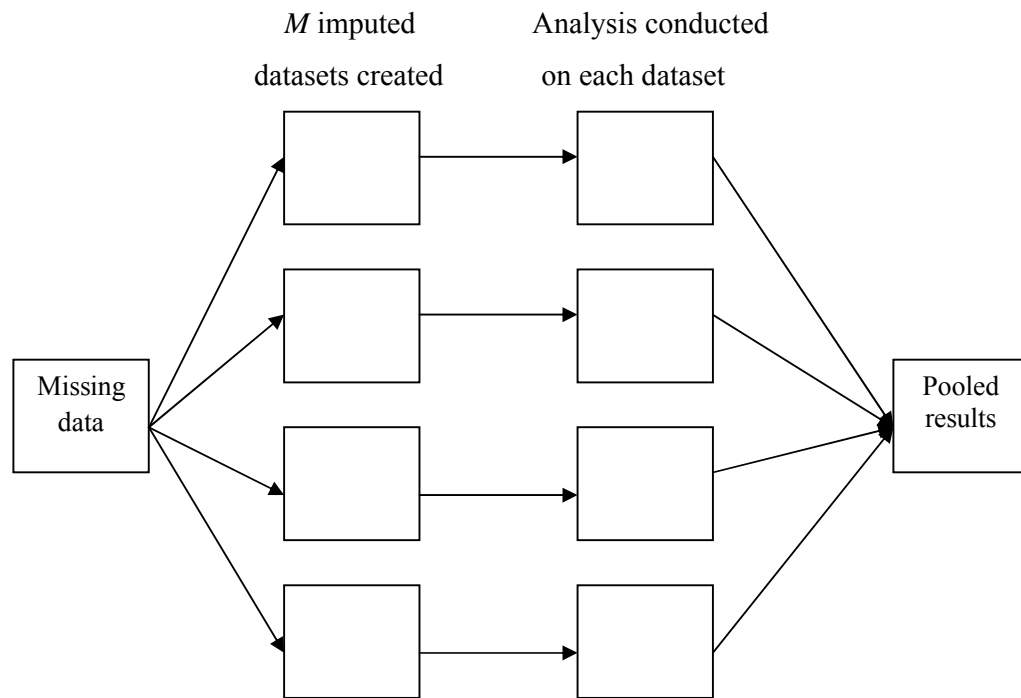
Source: (Twisk 2007), p. 214

7.4.1 Specifying the imputation model

The performance of multiple imputation is highly dependent upon the model specified for the missing data. The imputation model should include variables which will be useful for providing information on filling in the gaps as well as all analysis variables and those found to predict missingness (Johnson and Young 2011). Ideally one should err on side of caution and put as much information as possible into the imputation model, as it is better to put too many variables into the model which don't influence the results, rather than risk excluding an important variable which does act as a predictor of missingness. If an important variable is excluded bias could result (White, Royston and Wood 2011).

To assess which variables predicted missingness the method suggested by Twisk was employed whereby a binary response variable was created with 0 equating to "response" and 1 "missing response" (Twisk 2007). Logistic regression was then used to test the associations between various predictors and this response variable. Following Von Hippel's (2007) recommendations values for missing psychological distress, scores

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were imputed during the multiple imputation but then only those participants with complete data on this were actually used in the analysis ('multiple imputation, then deletion'). This method is thought to produce more efficient estimates and is thought to be more appropriate where there is a relatively large proportion of missingness in the dependent variable (Von Hippel 2007; Young and Johnson 2010), such as in this thesis.

Regression models were then run which investigated which variables predicted values in each variable included in the model. Psychological distress was included in each one as bias can result if the outcome variable is not incorporated in each regression (Johnson and Young 2011; White and Carlin 2008); in particular omission of psychological distress in the imputation model can bias the coefficients of partially-observed variables towards zero (White, Royston and Wood 2011). The tables at the end of this chapter (tables 7.3-7.5) show the variables which were used to impute values for each variable in the NSHD, NCDS and BCS70, along with the proportion of missing values in each. Once this stage was completed the imputation was run.

7.4.2 Running multiple imputation

The specific multiple imputation method used in this study was multiple imputation by chained equations (MICE), or 'full conditional specification', which uses information on each variable to impute values for the other variables (Carpenter and Plewis 2011). This method imputes missing values iteratively using regression equations cycling through all the variables as dependent variables regressed on the others. Each iteration uses values from the previous to predict values of the next (Johnson and Young 2011). One of the key advantages of this method is the ability to specify the level of measurement of each variable (Johnson and Young 2011). This is particularly beneficial in instances where there are a mixture of categorical, binary and continuous variables in the imputation models, such as in this thesis.

With regards to how many imputations to run this is an issue which is currently being debated and it appears that there is no hard or fast rule as to how many imputations should be carried out. It has been suggested by Rubin that typically 3-5 imputations should be carried out and that little information is gained by carrying out more than 5 imputations (Rubin 1987). However Kenward and Carpenter suggest that some studies may require 100-200 imputations, particularly clinical trials (Kenward and Carpenter

2007). 20 imputations seem to be more than adequate for most studies and this is the number that will be used in this project.

MICE is fairly easily implemented in STATA although in a project such as this which uses a large number of variables the regression models to be run in the imputation process have to be specified for each variable. If this was not done the imputation would take a long while to run as the programme is trying to extract too much information from each variable in order to impute another and would consequently produce poor estimates. In order to speed up and improve the quality of the imputation results an option can be added to the end of the STATA command which specifies exactly which variables one wishes to use to impute another and to prevent the programme from using all of them.

Subsequent analyses were only run for those with complete data on the outcome of psychological distress in all three cohorts, using Von Hippel's method of multiply imputing the dependent variable followed by deletion of imputed values on this variable.

7.5 Final sample size

All participants in the follow-up sample (i.e. beyond the birth sweep) of the NSHD were those born to married mothers, therefore the final sample size for analysis in this thesis was 3,293 representing those participants who had complete data on the Present State Examination ID at age 36 years.

In the NCDS, 11,192 participants had a complete Malaise Inventory scores at age 33 years. 510 people, whose mothers were single at time of birth of cohort participant and not in a relationship, were dropped from the analysis due to collinearity problems when running the imputation. This does not affect the analysis as these participants were not included in the current study due to the way that parental separation was defined (including only those whose mothers were married or in a stable union at time of birth). Also 59 people who reported "other" as a category of housing tenure at sweep 2 were not included in the imputation, and subsequently in the statistical analyses, due to collinearity problems in running the imputation. Therefore the final sample size for the NCDS analysis is 10,923.

11,101 participants of the BCS70 had complete information on the Malaise Inventory at age 30 years. Dropping those whose mothers were not married at birth resulted in a final sample size of 10,714.

Table 7.3 Variables included in the imputation model and proportion of missingness in the NSHD

Variable	Description	Sweep	% missingness*	Variable in regression equation
chsc	Childhood social class		4.5	mal5cat fsc0 sep lhqr own50
sep	Parental separation 0-16 yrs	1946-1962	0	NA
sex0	Sex of child	1946	0	NA
fsc0	Father's social class manual/non-manual	1946	0	NA
mothed0	Mother's educational level	1946	10.2	mal5cat fed fac52 id marb nau61 pop59
mothage	Mother's age at birth of cohort child	1946	11.6	mal5cat fsc0 sep nau61 fage
crow46	Overcrowding at age 0 yrs	1946	2.4	mal5cat mothmar fsc50t own48 rep48 crow48
fed	Father's education	1946	11.1	mal5cat mothed byby52 ibppa sep fsc0
aml48	Lack of home amenities age 2 yrs	1948	8.9	mal5cat fage bats48 crow48 lhqr own48
own48	Ownership of house	1948	5.9	mal5cat fsc0 fed own50
rep48	State of repair of dwelling	1948	7.4	mal5cat fsc0 fage lhqr
bats48	Bathroom available for use at age 2 yrs	1948	4.9	mal5cat crow48 sep bats57
crow48	Overcrowding at age 2 yrs	1948	5.3	mal5cat fsc0 crow50
yard48	Has yard or garden at age 2 yrs	1948	5.5	mal5cat yard50 fsc0 crow50
hwat48	Hot water source at age 2 yrs	1948	5.0	mal5cat hwat57 fsc0 crow46
fsc50t	Father's social class at age 4 yrs	1950	7.8	mal5cat sep mam ibppa sled50
crow50	Overcrowding at age 4 years	1950	4.9	mal5cat byby52 yard48 chsc crow48
own50	Ownership of house at age 4 yrs	1950	5.2	mal5cat own48 sep fsc0 CHILC50X LIVC50X
LIVC50X	Housing quality at age 4 yrs	1950	7.3	mal5cat byby52 fage CHILC50X
sled50	Child shares a bed with others age 4 yrs	1950	12.5	mal5cat byby52 own48 marst26
home50	Material home conditions at age 4 yrs	1950	15.4	mal5cat sep fsc0 byby52 fage
yard50	Has yard or garden at age 4 yrs	1950	4.8	mal5cat yard48 crow46 own48
CHILC50X	State of care of house and child at age 4 yrs	1950	13.2	mal5cat bats48 byby52 sep fage own48 chsc
fac52	Lack of home facilities at age 6 yrs	1952	6.8	mal5cat fsc0 aml48 bats48 crow50 own50 LIVC50X
byby52	Sleeping arrangements at age 6 yrs	1952	8.2	mal5cat fsc0 byby54 aml48 home50 own50
byby54	Sleeping arrangements at age 8 yrs	1954	9.7	mal5cat byby52 bats48 crow54 CHILC50X
crow54	Overcrowding at age 8 yrs	1954	9.4	mal5cat crow52 bats48 byby52 nau61 own54
own54	Ownership of house at age 8 yrs	1954	9.2	mal5cat own52 sep nau61 chsc
crow57	Overcrowding at age 11 yrs	1957	10.9	mal5cat crow54 own61 nau61

Variable	Description	Sweep	% missingness*	Variable in regression equation
own57	Ownership of house	1957	10.5	mal5cat bats48 crow54 own61 pads72
aml57	Lack of home amenities age 11 yrs	1957	11.3	mal5cat bats57 sep hwat57 mothage
bats57	Use of bathroom at age 11 yrs	1957	10.5	mal5cat bats48 byby54 crow54 hwat48 nau61
hwat57	Source of hot water at age 11 yrs	1957	10.4	mal5cat bats48 byby54 crow54 hwat48
byby57	Sleeping arrangements at age 11 yrs	1957	23.3	mal5cat byby52 fsc0 crow54
aml57	Lack of home amenities at age 11 yrs	1957	11.3	mal5cat aml48 bats48 crow48 nau61 sep fage
dar59	Dare-devil at 13 years – teacher rating	1959	12.6	mal5cat aml48 fsc0 lhqr
pop59	Popularity with other children age 13 – teacher rating	1959	12.4	mal5cat fsc0 fed marst26
hap59	Happiness at age 13 yrs – teacher rating	1959	13.0	mal5cat anxs61 mothage fsc0 lhqr CHILC50X
mpi61	Mother's psych distress (MPI)	1961	13.9	mal5cat fsc0 sep nau61 byby52 crow57 own57
anxs61	Anxious behaviour at age 15 yrs – teacher rating	1961	19.7	mal5cat sex0 aml57 sep fsc0 crow57 hap59
nau61	Antisocial behaviour (misconduct) age 15 – teacher rating	1961	19.2	mal5cat fsc0 job82 fed LIVC50X hand172
aml61	Lack of home amenities age 15 years	1961	13.6	mal5cat aml48 sep fed aml57
own61	Ownership of house	1961	12.8	mal5cat own57 sep own72 chsc
hwat61	Hot water source at age 15 yrs	1961	12.7	mal5cat sep hwat57 aml57 CHILC50X
byby61	Sleeping arrangements at age 15 yrs	1961	14.6	mal5cat sep byby57 crow61 mothage home50 nau61 own61
bats61	Use of bathroom at age 15 yrs	1961	12.7	mal5cat bats72 byby57 fed own57 marst26
crow61	Overcrowding at age 15 yrs	1961	12.5	mal5cat crow57 sep aml48 fed
hand172	Any illness or handicap	1972	8.3	mal5cat aml61 lhqr marj82 mpi61
marst26	Marital status at age 26 years	1972	5.3	mal5cat sex0 sc82 pads72 nau61 lhqr ibppa crow72 sep
own72	Ownership of house	1972	8.2	mal5cat chsc own61 own82
crow72	Overcrowding at age 26 yrs	1972	15.3	mal5cat sex0 anxs61 lhqr job82 marst26 own72 crow61
ibppa	Basic pay per annum	1972	66.0	mal5cat fsc0 lhqr mothed fed hand172 job82 wkst82 own72 marst26
marb	If divorced/widowed/sep & age at occurrence	1972	8.9	mal5cat marst26 hwat61 lhqr mpi61 sc72c
lhqr	Highest educational attainment (up to 26 yrs)	1972	4.7	mal5cat fsc0 aml57 byby61 fage home50 sc82 sc72c hand172
pads72	Have parents ever been sep or div by age 26 yrs?	1972	8.5	mal5cat nau61 bats61 lhqr sep
sc72c	Social class at age 26 yrs	1972	5.8	mal5cat chsc LIVC50X nau61 wkst82 sc89c
bats72	Use of bathroom at age 26 yrs	1972	8.4	mal5cat bats61 hwat61 nau61 sc72c
mal5cat	Psychological distress (Present State Exam 5-8)	1982	0	hand172 marst26 own72 anxs61 dar59 crow72 crow46 sex0 fed ibppa

Variable	Description	Sweep	% missingness*	Variable in regression equation
id	Index of definition (severity of PSE disorder)	1982	0	NA
marj82	Current marital status at age 36 yrs	1982	2.8	mal5cat bats72 byby61 fed marst26 ibppa pse182
sc82	Social class at age 36 yrs	1982	21.8	mal5cat lhqr crow72 ibppa marst26 pads72 sc89c sc72c
own82	Ownership of house	1982	0	NA
job82	Study member in paid work	1982	0	NA
wkst82	Reason why survey member not employed	1982	0	NA
fage	Father's age in 1982	1982	11.8	mal5cat fsc0 sep own72 mothage
pse182	Physical illness at age 36 yrs	1982	0.3	mal5cat lhqr sc89c hand172
sc89c	Social class at age 42 yrs	1989	10.2	mal5cat fsc0 sc82 lhqr nau61

*% of those with complete data on psychological distress at 1982 sweep (and therefore included in imputation/analysis)

NB variables in regression equation can be cross-referenced with variable and description columns for more detailed information

Table 7.4 Variables included in the imputation model and proportion of missingness in the NCDS

Variable	Description	Sweep	% missingness*	Variable in regression equation
divtime	Timing of parental separation	1958-1974	28	mal5cat n322 fsc0 n553 n545 n2360 mothwell fathwell ben16d fin16 ten16
sex0	Gender	1958	0	NA
fsc0	Father's social class	1958	7.1	mal5cat sclass33 tenure33 n526 n199 n553 n315 ben16d fin16 bed16 ten16 lav16 hqual23
n545	Mother's marital status	1958	5.1	mal5cat n553 n494 divtime n200
n553	Mother's age	1958	5.1	mal5cat n545 n526 n494 n199 ben16d n200 divtime parstat33 fights n5976
n494	Father's age	1958	5.9	mal5cat n553 fsc0 n315 sqfamgrs tenure33 ben16d
n512	Number of persons per room	1958	7.1	mal5cat n494 fsc0 n199 n200 divtime n315 n324 n1151 n2360 ten16 ben16d bed16 hqual23
n526	Mother's father's social class	1958	12.5	mal5cat fsc0 n199 n200 n324 fin16 ten16 hqual23 sclass33
mothed0	Mother's education	1958	6.5	mal5cat fsc0 n553 hqual23 tenure33 fin16 bed16 meals16 ten16 n200
n199	Type of accommodation	1965	12.6	mal5cat n200 lav16 n2360 ten16 divtime n545
n315	Financial difficulties	1965	21.5	mal5cat fin16 n553 divtime n545 ben16d ten16 n512 mhfam1 n1151 meals16 hqual23 n5976
n404	Emotional maladjustment	1965	15.5	mal5cat mhfam1 n5976 n5740 partner33 hqual23 divtime alone16
n144	Child fights others	1965	13.1	mal5cat fights bullies liked sex0 n316 n322 n324 n2885
n200	Housing tenure	1965	12.7	mal5cat n512 fsc0 n1151 ten16 hqual23 n494 n553 divtime bath16 lav16 hot16
n316	Family difficulties – illness/disability	1965	17.9	mal5cat mhfam1 fsc0 n553 ben16d n5740 n5976 hqual23 n322 n324 n512
n322	Family difficulties – domestic tension	1965	23.9	mal5cat divtime n5976 n324 n316 mhfam1 fathwell
n324	Family difficulties – unemployment	1965	18.3	mal5cat divtime n5976 n316 fsc0 n512 n200 fin16 hqual23 ben16d meals16
n135	Child bullies by others	1965	13.5	mal5cat fights liked sex0 alone16 hqual23 n5976 ten16 n322
n134	Child prefers to be alone	1965	13.3	mal5cat alone16 n144 n404 n322
mothmal1	Mother's psychiatric illness	1969	17.4	mal5cat n404 malaise fsc0 divtime bullies hqual23 n5976
n1151	Type of accommodation	1969	14.9	mal5cat n200 divtime n2476 n512 hqual23
n2360	Number of people in household	1974	25.6	mal5cat divtime n553 fsc0 n200 n512 sqfamgrs hqual23 n1151 n315 n324 n322 ben16d ten16 n2476
n2476	Number of rooms in accommodation	1974	26.1	mal5cat divtime n553 fsc0 n200 n512 sqfamgrs hqual23 n1151 n315 n324 n322 ben16d ten16
ben16d	Family receives benefits assoc with disadvantage	1974	25.9	mal5cat divtime ten16 hqual23 meals16 n324 mhfam1 fin16 n512
fin16	Financial hardship	1974	27.2	mal5cat divtime ten16 ben16d n324 n322 n512 hqual23 n2360 malaise n5976 sclass33
bed16	Child shares bed with others	1974	26.4	mal5cat divtime sex0 ben16d fsc0 n200 hot16 ten16 hqual23 n2360
meals16	Child gets free school meals	1974	26.5	mal5cat divtime ben16d ten16 hqual23 bed16 fsc0 n315 n324 fin16

Variable	Description	Sweep	% missingness*	Variable in regression equation
ten16	Housing tenure	1974	25.6	mal5cat divtime ben16d bed16 lav16 bath16 dtenure n199 n315 n2360 n512
bath16	Household amenities – bathroom	1974	25.6	mal5cat ten16 fsc0 n315 n1151 lav16 hot16
lav16	Household amenities – indoor lavatory	1974	26.3	mal5cat ten16 n315 n1151 bath16 hot16 hqual23
hot16	Household amenities – hot water supply	1974	25.8	mal5cat ten16 bath16 lav16 meals16 bed16
bullies	Child bullies others	1974	25.6	mal5cat n144 n135 fights mothwell hqual23 fin16
alone16	Child prefers to be alone	1974	25.6	mal5cat n134 liked hqual23 n5113 parstat33 sex0
liked	Child not much liked about others	1974	25.7	mal5cat alone16 divtime n322 n404 mhfam1 fin16 sex0
fights	Child fights others	1974	25.7	mal5cat n144 n322 n404 bullies sex0 mothwell hqual23 n2884 n2885 n2886
mothwell	Child gets on well with mother	1974	24.4	mal5cat n2886 n2885 n2884 n5976 fathwell sex0
fathwell	Child gets on well with father	1974	24.8	mal5cat n2886 n2885 mothwell divtime n322 parstat33
n2886	Parents disapprove of child's female friends	1974	26.6	mal5cat mothwell fathwell sex0 divtime partner33 hqual23 n2885 n2884 n2883
n2885	Parents disapprove of child's male friends	1974	27.2	mal5cat mothwell fathwell hqual23 fights n135 n2886 n2884 n2883
n2884	Parents ask where child goes in evening	1974	25.1	mal5cat mothwell hqual23 alone16 n2886 n2885 n2883 sex0
n2883	Parents have strong views of child's appearance	1974	25	mal5cat mothwell fathwell sex0 hqual23 n2886 n2885 n2884
hqual23	Highest qualification achieved	1981	6.3	mal5cat divtime sex0 sclass33 tenure33 fsc0 n5976 sqfamgrs bullies fin16 bed16 ten16 ben16d n316
malaise	Malaise Inventory Score	1981	14.3	mal5cat divtime sex0 sclass33 n5976 n315 n404 fathwell
n5113	Legal marital status	1981	14.1	mal5cat divtime sex0 partner33 n2885 n2883 bullies n2360 n553
sqfamgrs	sqrt(family gross income)	1981	14.1	mal5cat sclass33 parstat33 tenure33 fsc0 hqual23
n6149	Current social class	1981	31.4	mal5cat sclass33 fsc0 hqual23 divtime sex0 sqfamgrs dtenure fin16 fights
dtenure	Housing tenure	1981	16.4	mal5cat tenure33 sex0 divtime hqual23 sqfamgrs ten16 ben16d n5113
n5976	Ever in care as a child	1981	14.3	mal5cat divtime n322 mhfam1 fights ben16d n512 n315
n5740	Longstanding illness or disability	1981	14.1	mal5cat sex0 partner33 divtime n404 bullies sqfamgrs hqual23
parstat33	Partnership status	1991	3.3	mal5cat sex0 hqual23 divtime mothwell fathwell sqfamgrs
tenure33	Housing tenure	1991	8.6	mal5cat ten16 dtenure hqual23 sqfamgrs sclass33 n5113 partner33
sclass33	Social class	1991	7	mal5cat n6149 fsc0 hqual23 sex0 tenure33
mal5cat	Malaise Inventory binary score	1991	0	NA
partner33	Has respondent got a partner?	1991	0	mal5cat parstat33 n5740 dtenure n553

*% of those with complete data on psychological distress at 1991 sweep (and therefore included in imputation/analysis)

NB variables in regression equation can be cross-referenced with variable and description columns for more detailed information

Table 7.5 Variables included in the imputation model and proportion of missingness in the BCS70

Variable	Description	Sweep	% missingness*	Variable in regression equation
divtime	Timing of separation	1970-1986	52.9	mal5cat a0005a mothmal1 tenure30 bullies a0018 gb2 gb8_3 gb8_1 gb8_2 lsiany2 ben16b
sex0	Gender of child	1970	8.7	mal5cat
fsc0	Father's social class	1970	9.2	mal5cat sclass30 tenure30 a0018 a0010 a0005a e228b e190 d2 divtime ben16b
a0012	Mother's marital status	1970	8.8	mal5cat fsc0 mothmal1 a0010 a0005a e220
a0010	Father's age leaving education	1970	11.4	mal5cat fsc0 a0009 divtime hqual26 sclass30 d2 mal e264 e190
a0018	Mother's social class	1970	16.9	mal5cat fsc0 a0005a a0010 a0009 sclass30 e190 divtime e228b e224
a0005a	Mother's age at birth	1970	9.2	mal5cat fsc0 a0009 divtime parstat30 e190 relqual16 e228b e225 d2 fights
a0009	Mother's age leaving education	1970	10	mal5cat fsc0 a0005a parstat30 a0010 e190 mothmal1 e228b e225 hqual26
e228b	Persons:room ratio	1975	19.1	mal5cat fsc0 a0018 a0005a d2 e264 e005 a0009 fights sclass30
e190	Highest qualification of parents	1975	19.1	mal5cat fsc0 a0018 hqual26 a0009 a0010 a0005a e220 sclass30 mothmal1 e228b
e224	Availability of hot water supply	1975	19.3	mal5cat e220 a0009 d2 e225 e005
e220	Housing tenure	1975	18.3	mal5cat fsc0 e264 e005 divtime e225 e224 tenure30 a4a_41 ten16 fin16
e264	Standard of furniture & equipment in house	1975	19.6	mal5cat fsc0 e220 e228b sclass30 mothmal1 hqual26 b960421 b960664 ben16b ten16 fin16
e005	Number of people in household	1975	18.1	mal5cat e220 a4a_41 relqual16 divtime a0005a ben16b ten16
e225	Availability of garden or yard	1975	19.8	mal5cat e220 e224 divtime a4a_41 ten16
mothmal1	Mother's Malaise score	1980	23.6	mal5cat mal fsc0 a0018 divtime relqual16 bullies e220
d028	Often fights other children	1980	18.8	mal5cat fights bullies divtime d029 d043 sex0
d043	Often bullies other children	1980	18.7	mal5cat bullies d028 d029 sex0
d2	Housing tenure	1980	13.9	mal5cat fsc0 matdisad16 e264 divtime ben16b ten16
d029	Not much liked by other children	1980	18.9	mal5cat bullies fights liked alone d028 d043 ben16b ten16
ben16b	Family receives benefit assoc with disad	1986	34.1	mal5cat mothmal1 e220 tenure30 hqual26 a0005a divtime a0018 fsc0 fin16 ten16
ten16	Housing tenure	1986	34.9	mal5cat mothmal1 e220 tenure30 hqual26 divtime ben16b fin16 a0018
fin16	Financial hardship	1986	36	mal5cat mothmal1 e220 tenure30 hqual26 divtime ben16b ten16
bullies	Child frequently bullies others?	1986	39.3	mal5cat d043 d028 d029 fights liked alone sex0 mothmal1 divtime
liked	Child not much liked by others?	1986	39.9	mal5cat d043 d028 d029 fights bullies alone
alone	Child prefers to be alone?	1986	39.8	mal5cat d043 fights bullies liked sex0 mothmal1 parstat30
fights	Child frequently fights others?	1986	39.5	mal5cat d043 d028 sex0 mothmal1 bullies liked alone

Variable	Description	Sweep	% missingness*	Variable in regression equation
relqual16	Parent-child relationship factor score	1986	54.1	mal5cat mothmal1 sex0 gb1_1 gb1_5 gb1_10 gb2 gb8_1 gb8_3 divtime parstat30 ge1
a4a_41	No. of people in household	1986	13.8	mal5cat a0005a divtime e228b e005
gb1_1	Parents allow me reasonable freedom	1986	54.1	mal5cat relqual16 sex0 hqual26
gb1_5	Parents do not understand me/my motives	1986	54.1	mal5cat relqual16 gb1_1 gb2 gb8_1 gb8_3
gb1_10	My parents are generous	1986	54.1	mal5cat relqual16 gb2 gb1_1 gb1_3 sex0 divtime a0005a a0018
gb2	How strict are your parents?	1986	54.6	mal5cat relqual16 divtime sex0 e190
gb8_1	Do things together with mother alone	1986	59.5	mal5cat relqual divtime sex0 e190 e005
gb8_2	Do things together with father alone	1986	61.3	mal5cat relqual divtime sex0 e190 e005
gb8_3	Do things with both parents together	1986	58.6	mal5cat relqual16 divtime sex0 e190 e005 gb8_1 gb8_2
ge1	Feelings about living with your parents	1986	54.7	mal5cat relqual16 gb8_3 gb8_1 gb8_2 sex0
hqual26	Highest qualification	1996	35.7	mal5cat fsc0 e190 divtime a0005a a0018 sclass30 parstat30 tenure30
b960421	Housing tenure	1996	32.4	mal5cat tenure30 d2 e220 ben16b fin16
b960664	Standard of living compared to others	1996	32	mal5cat tenure30 sclass30 e264 sex0 parstat30
b960319	Currently in a relationship	1996	32	mal5cat parstat30 sex0 sclass30 divtime
lsiany2	Longstanding illness	1996	0	mal5cat sclass30 tenure30 mothmal1
sclass30	Social class	2000	18.2	mal5cat hqual26 fsc0 a0018 sex0 e220 e190
mal5cat	Malaise score	2000	0	NA
tenure30	Housing tenure	2000	0.8	mal5cat hqual26 sex0 e220 e190 b960421 b960664 ten16 ben16b
parstat30	Partnership status	2000	0	mal5cat hqual26 b960319 sex0 divtime relqual16 mal a0005a

*% of those with complete data on psychological distress at 2000 sweep (and therefore included in imputation/analysis)

NB variables in regression equation can be cross-referenced with variable and description columns for more detailed information

RESULTS

The results of this thesis are structured so that the descriptive results are first presented along with a comparison of observed and imputed data (chapter 8). The remainder of the results are structured by objective and the statistical analysis methods employed to test each objective are described at the beginning of each. Therefore chapter 9 presents the results for objective 1, testing the association between parental separation and adult psychological distress along with cohort, gender and age differences. Chapter 10 presents the results of objective 2, testing material pathways along with cohort, gender and age differences. Chapter 11 presents the results of objective 3, testing relational pathways along with cohort, gender and age differences. Finally chapter 12 presents the results for objective 4, testing whether material and relational pathways are interlinked across the life course and whether they explain the association between parental separation and adult psychological distress.

Chapter 8 Descriptive Results

8.1 Comparing observed and imputed data

The purpose of this chapter is to show the results of the multiple imputation process and to present descriptive findings for all analysis variables used in this project. All tables in this chapter show a comparison of descriptive results for those with all observed data[21] and those with imputed data on each analysis variable used. Only percentages are shown as in the imputed data the number of participants in each category will vary across the 20 imputed datasets created. The frequencies across these two groups in each cohort are very similar, as shown in all tables in this chapter) suggesting that the multiple imputation has been satisfactorily implemented. Please note that the frequencies for fully observed variables are the same as there were no missing values to impute.

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[21] 'Observed data' refers to those who have any information on each variable and is different from being a complete case who has data on every analysis variable

8.2 Descriptive results

8.2.1 Parental separation

Looking at just the imputed data (the data used in the analysis) it can be seen that, in line with societal divorce trends, parental separation appears to have increased over the time period of interest (table 8.1). In fact parental separation appears to have almost doubled between each 12 year period between cohorts (NSHD: 5.7%, NCDS: 9.1% and BCS70: 20.3%). The proportion of parental separation in the BCS70 is particularly high suggesting that just over 1 in 5 children in this cohort experienced separation before the age of 16 years.

Next, looking at the age of the child at the time of separation it can be seen that in the NSHD and NCDS the majority of separations occurred in early childhood (0-7 years; table 8.1). This is in line with the literature on the 'transition to parenthood'. It might have been expected that following the change in law regarding divorce, which was implemented in 1971 when NCDS participants were aged 13 years, that there would have been a larger proportion of separations occurring during the latest inter-sweep period between the ages of 11-16 years in the NCDS, however as seen above this was not the case. It is possible that there was a short lag period following the implementation of the new law which would not have affected the NCDS participants prior to age 16 years (1974). In the BCS70 the majority of separations occurred between age 5 and 10 years (1975-1980) and this fits with the idea of a short lag period between the implementation of the divorce reform act and increased divorces.

Table 8.1 Parental separation in the NSHD, NCDS & BCS70

Variable	NSHD		NCDS		BCS70	
	Observed data %	Imputed data %	Observed data %	Imputed data %	Observed data %	Imputed data %
Exposure variables						
Parental separation (0-16 yrs)						
No	94.3	94.3	91.2	90.9	80.9	79.7
Yes	5.7	5.7	8.8	9.1	19.1	20.3
Age of child at separation (0-16 yrs)[a]						
No separation						
Sweep 0-1	62.8	62.8	39.2	39.4	16.0	16.5
Sweep 1-2	15.5	15.5	29.8	29.5	53.5	54.3
Sweep 2-3	21.7	21.7	31.0	31.1	30.4	29.3

[a]% are only for those who experienced separation

8.2.2 Psychological distress

Next, looking at psychological distress in the mid-30s of participants of each cohort (shown in table 8.2), the reporting of psychological distress appears to have increased over time despite being measured at slightly younger ages (30 years in the BCS70, 33 years in the NCDS and 36 years in the NSHD). The proportion of those reporting distress is similar in the NCDS and NSHD, although it should be noted that different measures of psychological distress have been used. There is a substantial increase in the proportion of those reporting psychological distress in the BCS70 compared to the NCDS and the same measure was used in both cohorts. In addition, the BCS70 participants in this study were 3 years younger than NCDS participants when psychological distress was measured.

Table 8.2 Psychological distress in the NSHD, NCDS & BCS70

Variable	*NSHD*		*NCDS*		*BCS70*	
	Observed data %	**Imputed data %**	**Observed data %**	**Imputed data %**	**Observed data %**	**Imputed data %**
Outcome variable						
Psychological distress (30/33/36 yrs)						
No	93.8	93.8	93.2	93.2	87.4	87.4
Yes	6.2	6.2	6.8	6.8	12.7	12.7

When psychological distress measures were cross-tabulated with gender (see fig. 8.1), it was seen that women were more likely to report this than men and this is in line with previous studies (see section 2.5.1). It also appears that gender differences in psychological distress may be reducing slightly over time, appearing to narrow in the BCS70 at age 30 years compared to the gender differences seen in the NSHD and NCDS.

Fig. 8.1 – Gender differences in psychological distress in the NSHD (36 yrs), NCDS (33 yrs) and BCS70 (30 yrs)
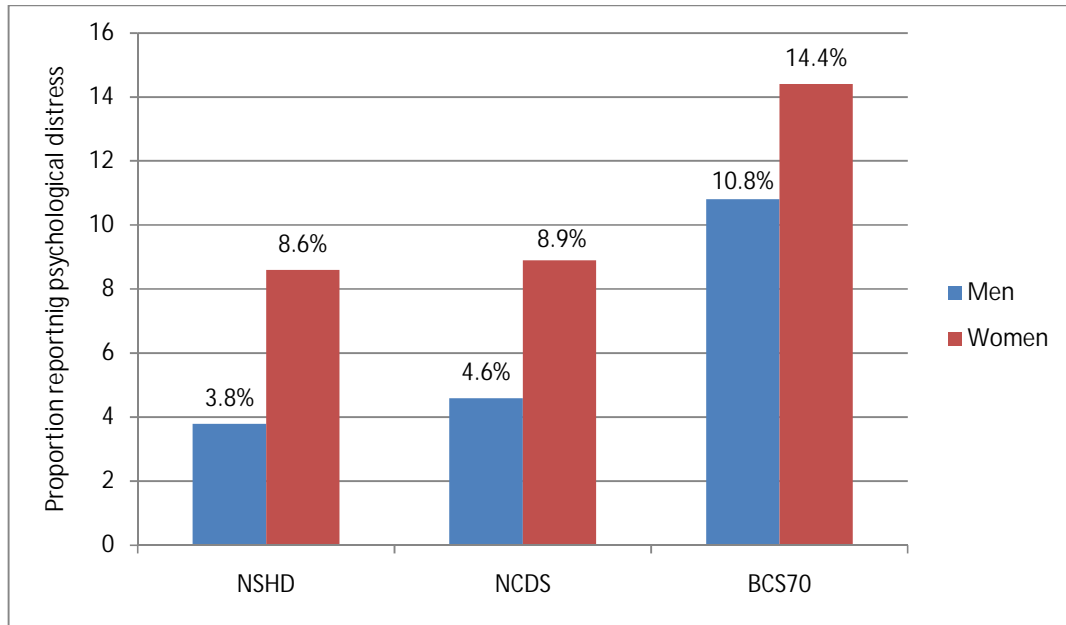
8.2.3 Parental characteristics and gender

The distribution of socio-demographic factors across the three cohorts are shown in table 8.3. Father's social class at birth in the NSHD was classified as either manual or non-manual. It can be seen that most participants (56.1%) came from a household where the father worked in non-manual or agricultural employment, although there were a relatively large proportion of those whose fathers were in manual work (43.9%). This reflects the design of the follow-up sample of the NSHD whereby all participants from the birth sweep were followed if their fathers were in non-manual or agricultural employment and 1 in 4 of all those born to fathers in manual employment. Despite this the high proportion of those in manual employment reflects society at the time, namely the large manual employment sector in post-war Britain (Marwick 2003); the 1951 census, 5 years after the NSHD started, reported that 64% of those working were in manual work (Crompton 1994). This is also in line with the distribution seen for the NCDS where the majority of children were from a manual social positions of origin; just over half of NCDS participants (50.8%) were born to fathers in skilled manual occupations (RGSC social class III). Examples of social class III manual occupations are those in skilled trades, such as electricians, plumbers and mechanics. By 1970 there

were a relatively higher proportion of children born into non-manual social classes but still more than half were born into manual social positions, particularly class III manual.

With regards to mother's education and particularly the proportion of mothers who stay in full-time education beyond the minimum school leaving age[22], it can be seen that in the NSHD just 9.3% of participants had mothers who stayed in full-time education beyond this age. This proportion is very low compared to the two later cohorts where 26.1% of NCDS participants' mothers and 36.1% of BCS70 participants' mothers stayed beyond the minimum leaving age[23]. This reflects changes in society and particularly the role of women, with increasing equality in educational and employment opportunities seen over this period (Marwick 2003).

Next looking at the age of mothers across the three cohorts, there appears to have been a decrease in the age of mothers. However this study does not look at birth order and therefore this apparent decrease does not necessarily translate into a reducing age of women at childbearing. Despite this, if these figures are compared to the ONS standardised mean ages of mothers for all birth (regardless of birth order) in 1946 the mean age was 29.1 years, 1958 was 27.6 years and in 1970 was 26.7 years (ONS 2011b). These results are very similar to those seen in the descriptive statistics table and suggest that the age of mothers has decreased over this period and also that the mothers are close to representative of society at the time with regards to age.

There was no alternative but to use different measures of psychological distress in mothers of cohort members. Among the NSHD mothers the median score was 1 on the Maudesley Personality Inventory, representing a very low score on this scale (range 0-6). Just 1.6% of mothers of NCDS participants reported the diagnosis of a psychiatric illness. In the BCS70 the Rutter Malaise Inventory was available to mothers when the children were aged 10 years and 9.8% of mothers reported psychological distress. Finally looking at gender it can be seen that there are roughly equal proportions of men and women in the analysis samples across all three cohorts.

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[22] The minimum school leaving age for NSHD mothers would have been 14 years as detailed in the 1918 Education Act ('Fisher Act'), implemented in 1921.

[23] The minimum school leaving age for the majority of NCDS and BCS70 mothers would have been 15 years following the implementation of the 1944 Education Act in 1947. The older NCDS mothers may have had a minimum leaving age of 14 years (see previous footnote above).

Table 8.3 – Parental characteristics and gender in the NSHD, NCDS & BCS70

Variable	NSHD Observed data %	Imputed data %	NCDS Observed data %	Imputed data %	BCS70 Observed data %	Imputed data %
Confounders						
Father's social class (0 yrs)						
I	56.1[a]	56.1[a]	4.7	4.8	5.4	5.4
II			13.8	13.8	12.5	12.5
IIINM			10.2	10.2	13.1	13.0
IIIM	43.9	43.9	50.8	50.8	46.4	46.4
IV			12.1	12.0	14.1	14.1
V			8.4	8.5	8.5	8.7
Mother's education (0 yrs)						
Stayed beyond minimum age	9.2	9.3	26.1	26.1	35.9	36.1
Left at or before minimum age	90.8	90.7	73.9	73.9	64.1	63.9
Mother's age (0 yrs)						
Mean (range, standard deviation)	29.1 (15-48, 5.7)	29.0 (15-50, 5.7)	27.7 (16-47, 5.6)	27.7 (16-48, 5.6)	26.0 (16-50, 5.7)	26.0 (16-50, 5.7)
Mother's psychological distress (10/11/15 yrs)						
Not distressed	1 (0-6, 3)[b]	1 (0-6, 3)[b]	98.4	98.4	90.6	90.2
Distressed			1.6	1.6	9.4	9.8
Other variables						
Gender						
Male	49.8	49.8	49.4	49.4	48.6	48.8
Female	50.2	50.2	50.6	50.6	51.4	51.2

[a]Father's social class in NSHD is manual/non-manual; [b]Median (range, interquartile range)

8.2.4 Material factors

Only the NCDS and BCS70 are used in the analyses involving material factors (previously mentioned in section 3.1). The distribution of material factors within these two cohorts are shown in table 8.4. Material disadvantage scores at age 16 years were split into two categories so that approximately 50% of the sample was in each. It is therefore not possible to compare across cohorts but it will be possible to compare the magnitude of the association between parental separation and material disadvantage and this is presented in chapter 10.

Table 8.4 – Material factors in the NCDS & BCS70

Variable	NCDS Observed data %	Imputed data %	BCS70 Observed data %	Imputed data %
Material factors				
Material disadvantage score (16 yrs)				
More advantaged	52.6	51.7	39.4	45.5
More disadvantaged	47.4	48.4	60.6	54.6
Educational attainment (23/26 yrs)				
No qualifications	13.6	13.7	4.8	6.0
CSE 2-5/O-level/NVQ1-2	49.6	49.7	58.9	60.6
A-level/NVQ3	17.6	17.5	10.8	10.4
Higher qual/degree/NVQ4	19.3	19.1	25.5	23.1
Social class (30/33 yrs)				
I	5.0	4.9	6.4	6.1
II	31.4	30.9	34.9	34.0
IIINM	23.6	23.5	24.8	24.9
IIIM	20.2	20.3	20.5	21.0
IV	15.4	15.7	10.8	11.2
V	4.5	4.7	2.7	2.9
Housing tenure (30/33 yrs)				
Owner occupied	3.1	3.3	65.1	65.0
Social housing	14.9	15.9	13.9	13.9
Privately rented	81.2	80.0	12.0	12.0
Other	0.8	0.8	9.1	9.1

Educational attainment and the highest qualifications of participants appear to have changed over time. In the NCDS there were a higher proportion of participants with no qualifications (13.7%) than in the BCS70 (6.0%). The majority (60.6%) of BCS70 participants had 2-5 CSE level qualifications whereas less than half (49.7%) of NCDS participants had this same level of educational attainment. Despite these changes, a higher proportion of NCDS participants had A-level or NVQ3 level qualifications than

BCS70 participants. However a larger proportion of BCS70 participants had degree or higher level qualifications by age 26 years (1996) than NCDS participants at age 23 years (1991). These changes in education are consistent with changes in the UK population particularly in the increasing proportion who have a higher qualification, such as a university degree (House of Commons 1999). For example in the UK in 1990/91 there were 1,079,000 people in higher education but in 2000/1 this figure had increased to 2,060,000 (Barnes 2011).

Figure 8.2 shows the stratification of educational attainment by gender in the two cohorts. When educational attainment is stratified by gender, increasing gender equality can be seen over time. In the NCDS women were more likely than men to have no educational qualifications. They were also more likely than men to have CSE/O-level qualifications but less likely to remain in education to gain A-level qualifications. In the BCS70 there is much more equality for men and women with regards to educational attainment and the chart shows that there is little difference between men and women in this respect. The extent to which parental separation affects educational attainment and how this differs for men and women is tested in chapter 10.

Fig. 8.2 – Educational attainment by gender in the NCDS (23 yrs) and BCS70 (26 yrs)
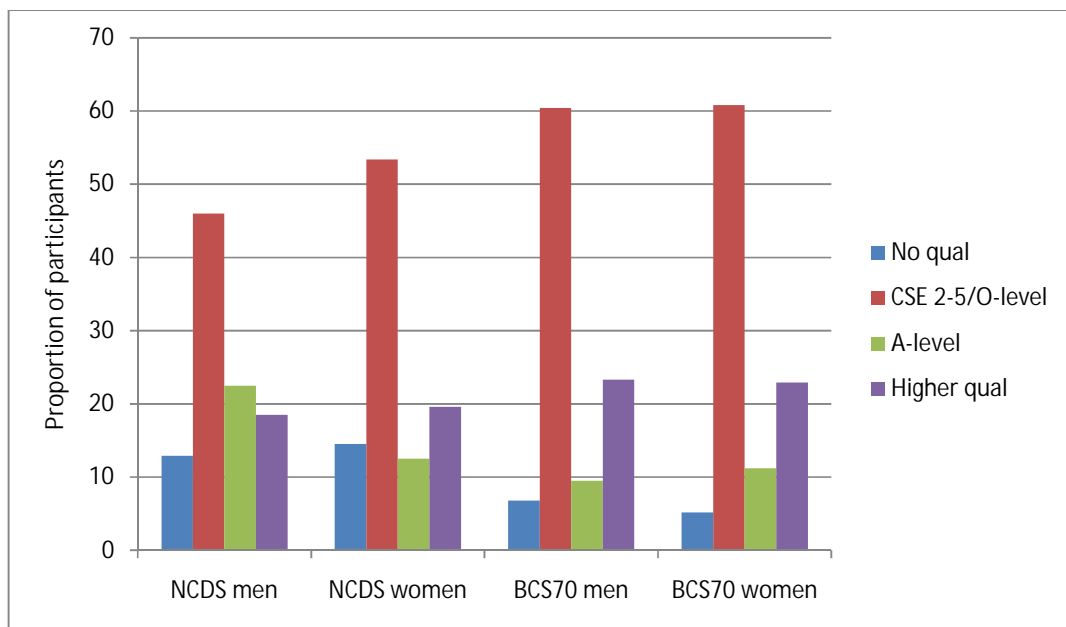
Next looking at social position when NCDS participants were aged 33 years (1991) and BCS70 participants were aged 30 years (2000) it can be seen that there has been a reduction in the proportion of those in manual occupations and this is consistent with data available from the Census (House of Commons 1999); in the UK there has been a decline in manual occupations, particularly as manufacturing has declined within the country, and there has also been an increase in those employed in 'white-collar' occupations and service industries. Note that social class is participant's own class (i.e. for women it is their own social class unless this was not available).

The second marker of adult material disadvantage is housing tenure measured at the same age as social class. The majority of NCDS participants at age 33 years (80%) were living in privately-rented accommodation and just 3.3% owned their home or had a mortgage. This was very different for the BCS70 participants of whom only 12% were living in privately-rented accommodation and 65% owned their home or had a mortgage.

8.2.5 Relational factors

Table 8.5 shows the distribution of relational factors in the NCDS and BCS70. In the NCDS a mean score was created of parent-child relationship quality for the parents present in the household. Most participants reported that they had a good or very good relationship with their parents at age 16 years. In the BCS70 parent-child relationship quality was created using factor analysis of three measures of parent-child quality and the resultant score divided into tertiles with 33.3% of participants in each category (see section 6.4.1 for more details).

Regarding peer relationship quality variables, around 11% of participants in the NCDS and BCS70 were reported by their mothers as frequently fighting with others. 5.2% of NCDS participants and 6.8% of BCS70 participants were reported as frequently bullying others. Relatively fewer NCDS participants (3.3%) were reported by their mothers as not being much liked by others than BCS70 participants (5.9%). A large proportion of teenagers were reported as preferring to be alone in both cohorts.

Table 8.5 – Relational factors in the NCDS & BCS70

Variable	NCDS Observed data %	Imputed data %	BCS70 Observed data %	Imputed data %
Relational factors				
Parent-child relationship quality (16 yrs)				
1 (very good)	29.7	29.7	42.8	33.3
1.5	12.5	12.5	21.7	33.3
2	36.3	36.3	35.5	33.3
2.5	9.6	9.6		
3	7.5	7.5		
3.5	2.5	2.5		
4	1.4	1.4		
4.5	0.3	0.3		
5 (very poor)	0.3	0.3		
Child frequently fights other (16 yrs)				
Does not apply	89.0	88.6	89.9	89.1
Applies	11.0	11.4	10.1	10.9
Child frequently bullies others (16 yrs)				
Does not apply	95.0	94.8	93.8	93.2
Applies	5.0	5.2	6.2	6.8
Child is not much liked by others (16 yrs)	96.8	96.7	94.6	94.1
Does not apply	3.2	3.3	5.4	5.9
Applies				
Child prefers to be alone (16 yrs)				
Does not apply	59.3	59.3	60.4	60.0
Applies	40.7	40.7	39.6	40.0
Adult partnership status (30/33 yrs)				
Cohabiting	5.5	5.5	21.5	21.5
Single	12.1	12.1	28.2	28.2
Married	64.1	64.1	42.3	42.3
Remarried	7.0	7.0	1.6	1.6
Separated/divorced	11.3	11.3	6.5	6.5

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Figure 8.3 stratifies these variables by gender. This figure shows that slightly more girls than boys in the NCDS were reported to "frequently fight others" but there was no difference in the BCS70. This is surprising considering that it is often thought that boys tend to fight more than girls (Bjorkqvist, Lagerspetz and Kaukiainen 1992; Underwood, Galen and Paquette 2001) though it should be remembered that mothers reported this variable. Despite this, more boys than girls were reported as bullying others in both cohorts. Boys were more likely to not be liked by others than girls and also to prefer to be alone than girls. Most importantly it can be seen that there has been little change over time in peer relationship quality.

Fig. 8.3 – Peer relationship variables by gender in the NCDS (16 yrs) and BCS70 (16 yrs)
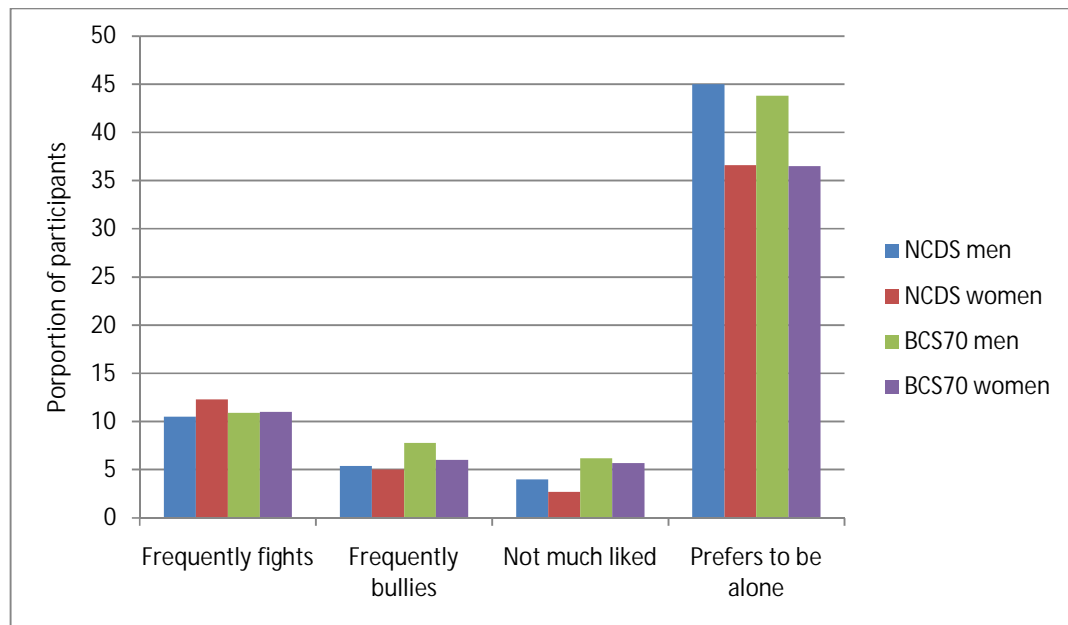
Finally, looking at adult partnership status at age 33 years in the NCDS (1991) and age 30 years BCS70 (2000), it can be seen that there are considerable differences between the cohorts. One of the most notable is the increasing proportion of those who were cohabiting in the BCS70 compared to the NCDS. Cohabitation has become increasingly common in the UK and couples frequently cohabit for two main reasons – an alternative to marriage or as a precursor to marriage (Hunt 2009; Rhoades, Stanley and Markman 2009a; Stanley, Rhoades, and Markman 2006). There were also more single people in the BCS70 compared to the NCDS and this is in line with what has previously been

shown in this cohort in that they have delayed partnering, childbearing and spent longer in full-time education (Ross, Schoon, Martin and Sacker 2009; Schoon 2006; Schoon, Ross and Martin 2009). Also BCS70 participants were less likely to be married than NCDS participants at this stage of the life course. Linked to this there was a larger proportion of NCDS participants who were divorced or separated and this is likely to reflect the younger age of NCDS participants at marriage and also the larger proportion of those who did marry. In the BCS70 people were more likely to be cohabiting and therefore if they had split up from their partner would have been recorded as being single in this variable, rather than separated or divorced, as it would not have been due to the breakdown of a marriage.

Chapter 9 Parental separation and adult psychological distress: is there an association and does this vary by cohort, age and gender?

This chapter tests the association between parental separation and adult psychological distress in all three cohorts and tests modification by cohort, gender and the age of the child at separation. The statistical methods used to test this are first described and then the results are presented, structured by hypotheses that fall under the first objective.

9.1 Statistical analysis methods

The association between parental separation and psychological distress was tested using logistic regression, as the outcome measure is binary. Analyses have been conducted separately for men and women. Likelihood ratio tests would usually be conducted in post-estimation hypothesis tests, for instance in testing gender interactions, but these are not appropriate for use with multiply imputed data as the estimates do not come from a single model and therefore the true likelihood value is unknown (Medeiros 2008). Wald tests are therefore recommended with multiply imputed data (White, Royston, and Wood 2011). In this project for each association separation-gender interactions were tested using Wald tests.

Differences in the consequences of parental separation by the age of the child were tested by substituting the separation timing variable for the overall separation variable in the models. These analyses, therefore, were conducted for only the sub-sample of those who had experienced separation. Cohort-separation interactions were tested by pooling the cohorts into a single dataset using the cohort variable created and conducting a Wald test to test the interaction. Analyses were first carried out unadjusted, followed by adjustment for father's social class as a pre-separation risk factor and then additionally adjusted for the other confounding factors (mother's age, mother's education and mother's psychological distress).

9.2 The association between parental separation and adult psychological distress

Previous research presented in chapter 2 showed that parental separation occurring during childhood is associated with increased reporting of psychological distress in adulthood. One of the motivations for this section of the analysis was to see whether this association existed in mid-adulthood in the three maturing British birth cohorts and to see whether there had been any change over time. Gender differences are also tested

in the three cohorts with the aim of strengthening the evidence base in this respect. The results testing these two hypotheses are given for all three cohorts simultaneously.

9.2.1 Unadjusted logistic regression results

The results of unadjusted logistic regression analyses testing the association between parental separation and psychological distress in the three birth cohorts are given in table 9.1. Looking firstly at the results for the NSHD at the top of the table it appears that parental separation occurring during childhood is associated with the increased reporting of psychological distress as measured by the PSE ID at age 36 years. This association appears to be larger for women compared to men (results are not statistically significant for men) but when the interaction between gender and the experience of parental separation was formally tested it was found not to be statistically significant (p value given at bottom of NSHD results in table). Therefore if just the result for both genders combined is considered the odds ratio for psychological distress for those who experienced parental separation was 2.23 when compared to those who lived in an intact family from birth to age 16 years.

The results for the NCDS are shown in the middle of table 9.1. Again for both men and women of this cohort, parental separation was associated with increased reporting of psychological distress at age 33 years. The effect estimate appears to be somewhat stronger for men but when this was tested the interaction between gender and parental separation was not statistically significant (p=0.187). Therefore looking at the odds ratio for both genders together, the results show that those who experienced parental separation during childhood were 1.8 times more likely to report psychological distress at age 33 years than those who grew up in a household with both parents.

Like the results for the previous two cohorts, the results for the BCS70 indicate that parental separation is associated with increased reporting of psychological distress at age 30 years. Again, like the older cohorts, the separation-gender interaction term was not statistically significant (p=0.846), therefore looking at the results for both genders combined it can be seen that experiencing parental separation increases the odds of reporting psychological distress by 1.66 compared to those from intact families.

Table 9.1 – Association between parental separation and adult psychological distress by gender (unadjusted)

NSHD Men (N=1,640)	Frequency (%)	Odds ratio for psychological distress	95% CI	p value
Parental separation (0-16 yrs)				
Yes	5.6	1.45	0.43, 4.88	0.548
No	94.4	Ref		
Women (N=1,653)				
Parental separation (0-16 yrs)				
Yes	5.8	2.48	1.29, 4.78	0.007
No	94.2	Ref		
Both genders (N=3,293)				
Parental separation (0-16 yrs)				
Yes	5.7	2.23	1.27, 3.92	0.005
No	94.3	Ref		
Interaction between separation and gender				0.445
NCDS Men (N=5,396)	Frequency (%)	Odds ratio for psychological distress	95% CI	p value
Parental separation (0-16 yrs)				
Yes	9.1	2.21	1.51, 3.25	<0.001
No	90.9	Ref		
Women (N=5,527)				
Parental separation (0-16 yrs)				
Yes	9.1	1.60	1.17, 2.19	0.003
No	90.9	Ref		
Both genders (N=10,923)				
Parental separation (0-16 yrs)				
Yes	9.1	1.80	1.41, 2.31	<0.001
No	90.9	Ref		
Interaction between separation and gender				0.187
BCS70 Men (N=5,204)	Frequency (%)	Odds ratio for psychological distress	95% CI	p value
Parental separation (0-16 yrs)				
Yes	20.5	1.69	1.32, 2.18	<0.001
No	79.6	Ref		
Women (N=5,452)				
Parental separation (0-16 yrs)				
Yes	20.1	1.64	1.32, 2.05	<0.001
No	79.9	Ref		
Both genders (N=10.714)				
Parental separation (0-16 yrs)				
Yes	20.3	1.66	1.40, 1.98	<0.001
No	79.7	Ref		
Interaction between separation and gender				0.846

9.2.2 Adjusted logistic regression results

Table 9.2 shows the association between parental separation and psychological distress controlling firstly for father's social class at birth (model 1) and then for confounders (mother's age, education and psychological distress) (model 2). As no significant gender differences were found in the previous stage of the analysis the results in table 9.2 are presented for both men and women combined. In the NSHD, after controlling for father's social class (model 1), there is no change in the magnitude of the association between parental separation and psychological distress, suggesting that the association cannot be explained by social disadvantage prior to parental separation. Father's social class was also tested as a modifier of the association and the resulting p value was 0.524 therefore suggesting that the association between parental separation and psychological distress does not vary by social position of origin. The results for model 2 again show that there is minimal change in the association between parental separation and the reporting of adult psychological distress after controlling additionally for *a priori* confounders suggesting that these factors do not explain the association and therefore that parental separation appears to be strongly associated with psychological distress at a later point in the life course. This may of course be explained by other mechanisms, such as those involving material and relational factors, and results testing these are presented in subsequent chapters.

In the NCDS a father's social class of IIIM has been used as the reference category, as this is the modal group. The results for model 1 show that upon adjusting for father's social class at birth, a small decrease in effect size is seen, however parental separation remains strongly associated with adult psychological distress. Father's social class was also associated with adult psychological distress, suggesting that social position in early life continues to exert an effect across the life course as has been found in other studies using the NCDS (Cheung, Khoo, Karlberg and Machin 2002; Hamilton 2009; Mandemakers, Monden and Kalmijn 2010; Sacker and Cable 2010). The results of model 2 adjusting for *a priori* confounders show that the effect size barely changes suggesting that these factors do not explain the association. Both mother's education and father's social class were still associated with psychological distress in adulthood after taking account of parental separation and other confounders. Parental separation in childhood continues to be associated with adult psychological distress even after controlling for father's social class and confounders, in that those who experience separation are 1.75 times more likely to report psychological distress at age 33 years.

Table 9.2 – Association between parental separation and adult psychological distress controlled for father's social class and confounders

NSHD Both genders (N=3,293)	Frequency (%)	Model 1 Odds ratio for psychological distress	95% CI	p value	Model 2 Odds ratio for psychological distress	95% CI	p value
Parental separation (0-16 yrs)							
Yes	5.7	2.23	1.27, 3.93	0.005	2.21	1.25, 3.92	0.007
No	94.3	Ref			Ref		
Father's social class (birth)							
Manual	43.9	1.01	0.76, 1.35	0.920	0.99	0.74, 1.34	0.967
Non-manual	56.1	Ref			Ref		
Mother's psychological distress (15 yrs)	Median:						
Range 0-6, per unit increase	1				1.00	1.00, 1.00	0.429
Age of mother (birth)	Mean:						
Range 15-50yrs (per 1 year increase)	29.0 yrs				1.00	0.96, 1.03	0.766
Mother's education (birth)							
Left before/at minimum age	90.7				1.05	0.55, 2.02	0.875
Stayed beyond minimum age	9.3				Ref		
NCDS Both genders (N=10,923)	Frequency (%)	Model 1 Odds ratio for psychological distress	95% CI	p value	Model 2 Odds ratio for psychological distress	95% CI	p value
Parental separation (0-16 yrs)							
Yes	9.1	1.72	1.34, 2.21	<0.001	1.75	1.35, 2.26	<0.001
No	90.9	Ref			Ref		
Father's social class (birth)							
I	4.8	0.38	0.22, 0.66	<0.001[a]	0.47	0.27, 0.82	<0.001[a]
II	13.8	0.51	0.38, 0.68		0.58	0.42, 0.78	
IIINM	10.2	0.74	0.56, 0.99		0.79	0.59, 1.05	
IIIM	50.8	Ref			Ref		
IV	12.0	1.17	0.93, 1.48		1.15	0.91, 1.44	
V	8.5	1.55	1.22, 1.97		1.51	1.18, 1.92	

	Frequency (%)	Model 1 Odds ratio for psychological distress	95% CI	p value	Model 2 Odds ratio for psychological distress	95% CI	p value
Mother's psychological distress (11 yrs)							
Not distressed	98.4				Ref		
Distressed	1.6				1.19	0.70, 2.04	0.524
Age of mother (birth)	Mean:						
Range 16-48yrs (per 1 year increase)	27.7 yrs				1.01	1.00, 1.02	0.113
Mother's education (birth)							
Left before/at minimum age	73.9				1.56	1.25, 1.94	<0.001
Stayed beyond minimum age	26.1				Ref		
BCS70		*Model 1* Odds ratio for psychological distress			*Model 2* Odds ratio for psychological distress		
Both genders (N=10,714)	Frequency (%)		95% CI	p value		95% CI	p value
Parental separation (0-16 yrs)							
Yes	20.3	1.59	1.33, 1.90	<0.001	1.50	1.25, 1.80	<0.001
No	79.7	Ref			Ref		
Father's social class (birth)							
I	5.4	0.58	0.42, 0.80	<0.001[a]	0.65	0.47, 0.91	<0.001[a]
II	12.5	0.64	0.52, 0.80		0.71	0.56, 0.88	
IIINM	13.0	0.74	0.61, 0.91		0.79	0.65, 0.96	
IIIM	46.4	Ref			Ref		
IV	14.1	1.10	0.93, 1.31		1.08	0.91, 1.28	
V	8.7	1.20	0.98, 1.46		1.15	0.94, 1.41	
Mother's psychological distress (10yrs)							
Not distressed	90.2				Ref		
Distressed	9.8				2.05	1.72, 2.45	<0.001
Age of mother (birth)	Mean:						
Range 16-50yrs (per 1 year increase)	26.0 yrs				0.99	0.98, 1.01	0.376
Mother's education (birth)							
Left before/at minimum age	63.9				1.13	0.98, 1.30	0.105
Stayed beyond minimum age	36.1				Ref		

[a] p value for trend; **Model 1:** association between parental separation and psychological distress controlling for father's social class at birth; **Model 2:** model 1 additionally controlled for confounders (mother's age, education and psychological distress)

The results of model 1 for the BCS70 show that after controlling for pre-separation social disadvantage parental separation is still associated with increased odds of reporting psychological distress. In addition those who are in non-manual social classes (I, II and IIINM) were significantly less likely than those in social class IIIM to report psychological distress. The results for model 2 show that after additionally controlling for the confounders in this study that there is some attenuation in the association between parental separation and psychological distress. Father's social class still remains associated with psychological distress as in model 1. Mother's psychological distress and education are also associated with the child's psychological distress at age 30 years.

The results show strong support for hypothesis 1a in that parental separation is associated with increased reporting of psychological distress in the 30s in three of the British birth cohorts using large samples, imputed data and prospective measures. This association remained after taking account of material disadvantage prior to parental separation and confounding factors. These results are consistent with previous research, which was largely conducted in the US and Scandinavia, showing this same association. With regards to hypothesis 1b proposing gender differences, there was no support for this in any of the three cohorts as separation-gender interactions were not statistically significant. This therefore suggests that men and women are equally affected by parental separation. Possible gender differences in material and relational pathways may exist and these are tested in subsequent chapters.

9.3 Is the age of the child at separation important?

This stage of the analysis involved only the sub-samples of those participants who experienced parental separation between birth and age 16 years in order to test whether separation occurring in early childhood had a more adverse effect. The evidence presented in the literature review (see section 2.6) built a case for early childhood being crucial for the formation of a secure attachment between the child and both parents. The first age category was taken as the reference group for each cohort and subsequent categories compared to this. The results are presented in table 9.3 for all cohorts.

Table 9.3 – Association between age of child at separation and adult psychological distress

NSHD Men	Frequency (%)	Odds ratio for psychological distress	95% CI	p value trend
Age of child at separation				
0-7 yrs	64.0	NA[a]	NA	NA
8-11 yrs	13.0			
12-16 yrs	23.0			
Women				
Age of child at separation				
0-7 yrs	61.7	Ref		0.263
8-11 yrs	17.8	1.10	0.25, 4.84	
12-16 yrs	20.6	0.34	0.06, 1.99	
Both genders				
Age of child at separation				
0-7 yrs	62.8	Ref		0.159
8-11 yrs	15.5	1.00	0.27, 3.69	
12-16 yrs	21.7	0.31	0.06, 1.52	
Interaction between age at separation and gender				NA

NCDS Men	Frequency (%)	Odds ratio for psychological distress	95% CI	p value trend
Age of child at separation				
0-7 yrs	39.9	Ref		0.471
8-11 yrs	28.4	0.86	0.37, 1.96	
12-16 yrs	31.7	0.72	0.29, 1.79	
Women				
Age of child at separation				
0-7 yrs	39.1	Ref		0.163
8-11 yrs	30.5	0.41	0.18, 0.93	
12-16 yrs	30.4	0.64	0.31, 1.31	
Both genders				
Age of child at separation				
0-7 yrs	39.4	Ref		0.130
8-11 yrs	29.5	0.57	0.31, 1.03	
12-16 yrs	31.1	0.67	0.38, 1.18	
Interaction between age at separation and gender				0.361

BCS70 Men	Frequency (%)	Odds ratio for psychological distress	95% CI	p value trend
Age of child at separation				
0-5 yrs	16.8	Ref		0.124
6-10 yrs	53.8	0.74	0.40, 1.38	
11-16 yrs	29.5	0.59	0.30, 1.14	
Women				
Age of child at separation				
0-5 yrs	16.2	Ref		0.820
6-10 yrs	54.7	0.80	0.46, 1.39	
11-16 yrs	29.1	0.89	0.50, 1.61	
Both genders				
Age of child at separation				
0-5 yrs	16.5	Ref		0.254
6-10 yrs	54.3	0.77	0.49, 1.23	
11-16 yrs	29.3	0.74	0.83, 1.92	
Interaction between age at separation and gender				0.282

[a] Not possible to estimate due to insufficient cases who are then stratified by gender.

NB results are adjusted for father's social class at birth, mother's psychological distress, mother's education and mother's age

Both the results for NSHD women and for both genders show that the age of the child at the time of separation does not affect the magnitude of association between parental separation and distress, although caution should be exercised with this result because of the inability to estimate odds ratios for NSHD men. The results from the NCDS suggest that, for men, the age of the child at the time of separation does not affect the association between parental separation and adult psychological distress. However for women, those who experience parental separation between the ages of 7 and 11 years were significantly less likely to be psychologically distressed at age 33 years compared to those who experienced separation between birth and age 7 years. This, therefore, provides support for the hypothesis that those who experienced separation in early childhood would be most adversely affected. This is thought to be due to the disruption of secure attachment formation (representing a sensitive period in life course theory) and also due to increased likelihood of spending a longer period in a single parent household (representing accumulation in life course theory). Despite this, the gender-separation timing interaction was not statistically significant (p=0.361) and the combined results for men and women suggest that the age of the child at the time of separation does not matter with regards to psychological distress in adulthood. Similarly the results for the BCS70 suggest that the association between parental separation and adult psychological distress does not vary by the age of the child and also that this does not vary by gender (p=0.282).

The results of analyses testing whether the age of the child at the time of separation modifies the association between parental separation and adult psychological distress, all show that there is no evidence that this is the case and therefore there is no support for hypothesis 1c. Regarding support for hypothesis 1b which was concerned with gender differences the NCDS results showed that women who experience separation between the ages of 7 and 11 years were less likely to report psychological distress than those who experience separation earlier in life and this difference was not seen for men. However this gender difference was not supported by formal testing of the interaction between gender and the timing of separation (p=0.361).

9.4 Parental separation and adult psychological distress: changes over time?
Tables 8.1, 9.1 and 9.2 all showed that the proportion of participants who experienced parental separation between the ages of 0 and 16 years has increased across the cohorts used. In fact the prevalence of parental separation has approximately doubled from one

cohort to the next over each 12 year period. The next hypothesis tested in this project was whether this increase in parental separation has resulted in a reduction in the association with psychological distress in adulthood i.e. is the 'reduced effect' hypothesis with regards to psychological distress supported within these three cohorts?

Table 9.4 combines the results seen earlier in this chapter for each cohort. Looking at the difference in odds ratios between the cohorts, the association between parental separation and psychological distress appears to be largest in the NSHD, less in the NCDS and less again in the BCS70. As no gender differences were found in any of the cohorts, the results are presented for both men and women together. Support for the 'reduced effect' hypothesis was formally tested by testing a cohort-separation interaction using a Wald test. The results of this test did not reach statistical significance but looking at the effect estimates would suggest that the association between parental separation and adult psychological distress has reduced over time.

As expected, the likelihood of experiencing parental separation was associated with cohort (OR=2.32, 95% CI: 2.14, 2.51); taking the NSHD as the reference cohort, those in the NCDS were more likely to experience parental separation (OR=1.66, 95% CI: 1.40, 1.97) and those in the BCS70 were considerably more likely to (OR=4.28, 95% CI: 3.64, 5.02). A highly significant p value for trend also supports this (p<0.001).

Table 9.4 – Comparing the association between parental separation (0-16yrs) and adult psychological distress (30/33/36yrs) in the NSHD, NCDS and BCS70

NSHD (N=3,293)	Frequency (%)	Odds ratio for psychological distress	95% CI	P value
Parental separation				
Yes	5.7	2.21	1.25, 3.92	0.007
No	94.3	Ref		
NCDS (N=10,923)				
Parental separation				
Yes	9.1	1.75	1.35, 2.26	<0.001
No	90.9	Ref		
BCS70 (N=10,714)				
Parental separation				
Yes	20.3	1.50	1.25, 1.80	<0.001
No	79.7	Ref		
Interaction between separation and cohort				0.675

NB these results are adjusted for mother's age at birth, mother's psychological distress, mother's education and father's social class

9.5 Summary of results for objective 1

In summary, this chapter has shown that parental separation occurring during childhood is associated with the increased likelihood of reporting psychological distress in adulthood in three of the British birth cohorts, therefore supporting hypothesis 1a. This provides further weight to the evidence base, particularly that involving British samples, involving large representative population samples and prospective measures. The association between parental separation and psychological distress did not differ for men and women in any of the cohorts and therefore there was no support for hypothesis 1b. In addition no difference was found by the age of the child at the time of separation and therefore there was no support for hypothesis 1c, although this may have been a statistical power issue particularly in the earlier cohorts and there was an indication of a trend (although not statistically significant) in reducing odds with increasing age.

Despite increasing separation rates since the mid-20th century within Great Britain, the association between parental separation and adult psychological distress has not reduced to a statistically significant extent and this translates to more people being likely to be affected. This finding supports other work which has looked at the effect of parental divorce on other outcomes with regards to how associations have changed over time (Ely, Richards, Wadsworth and Elliott 1999; Sigle-Rushton, Hobcraft, and Kiernan 2005).

Chapter 10 Are material factors involved in the association between parental separation and adult psychological distress and does this differ by cohort, age and gender?

This chapter presents the results which fall under objective 2 of this thesis which test whether material factors are involved in the association between parental separation and adult psychological distress in the NCDS and BCS70, and whether there is modification by gender, the age of the child at separation and cohort. The evidence presented in the literature review (chapter 2) suggests that parental separation occurring in childhood is associated with a range of adverse socioeconomic or material outcomes and that these in turn are associated with psychological distress (see section 2.3.1). Results are again structured by the hypotheses which are covered in objective 2 and the statistical methods used to test these are presented prior to these. Results are presented for both cohorts together for ease of comparison.

10.1 Statistical analysis methods

Regression methods were employed to test the associations specified in the conceptual model in figure 3.1. Associations involving binary outcomes were tested using logistic regression (e.g. association between parental separation and adolescent material disadvantage), those involving ordered outcomes, such as educational attainment and social class, were tested using ordered logistic regression and those involving nominal variables, such as housing tenure, were tested using multinomial logistic regression in STATA. The final stage involved assessing whether material factors may be involved in the overall association between parental separation and adult psychological distress and this involved entering all material factors into the model simultaneously along with confounders. If a reduction in effect was seen, then this would indicate that material factors appear to explain some of the association. The specific pathways are tested in more detail in objective 4 (chapter 12). Wald tests were used to test interactions with gender and age of the child in order to assess whether differences existed.

10.2 Parental separation and adolescent material disadvantage

In the literature review it was shown that those who experience parental separation in childhood are more likely to experience material disadvantage in adolescence, particularly where the household is headed by a single mother. This association has been tested in the NCDS and BCS70 using logistic regression and the results are given

in table 10.1 (see section 6.3.1 for information on the derivation of material disadvantage in adolescence). The results support previous research, showing that parental separation is associated with an increased likelihood of being materially disadvantaged at age 16 years; in the NCDS those who experienced separation were 2.2 times more likely to be materially disadvantaged compared to those who grew up with both parents. The association was even stronger in the BCS70 with those experiencing parental separation being 3.6 times more likely to be materially disadvantaged at age 16 years. These results also suggest that the association between parental separation and material disadvantage has become stronger over time.

10.3 Parental separation and educational attainment

It has been found in many previous studies that parental separation is associated with poorer educational attainment and education has been shown to mediate the association between parental separation and adult psychological distress. This thesis seeks to strengthen this evidence basis in this respect, testing this association in two of the British birth cohorts. The results testing this association are given in table 10.2. The association was tested using ordered logistic regression as educational attainment is an ordered categorical variable. Odds ratios represent the increase in odds of increasingly higher qualifications comparing those who experience separation to those who do not.

Consistent with previous research, the results show that parental separation is associated with a reduced likelihood of having any educational qualifications compared to those from intact families. There was no statistically significant difference by gender in either cohort and the results for both cohorts were very similar, suggesting that there has been no change in this association over time. This is consistent with Ely and colleagues' study which examined the 'reduced effect' hypothesis with regards to educational attainment in the three cohorts, finding that there was no change over time (Ely et al 1999). Ordered logistic regression uses more information than simple logistic regression, which does not take account of order, and therefore allows one to conclude, in this context, that parental separation is associated with having lower level educational qualifications even among those who have some.

Table 10.1 – Association between parental separation (0-16 yrs) and material disadvantage (16 yrs) in the NCDS and BCS70

NCDS	Frequency (%)	Odds ratio for being materially disadvantaged	95% CI	P value	BCS70	Frequency (%)	Odds ratio for being materially disadvantaged	95% CI	P value
Men (N=5,396)					**Men (N=5,207)**				
Parental separation					Parental separation				
Yes	9.1	2.12	1.66, 2.71	<0.001	Yes	20.5	3.52	2.88, 4.29	<0.001
No	90.9	Ref			No	79.6	Ref		
Women (N=5,527)					**Women (N=5,458)**				
Parental separation					Parental separation				
Yes	9.1	2.28	1.77, 2.94	<0.001	Yes	20.1	3.60	2.96, 4.38	<0.001
No	90.9	Ref			No	79.9	Ref		
Both (N=10,923)					**Both (10,714)**				
Parental separation					Parental separation				
Yes	9.1	2.20	1.85, 2.62	<0.001	Yes	20.3	3.56	3.07, 4.13	<0.001
No	90.9	Ref			No	79.7	Ref		
Interaction between separation and gender			0.686						0.865

Table 10.2 – Association between parental separation (0-16 yrs) and educational attainment (23/26 yrs) in the NCDS and BCS70

NCDS					BCS70				
Men (N=5,396)	**Frequency (%)**	**Odds ratio for having any qualifications**	**95% CI**	**P value**	**Men (N=5,207)**	**Frequency (%)**	**Odds ratio for having any qualifications**	**95% CI**	**P value**
Parental separation					Parental separation				
Yes	9.1	0.53	0.43, 0.65	<0.001	Yes	20.5	0.54	0.45, 0.65	<0.001
No	90.9	Ref			No	79.6	Ref		
Women (N=5,527)					**Women (N=5,458)**				
Parental separation					Parental separation				
Yes	9.1	0.50	0.41, 0.62	<0.001	Yes	20.1	0.53	0.45, 0.64	<0.001
No	90.9	Ref			No	79.9	Ref		
Both (N=10,923)					**Both (10,714)**				
Parental separation					Parental separation				
Yes	9.1	0.52	0.44, 0.60	<0.001	Yes	20.3	0.54	0.47, 0.62	<0.001
No	90.9	Ref			No	79.7	Ref		
Interaction between separation and gender			0.950						0.814

As previously mentioned, one of the reasons that parental separation may be associated with reduced educational attainment may in part be explained by material disadvantage (see section 2.3.1.2) and this is the next stage tested in this chapter. For material disadvantage to mediate the association between parental separation and educational attainment, parental separation must be associated with material disadvantage (see section 10.2) and this in turn should be associated with educational attainment. The results of ordered logistic regression testing the association between material disadvantage at age 16 years and educational attainment at ages 23 and 26 years are presented in table 10.3.

The results show that those whose parents are more materially disadvantaged are less likely to have educational qualifications than those who are more advantaged. In the NCDS there was a statistically significant gender-material disadvantage interaction; women who are materially disadvantaged are less likely than men to have any educational qualifications. In the BCS70 no such difference was seen. Regarding change over time, the results show that the association between material disadvantage and educational attainment is stronger in the NCDS than the BCS70, suggesting that those who experience separation in NCDS differ more from those who do not with regards to educational attainment.

In order to establish whether the pathway between parental separation and educational attainment exists, independent of material disadvantage, this association is retested controlling for material disadvantage at age 16 years. This has been conducted separately for men and women because of the gender differences seen in the NCDS with regards to the association between parental separation and educational attainment. The results of this analysis are presented in table 10.4. This shows, that after controlling for material disadvantage, there is still an association between parental separation and educational attainment, and this has been attenuated by a small degree suggesting that material disadvantage explains only a small part of this association. In addition, material disadvantage remained an important predictor of educational attainment in all regression models. These specific pathways can be tested more comprehensively using path analysis and this is done in chapter 12.

Table 10.3 – Association between material disadvantage (16 yrs) and educational attainment (23/26 yrs) in the NCDS and BCS70

NCDS	Frequency (%)	Odds ratio for having any qualifications	95% CI	P value	BCS70	Frequency (%)	Odds ratio for having any qualifications	95% CI	P value
Men (N=5,396)					*Men (N=5,207)*				
Material disadvantage					Material disadvantage				
More disadvantaged	49.1	0.38	0.33, 0.42	<0.001	More disadvantaged	54.5	0.47	0.41, 0.55	<0.001
Less disadvantaged	50.9	Ref			Less disadvantaged	45.5	Ref		
Women (N=5,527)					*Women (N=5,458)*				
Material disadvantage					Material disadvantage				
More disadvantaged	47.6	0.32	0.28, 0.36	<0.001	More disadvantaged	54.8	0.48	0.42, 0.55	<0.001
Less disadvantaged	52.4	Ref			Less disadvantaged	45.2	Ref		
Both (N=10,923)					*Both (10,714)*				
Material disadvantage					Material disadvantage				
More disadvantaged	48.4	0.35	0.32, 0.38	<0.001	More disadvantaged	54.6	0.48	0.43, 0.53	<0.001
Less disadvantaged	51.7	Ref			Less disadvantaged	45.4	Ref		
Interaction between disadvantage and gender			0.029						0.522

Table 10.4 – Association between parental separation (0-16 yrs) and educational attainment (23/26 yrs) controlling for material disadvantage (16 yrs) in the NCDS and BCS70

NCDS					BCS70				
Men (N=5,396)	**Frequency (%)**	**Odds ratio for having any qualifications**	**95% CI**	**P value**	**Men (N=5,207)**	**Frequency (%)**	**Odds ratio for having any qualifications**	**95% CI**	**P value**
Parental separation					Parental separation				
Yes	9.1	0.61	0.49, 0.76	<0.001	Yes	20.5	0.66	0.54, 0.80	<0.001
No	90.9	Ref			No	79.6	Ref		
Women (N=5,527)					**Women (N=5,458)**				
Parental separation					Parental separation				
Yes	9.1	0.61	0.49, 0.75	<0.001	Yes	20.1	0.65	0.53, 0.78	<0.001
No	90.9	Ref			No	79.9	Ref		
Both (N=10,923)					**Both (10,714)**				
Parental separation					Parental separation				
Yes	9.1	0.61	0.53, 0.71	<0.001	Yes	20.3	0.65	0.57, 0.75	<0.001
No	90.9	Ref			No	79.7	Ref		
Interaction between separation and gender			0.811						0.793

10.4 Educational attainment and adult material disadvantage

Educational attainment was included on the material pathway as a way in which adolescent material disadvantage might translate into adult material disadvantage (see section 3.2). In order for this to this pathway to exist, educational attainment must be associated with adult material disadvantage indicators. The results of the multinomial logistic regression analyses testing the association between educational attainment and housing tenure are shown in table 10.5. Looking firstly at the results for the NCDS, compared to those with CSE or O-level qualifications those with no qualifications were much more likely to be living in social housing rather than privately-rented housing at age 33 years. Similarly those with higher qualifications were less likely to be in social housing compared to privately-rented accommodation. There was no difference between men and women in this association in the NCDS.

The results from the BCS70 show a similar pattern, with those possessing no qualifications being more likely to be living in social housing. In addition, those with higher qualifications or a degree are less likely to own their own home compared to privately renting it. This association was not seen in the NCDS and is likely to reflect the increasing proportion of BCS70 participants who stayed in further or higher education (22.3%) than in the NCDS (18.3%). This difference, combined with a rise in housing prices over this period, is likely to mean that those who remain in education and subsequently have higher qualifications, are less likely to have had both the opportunity and financial resources to own a home. Indeed this has been shown in previous work comparing the NCDS and BCS70 (Kneale, Lupton, Obolenskaya and Wiggins 2010), although it is possible that if this were compared at later ages there would be less difference between the cohorts. Conversely, the results show also that those who have no qualifications were less likely to own their own home or have a mortgage compared to living in privately-rented accommodation and this may reflect reduced financial resources from less secure, lower status employment opportunities. In addition it appears that there is a stronger graded association between educational attainment and the chances of living in social housing in the NCDS compared to the BCS70. Similar to the NCDS there were no gender differences seen in any of these associations.

Table 10.5 – Association between educational attainment (23/26 yrs) and housing tenure (30/33 yrs) in the NCDS and BCS70

NCDS	Frequency (%)	Housing tenure RRR (95% CI)			
Men (5,396)		Owns own home	Privately-renting	Social housing	Other/rent-free
Educational attainment					
No qualifications	13.9	1.01 (0.53, 1.95)	Ref	4.18 (3.40, 5.15)***	3.01 (1.28, 7.09)*
CSE 2-5/O-level	47.4	1.00	Ref	1.00	1.00
A-level	20.3	0.99 (0.65, 1.49)	Ref	0.41 (0.31, 0.53)***	1.04 (0.42, 2.56)
Higher qualification/degree	18.3	0.67 (0.42, 1.08)	Ref	0.10 (0.06, 0.18)***	0.93 (0.37, 2.37)
Women (5527)					
Educational attainment					
No qualifications	15.6	1.17 (0.68, 2.02)	Ref	4.02 (3.34, 4.85)***	1.56 (0.67, 3.62)
CSE 2-5/O-level	52.5	1.00	Ref	1.00	1.00
A-level	13.7	0.96 (0.60, 1.52)	Ref	0.29 (0.20, 0.42)***	0.35 (0.08, 1.45)
Higher qualification/degree	18.2	1.06 (0.73, 1.55)	Ref	0.17 (0.12, 0.25)***	0.88 (0.42, 1.88)
Both genders (10923)					
Educational attainment					
No qualifications	14.7	1.10 (0.71, 1.69)	Ref	4.09 (3.57, 4.70)***	2.13 (1.18, 3.85)*
CSE 2-5/O-level	49.9	1.00	Ref	1.00	1.00
A-level	17.2	0.98 (0.72, 1.33)	Ref	0.36 (0.29, 0.44)***	0.71 (0.35, 1.41)
Higher qualification/degree	18.3	0.87 (0.65, 1.17)	Ref	0.14 (0.10, 0.19)***	0.90 (0.50, 1.62)
Interaction between educational attainment and gender					p=0.495

BCS70	Frequency (%)		Privately-renting		
Men (5,207)		Owns own home		Social housing	Other/rent-free
Educational attainment					
No qualifications	6.8	0.76 (0.50, 1.15)	Ref	1.73 (1.03, 2.92)*	0.83 (0.57, 1.44)
CSE 2-5/O-level	60.4	1.00	Ref	1.00	1.00
A-level	9.5	0.85 (0.60, 1.21)	Ref	0.53 (0.38, 0.75)**	0.77 (0.63, 1.19)
Higher qualification/degree	23.3	0.74 (0.60, 0.92)**	Ref	0.22 (0.17, 0.29)***	0.54 (0.40, 0.74)***
Women (5,458)					
Educational attainment					
No qualifications	5.2	0.72 (0.42, 1.23)	Ref	2.50 (1.46, 4.29)***	0.97 (0.44, 2.14)
CSE 2-5/O-level	60.8	1.00	Ref	1.00	1.00
A-level	11.2	0.96 (0.69, 1.33)	Ref	0.53 (0.34, 0.83)**	1.04 (0.65, 1.67)
Higher qualification/degree	22.9	0.69 (0.55, 0.87)***	Ref	0.22 (0.15, 0.31)***	0.74 (0.53, 1.04)
Both sexes (10,923)					
Educational attainment					
No qualifications	6.0	0.72 (0.51, 1.03)	Ref	1.98 (1.38, 2.86)***	0.91 (0.57, 1.44)
CSE 2-5/O-level	60.6	1.00	Ref	1.00	1.00
A-level	10.4	0.91 (0.72, 1.16)	Ref	0.53 (0.38, 0.75)***	0.87 (0.63, 1.19)
Higher qualification/degree	23.1	0.72 (0.62, 0.84)***	Ref	0.22 (0.17, 0.29)***	0.62 (0.50, 0.77)***
Interaction between educational attainment and gender					p=0.898

*P≤0.05; **P≤0.01; ***P≤0.001

The second indicator of adult material disadvantage is occupational social class (RGSC). The association between educational attainment and social class was tested using ordered logistic regression and the results are given in table 10.6 for both cohorts. The category of CSE/O-level qualifications was used as the reference category as this was the category containing the most participants in each cohort. In both cohorts it is seen that those with no qualifications are much more likely to be in lower social classes than those with CSE or O-level qualifications. Similarly those with A-level or higher qualifications were significantly less likely to be in lower social classes compared to those with CSE or O-level qualifications. In the BCS70 the gender-educational attainment interaction was statistically significant. The results suggest a steeper gradient between educational attainment and participant's own social class for women compared to men in the BCS70. In particular this suggests that, within this cohort, women with no qualifications were much more likely than men with no qualifications to be in manual social classes. In summary, the results shown for both indicators of material disadvantage suggest that poorer educational attainment is associated with a higher level of material disadvantage in adulthood as indicated by housing tenure and social class.

Table 10.6 – Association between educational attainment (23/26 yrs) and social class (30/33 yrs) in the NCDS and BCS70

NCDS Men (5,396):	Frequency (%)	Odds ratio for being in lower social classes	95% CI	P value trend	BCS70 Men (5,207):	Frequency (%)	Odds ratio for being in lower social classes	95% CI	P value trend
Educational attainment (23 yrs)					Educational attainment (26 yrs)				
No qualifications	13.9	3.65	3.07, 4.35	<0.001	No qualifications	6.8	3.91	3.08, 4.97	<0.001
CSE 2-5/O-level	47.4	Ref			CSE 2-5/O-level	60.4	Ref		
A-level	20.3	0.33	0.29, 0.38		A-level	9.5	0.28	0.22, 0.35	
Higher qualification/degree	18.3	0.10	0.08, 0.12		Higher qualification/degree	23.3	0.09	0.08, 0.11	
Women (5,527):					**Women (5,458):**				
Educational attainment (23 yrs)					Educational attainment				
No qualifications	15.6	3.79	3.25, 4.43	<0.001	No qualifications	5.2	4.93	3.66, 6.64	<0.001
CSE 2-5/O-level	52.5	Ref			CSE 2-5/O-level	60.8	Ref		
A-level	13.7	0.32	0.27, 0.37		A-level	11.2	0.32	0.26,0.38	
Higher qualification/degree	18.2	0.09	0.08, 0.11		Higher qualification/degree	22.9	0.12	0.10, 0.15	
Both genders (10,923):					**Both genders (10,714):**				
Educational attainment (23 yrs)					Educational attainment (26 yrs)				
No qualifications	14.7	3.66	3.26, 4.11	<0.001	No qualifications	6.0	4.36	3.62, 5.26	<0.001
CSE 2-5/O-level	49.9	Ref			CSE 2-5/O-level	60.6	Ref		
A-level	17.2	0.34	0.31, 0.38		A-level	10.4	0.30	0.26, 0.35	
Higher qualification/degree	18.3	0.10	0.09, 0.12		Higher qualification/degree	23.1	0.11	0.09, 0.12	
Interaction between educational attainment and gender			0.820		**Interaction between educational attainment and gender**				<0.001

10.5 Adult material disadvantage and psychological distress

So far it has been shown that parental separation is associated with a range of poorer material outcomes across the life course. As outlined above in the literature review (see section 2.3.1.3), there is evidence that material factors lead to the increased risk of reporting psychological distress. The first association to test in this respect is that between both indicators of adult material disadvantage and psychological distress. This was tested using logistic regression, the results of which are given in tables 10.7a and 10.7b.

In the NCDS those living in social housing were significantly more likely to be psychologically distressed than those living in privately-rented accommodation. No differences were seen between other categories and the association did not differ for men and women. With regards to social class, a graded association was seen with psychological distress. Again there were no gender differences seen. In the BCS70 the same pattern of results were seen. With regards to cohort differences, both indicators of adult material disadvantage appear to be more strongly associated with reporting of psychological distress in the NCDS compared to the BCS70.

These associations represent the final link in the proposed material pathway, however an additional link is also proposed in the conceptual model – the association between educational attainment and psychological distress acting independently of that through adult material disadvantage.

Table 10.7a – Association between adult material disadvantage (housing tenure and social class, 33 yrs) and psychological distress (33 yrs) in the NCDS

NCDS Men (5,396)	Frequency (%)	Odds ratio for reporting psychological distress	95% CI	P value
Housing tenure				
Owns/mortgage	3.3	1.88	0.94, 3.77	0.075
Social housing	15.9	4.08	3.09, 5.40	<0.001
Privately rented	80.0	Ref		
Other	0.8	2.62	0.80, 8.57	0.111
Social class				
I	6.0	0.54	0.25, 1.19	<0.001*
II	31.1	0.66	0.39, 1.12	
IIINM	16.0	Ref		
IIIM	27.5	1.07	0.65, 1.74	
IV	14.8	1.93	1.16, 3.21	
V	4.6	3.76	2.05, 6.93	
Women (5,527)				
Housing tenure				
Owns/mortgage	3.4	0.98	0.52, 1.84	0.944
Social housing	17.5	3.54	2.88, 4.35	<0.001
Privately rented	78.3	Ref		
Other	0.9	1.01	0.31, 3.26	0.990
Social class				
I	3.1	0.16	0.02, 1.00	<0.001*
II	29.4	0.71	0.54, 0.95	
IIINM	31.5	Ref		
IIIM	12.7	1.55	1.08, 2.21	
IV	17.8	1.96	1.52, 2.54	
V	5.5	2.47	1.73, 3.54	
Both genders (10,923)				
Housing tenure				
Owns/mortgage	3.4	1.28	0.80, 2.05	0.306
Social housing	16.6	3.76	3.18, 4.44	<0.001
Privately rented	79.2	Ref		
Other	0.9	1.53	0.67, 3.52	0.312
Social class				
I	4.6	0.29	0.15, 0.56	<0.001*
II	30.2	0.59	0.47, 0.75	
IIINM	23.5	Ref		
IIIM	20.4	0.87	0.68, 1.10	
IV	16.2	1.76	1.41, 2.21	
V	5.1	2.59	1.92, 3.49	
Gender*housing tenure				0.338
Gender*social class				0.180

* P value for trend for social class

Table 10.7b – Association between adult material disadvantage (housing tenure and social class, 30 yrs) and psychological distress (30 yrs) in the BCS70

BCS70 Men (5,207)	Frequency (%)	Odds ratio for reporting psychological distress	95% CI	P value
Housing tenure				
Owns/mortgage	63.6	0.50	0.39, 0.65	<0.001
Social housing	11.8	1.78	1.32, 2.39	<0.001
Privately rented	13.2	Ref		
Other	11.4	1.00	0.72, 1.37	0.988
Social class				
I	7.5	0.42	0.23, 0.77	<0.001*
II	33.4	0.78	0.58, 1.05	
IIINM	14.3	Ref		
IIIM	30.4	0.90	0.66, 1.23	
IV	11.1	1.42	1.01, 2.02	
V	3.2	1.28	0.70, 2.38	
Women (5,458)				
Housing tenure				
Owns/mortgage	66.4	0.64	0.50, 0.82	0.001
Social housing	15.9	1.75	1.33, 2.29	<0.001
Privately rented	10.8	Ref		
Other	6.9	0.96	0.67, 1.37	0.822
Social class				
I	4.7	0.47	0.28, 0.97	<0.001*
II	34.6	0.85	0.69, 1.05	
IIINM	34.9	Ref		
IIIM	12.1	1.40	1.08, 1.87	
IV	11.2	1.37	1.04, 1.86	
V	2.6	1.43	0.81, 2.40	
Both sexes (10,714)				
Housing tenure				
Owns/mortgage	65.0	0.59	0.49, 0.70	<0.001
Social housing	13.9	1.80	1.48, 2.19	<0.001
Privately rented	12.0	Ref		
Other	9.1	0.97	0.76, 1.23	0.786
Social class				
I	6.1	0.44	0.29, 0.67	<0.001*
II	34.0	0.79	0.67, 0.93	
IIINM	24.8	Ref		
IIIM	21.0	0.98	0.80, 1.19	
IV	11.2	1.35	1.08, 1.69	
V	2.9	1.27	0.83, 1.96	
Interaction between housing tenure and gender				0.211
Interaction between social class and gender				0.239

* P value for trend for social class

10.6 Educational attainment and adult psychological distress

The association between educational attainment and psychological distress was tested using logistic regression in both cohorts. The results are given in table 10.8. There is a significant trend for those with lower educational attainment to be more likely to report psychological distress, with those who have no qualifications being more than 2.5 times in the NCDS and 2.2 times in the BCS70 more likely to report psychological distress compared to those with CSE or O-level qualifications. Also those with A-level or higher qualifications were approximately 60% less likely in the NCDS and 50% less likely in the BCS70 to report psychological distress than those in the reference group.

In order to assess the extent to which the association between educational attainment and psychological distress might depend upon greater material disadvantage amongst those with fewer qualifications, the association was tested controlling for adult material disadvantage. The results of this analysis are shown in table 10.9. Whilst somewhat attenuated, the association between educational attainment and psychological distress still exists after adjusting for adult material disadvantage indicators. This suggests that whilst adult material disadvantage appears to explain some of the association, a 'direct' pathway between educational attainment and psychological distress still appears to exist independent of the association through material disadvantage. Direct and indirect pathways are explored further in chapter 12.

Table 10.8 – Association between educational attainment (23/26 yrs) and psychological distress (30/33 yrs) in the NCDS and BCS70

NCDS	Frequency (%)	Odds ratio for reporting psychological distress	95% CI	P value trend	BCS70	Frequency (%)	Odds ratio for reporting psychological distress	95% CI	P value trend
Men (5,396):					**Men (5,207):**				
Educational attainment (23 yrs)					Educational attainment (26 yrs)				
No qualifications	13.9	2.38	1.74, 3.25	<0.001	No qualifications	6.8	2.07	1.48, 2.91	<0.001
CSE 2-5/O-level	47.4	Ref			CSE 2-5/O-level	60.4	Ref		
A-level	20.3	0.58	0.39, 0.86		A-level	9.5	0.62	0.42, 0.93	
Higher qualification/degree	18.3	0.33	0.19, 0.56		Higher qualification/degree	23.3	0.47	0.34, 0.64	
Women (5,527):					**Women (5,458):**				
Educational attainment (23 yrs)					Educational attainment (26 yrs)				
No qualifications	15.6	2.69	2.16, 3.35	<0.001	No qualifications	5.2	2.43	1.73, 3.40	<0.001
CSE 2-5/O-level	52.5	Ref			CSE 2-5/O-level	60.8	Ref		
A-level	13.7	0.36	0.23, 0.57		A-level	11.2	0.69	0.51, 0.94	
Higher qualification/degree	18.2	0.44	0.31, 0.62		Higher qualification/degree	22.9	0.60	0.47, 0.76	
Both genders (10,923):					**Both genders (10,714):**				
Educational attainment (23 yrs)					Educational attainment (26 yrs)				
No qualifications	14.7	2.54	2.13, 3.03	<0.001	No qualifications	6.0	2.19	1.75, 2.74	<0.001
CSE 2-5/O-level	49.9	Ref			CSE 2-5/O-level	60.6	Ref		
A-level	17.2	0.42	0.31, 0.56		A-level	10.4	0.68	0.53, 0.87	
Higher qualification/degree	18.3	0.40	0.30, 0.53		Higher qualification/degree	23.1	0.54	0.44, 0.66	
Interaction between educational attainment and gender				0.235	**Interaction between educational attainment and gender**				0.622

Table 10.9 – Association between educational attainment (23/26 yrs) and psychological distress (30/33 yrs) controlling for material disadvantage (30/33 yrs) in the NCDS and BCS70

NCDS Men (5,396):	Frequency (%)	Odds ratio for reporting psychological distress	95% CI	P value trend	BCS70 Men (5,207):	Frequency (%)	Odds ratio for reporting psychological distress	95% CI	P value trend
Educational attainment (23 yrs)					Educational attainment (26 yrs)				
No qualifications	13.9	1.53	1.08, 2.17	<0.001	No qualifications	6.8	1.86	1.28, 2.71	<0.001
CSE 2-5/O-level	47.4	Ref			CSE 2-5/O-level	60.4	Ref		
A-level	20.3	0.69	0.45, 1.04		A-level	9.5	0.62	0.41, 0.94	
Higher qualification/degree	18.3	0.44	0.25, 0.78		Higher qualification/degree	23.3	0.50	0.36, 0.71	
Women (5,527):					Women (5,458):				
Educational attainment (23 yrs)					Educational attainment (26 yrs)				
No qualifications	15.6	1.94	1.52, 2.48	<0.001	No qualifications	5.2	1.98	1.40, 2.80	<0.001
CSE 2-5/O-level	52.5	Ref			CSE 2-5/O-level	60.8	Ref		
A-level	13.7	0.44	0.28, 0.70		A-level	11.2	0.76	0.56, 1.04	
Higher qualification/degree	18.2	0.59	0.41, 0.87		Higher qualification/degree	22.9	0.70	0.54, 0.90	
Both genders (10,923):					Both genders (10,714):				
Educational attainment (23 yrs)					Educational attainment (26 yrs)				
No qualifications	14.7	1.79	1.47, 2.18	<0.001	No qualifications	6.0	1.91	1.51, 2.43	<0.001
CSE 2-5/O-level	49.9	Ref			CSE 2-5/O-level	60.6	Ref		
A-level	17.2	0.52	0.38, 0.70		A-level	10.4	0.71	0.55, 0.91	
Higher qualification/degree	18.3	0.55	0.40, 0.76		Higher qualification/degree	23.1	0.61	0.49, 0.75	
Interaction between educational attainment and gender				0.270	**Interaction between educational attainment and gender**				0.654

10.7 Mediation by material factors across the life course

The final stage of the analysis investigating material pathways involves looking at the overall relationship between parental separation and adult psychological distress adjusting for all material factors investigated in this thesis. This was tested using logistic regression and the results are presented for both cohorts together (see tables 10.10a and 10.11b). There were no statistically significant gender differences in either cohort (NCDS, p=0.149; BCS70, p=0.654).

In the NCDS each material factor, with the exception of material disadvantage in adolescence, significantly predicts the reporting of psychological distress independently of all other material factors, confounders and parental separation. In the BCS70 all material factors except adolescent material disadvantage predict psychological distress. Upon adjustment for all material factors, the odds of reporting psychological distress in adulthood, having experienced parental separation in childhood, are somewhat attenuated. The reduction in odds appears to be of similar magnitude in both cohorts and does not differ by gender. Mother's psychological distress was also still significantly independently associated with psychological distress among cohort members in their early 30s.

Although simple, non-simultaneously estimated regression analyses are limited to some extent in providing evidence for the interrelated nature of material factors across the life course, such as that hypothesised in this project, they do give an indication of what may be seen in later analyses using path models. These results suggest that material factors may play a role in the association between parental separation and adult psychological distress but this association does not differ by gender. Material pathways are examined in more detail in chapter 12 using path analysis.

Table 10.10a – Association between parental separation (0-16 yrs) and adult psychological distress (33 yrs) controlling for material factors in the NCDS

NCDS Both genders (10,923)	Odds ratio for reporting psychological distress	95% CI	P value
Parental separation (0-16 yrs) – unadjusted for material factors			
Yes	1.75	1.35, 2.26	<0.001
No	Ref		
Parental separation (0-16 yrs) – adjusted for material factors			
Yes	1.42	1.08, 1.86	0.012
No	Ref		
Adolescent material disadvantage (16 yrs)			
More disadvantaged	1.16	1.01, 1.32	0.035
Less disadvantaged	Ref		
Educational attainment (23 yrs)			
No qualifications	1.70	1.40, 2.08	<0.001[a]
CSE 2-5/O-level	Ref		
A-level	0.57	0.42, 0.78	
Higher qualification/degree	0.62	0.45, 0.85	
Housing tenure (33 yrs)			
Owner	1.25	0.78, 2.00	0.357
Social housing	2.20	1.81, 2.66	<0.001
Privately rented	Ref		
Other	1.31	0.56, 3.jh05	0.536
Social class (33 yrs)			
I	0.46	0.23, 0.93	0.003[a]
II	0.81	0.63, 1.04	
IIINM	Ref		
IIIM	0.71	0.55, 0.91	
IV	1.14	0.89, 1.45	
V	1.30	0.93, 1.82	
Mother's age (0 yrs) – per 1 yr increase	1.01	1.00, 1.02	0.185
Mother's psychological distress (11 yrs)			
Yes	1.10	0.63, 1.91	0.731
No	Ref		
Mother's education (0 yrs)			
Left at minimum age	1.15	0.91, 1.44	0.731
Stayed beyond minimum age	Ref		
Father's social class (0 yrs)			
I	0.79	0.44, 1.41	0.214[a]
II	0.81	0.59, 1.11	
IIINM	0.97	0.72, 1.30	
IIIM	Ref		
IV	0.97	0.76, 1.22	
V	1.07	0.83, 1.37	
Interaction between separation and gender			0.149

[a] P value for trend

Table 10.10b – Association between parental separation (0-16 yrs) and adult psychological distress (30 yrs) controlling for material factors in the BCS70

BCS70 Both genders (10,714)	Odds ratio for reporting psychological distress	95% CI	P value
Parental separation (0-16 yrs) – unadjusted for material factors			
Yes	1.50	1.25, 1.80	<0.001
No	Ref		
Parental separation (0-16 yrs) – adjusted for material factors			
Yes	1.32	1.08, 1.60	0.007
No	Ref		
Adolescent material disadvantage (16 yrs)			
More disadvantaged	1.08	0.91, 1.27	0.373
Less disadvantaged	Ref		
Educational attainment (26 yrs)			
No qualifications	1.81	1.42, 2.30	<0.001[a]
CSE 2-5/O-level	Ref		
A-level	0.76	0.59, 0.98	
Higher qualification/degree	0.67	0.54, 0.85	
Housing tenure (30 yrs)			
Owner	0.58	0.49, 0.70	<0.001
Social housing	1.42	1.16, 1.75	0.042
Privately rented	Ref		
Other	0.94	0.74, 1.20	0.728
Social class (30 yrs)			
I	0.64	0.41, 0.99	0.926[a]
II	0.95	0.79, 1.13	
IIINM	Ref		
IIIM	0.79	0.64, 0.98	
IV	0.97	0.77, 1.24	
V	0.78	0.49, 1.23	
Mother's age (0 yrs) – per 1 yr increase	1.00	0.98, 1.01	0.426
Mother's psych distress (5 yrs)			
Yes	1.98	1.50, 2.61	<0.001
No	Ref		
Mother's education (0 yrs)			
Left at minimum age	0.99	0.85, 1.15	0.899
Stayed beyond minimum age	Ref		
Father's social class (0 yrs)			
I	0.86	0.61, 1.21	0.126[a]
II	0.82	0.65, 1.03	
IIINM	0.88	0.72, 1.08	
IIIM	Ref		
IV	1.00	0.84, 1.18	
V	1.00	0.82, 1.23	
Interaction between separation and gender			0.721

[a] P value for trend

10.8 Is the age of the child at separation important?

The analyses conducted so far on material pathways have treated all separations as having an equal association regardless of the age of the child. It has been suggested previously that young children may be more affected by parental separation compared to older children or adolescents, both in terms of relational and material mechanisms (see section 2.6). This section investigates whether the age of the child at the time of separation is important for material pathways; that is, whether the association between parental separation and both adolescent material disadvantage and educational attainment varies according to the age of the child.

The results of the logistic regression analysis testing the association between the age of separation and material disadvantage are given in table 10.11. Despite not being statistically significant, there is an indication that those who were aged 8-11 years in the NCDS when their parents separated were more likely to be materially disadvantaged at age 16 years. In the BCS70 a statistically significant trend was seen for the association between age at separation and material disadvantage and this appears to be driven by the increased odds of being disadvantaged at age 16 years if parental separation was experienced between the ages of 10 and 16 years. This trend is in the opposite direction to that hypothesised. It may be that remarriage plays a role in that those who experience separation earlier are more likely to have mothers who remarry before the age of 16 years and therefore are perhaps less likely to be materially disadvantaged. No gender differences were seen for either cohort.

Table 10.11 – Association between age of child at separation (0-16 yrs) and material disadvantage (16 yrs) in the NCDS and BCS70

NCDS	Frequency (%)	Odds ratio for being materially disadvantaged	95% CI	P value trend	BCS70	Frequency (%)	Odds ratio for being materially disadvantaged	95% CI	P value trend
Men					**Men**				
Age at separation					Age at separation				
0-7 yrs	39.9	Ref		0.712	0-5 yrs	16.8	Ref		0.062
8-11 yrs	28.4	1.09	0.60, 1.98		6-10 yrs	53.8	1.07	0.65, 1.76	
12-16 yrs	31.7	1.12	0.61, 2.04		11-16 yrs	29.5	1.51	0.93, 2.46	
Women					**Women**				
Age at separation					Age at separation				
0-7 yrs	39.1	Ref		0.902	0-5 yrs	16.2	Ref		0.018
8-11 yrs	30.5	1.18	0.66, 2.13		6-10 yrs	54.7	1.21	0.74, 1.97	
12-16 yrs	30.4	0.95	0.54, 1.69		11-16 yrs	29.1	1.75	1.06, 2.90	
Both					**Both**				
Age at separation					Age at separation				
0-7 yrs	39.4	Ref		0.842	0-5 yrs	16.5	Ref		0.005
8-11 yrs	29.5	1.13	0.75, 1.72		6-10 yrs	54.3	1.14	0.79, 1.65	
12-16 yrs	31.1	1.03	0.70, 1.52		11-16 yrs	29.3	1.63	1.12, 2.39	
Interaction between age at separation and gender				0.860	**Interaction between age at separation and gender**				0.911

Table 10.12 – Association between age of child at separation (0-16 yrs) and educational attainment (23/26 yrs) in the NCDS and BCS70

NCDS Men	Frequency (%)	Odds ratio for having an educational qualification	95% CI	P value trend	BCS70 Men	Frequency (%)	Odds ratio for having an educational qualification	95% CI	P value trend
Age at separation					Age at separation				
0-7 yrs	39.9	Ref		0.164	0-5 yrs	16.8	Ref		0.870
7-11 yrs	28.4	1.14	0.70, 1.86		5-10 yrs	53.8	0.99	0.61, 1.59	
11-16 yrs	31.7	1.35	0.87, 2.09		10-16 yrs	29.5	1.04	0.60, 1.78	
Women					**Women**				
Age at separation					Age at separation				
0-7 yrs	39.1	Ref		0.488	0-5 yrs	16.2	Ref		0.553
7-11 yrs	30.5	1.23	0.75, 2.00		5-10 yrs	54.7	1.02	0.64, 1.61	
11-16 yrs	30.4	1.16	0.74, 1.79		10-16 yrs	29.1	0.88	0.52, 1.49	
Both					**Both**				
Age at separation					Age at separation				
0-7 yrs	39.4	Ref		0.136	0-5 yrs	16.5	Ref		0.786
7-11 yrs	29.5	1.18	0.85, 1.65		5-10 yrs	54.3	1.00	0.70, 1.43	
11-16 yrs	31.1	1.25	0.92, 1.70		10-16 yrs	29.3	0.96	0.63, 1.44	
Interaction between age at separation and gender				0.912	**Interaction between age at separation and gender**				0.759

The association between parental separation and educational attainment was also assessed for modification by the age of the child. Were cohort members who experienced separation in early childhood more likely to have lower educational qualifications than if separation had been experienced at later ages? The results of ordered logistic regression analyses testing this are shown in table 10.12. The results show that educational attainment is not affected by the age of the child at the time of separation in either cohort and the results also do not vary by gender. Despite not being statistically significant, the results in the NCDS suggest an increasing trend in the hypothesised direction; those who experience separation in early childhood are less likely to have educational qualifications than if separation occurred later in childhood. In the BCS70 the trend appears to be operating in the opposite direction so that those who experience separation in early childhood are more likely to have educational qualifications than if it occurred in later childhood, however this was again not statistically significant.

10.9 Are there differences by cohort?

If the results in this chapter are compared across cohorts it can be seen that some differences are evident. Some associations appear to be stronger in the NCDS as hypothesised. For example the association between adolescent material disadvantage and educational attainment appears to be more pronounced in the NCDS. In addition the associations between educational attainment and housing tenure, and the associations between both social class and housing tenure and psychological distress were all stronger in the NCDS than the BCS70. However the association between parental separation and material disadvantage in adolescence appeared to be stronger in the BCS70 as well as the association between educational attainment and social class, suggesting that educational qualifications have become more important for occupational status and consequently social class.

There was relatively little difference in the magnitude of the association between educational attainment and psychological distress in either cohort. In the final analyses of material pathways, whereby logistic regression was conducted to look at the association between parental separation and psychological distress controlling for all material factors, the effect of parental separation appeared to be attenuated by a similar degree in both cohorts. This therefore suggests that the importance of material factors in the association between parental separation and psychological distress has not changed

over time. If hypothesis 2d were supported, then a greater reduction in association would have been expected in the NCDS compared to the BCS70, however this was not the case. Further analysis using path models will show whether different pathways are more important in one cohort than the other (chapter 12).

10.10 Summary of results for objective 2

A more comprehensive discussion is given in chapter 13. However to briefly summarise, this chapter has shown that material factors appear to explain some of the association between parental separation occurring during childhood and the reporting of psychological distress in adulthood, and that there is evidence in both cohorts for all of the proposed associations in the conceptual model. Hypothesis 2a, that those experiencing parental separation would be more likely to be materially disadvantaged as an adolescent and an adult and have a lower level of educational attainment, is therefore supported by these results. With regards to gender differences, only one association differs for men and women – the association between educational attainment and social class in the BCS70, and therefore hypothesis 2b is partially supported by these findings. This appears to be driven by women who have no educational qualifications being much more likely than men to be in a less advantaged social class by their early 30s. Therefore there was partial support for hypothesis 2b in this respect and in the direction hypothesised, with women being more adversely affected than men.

With regards to hypothesis 2c, that separation in early childhood would have a stronger association with material factors, there was some indication that age was important but in the opposite direction to that hypothesised; those who experienced separation in later childhood were more likely to be materially disadvantaged at age 16 years compared to those who experienced separation in early childhood in the BCS70. Therefore hypothesis 2c was not supported. With regards to hypothesis 2d, there was some support for the hypothesis that material factors would play more of a role in the NCDS as many of the associations appeared to be stronger in the NCDS compared to the BCS70. However other associations did not differ by cohort and some were stronger in the BCS70. Therefore there is only partial support for this hypothesis. However after adjusting for all material factors, there was still a significant association between parental separation and adult psychological distress in both cohorts. One such other potential mechanism is relational pathways, the testing of which is covered in the next chapter.

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Chapter 11 Are relational factors involved in the association between parental separation and adult psychological distress and does this differ by cohort, by age and by gender?

The second set of pathways tested in this thesis between parental separation and adult psychological distress are those operating through relational factors (the quality of parent-child and peer relationships, and adult partnership status). The evidence in the literature review presented suggests that these are important and are likely to explain some of the association between parental separation and psychological distress. This is tested using the NCDS and BCS70. In addition there is little concrete evidence regarding gender and age differences and therefore this chapter aims to rectify this to some extent. Changes over time, by comparing data from the cohorts, will also be considered.

11.1 Statistical analysis methods

Similar to the previous chapter investigating material pathways, this chapter also involves the use of regression to test the associations indicated in figure 3.1. Logistic regression was used for binary outcomes such as peer relationship scores, ordered logistic regression used for ordinal outcomes such as parent-child relationship quality and multinomial logistic regression used for categorical outcomes such as adult partnership status. All analyses were initially conducted separately for men and women and gender differences were tested using Wald tests (testing gender interactions). Differences by the age of the child were tested by substituting the separation timing variable into the models in place of the overall separation variable using the sub-sample of participants who experienced parental separation during childhood. In order to assess whether relational variables might be involved in the association between parental separation and psychological distress, all relational variables were entered into the model simultaneously in order to see whether there was attenuation in the effect estimate. All tables are again presented at the end of the chapter.

11.2 Parental separation and parent-child relationship quality

There is much evidence from previous research to suggest that those who experience parental separation will experience poorer quality parent-child relationship than those who do not (see section 2.3.2.1). For example it has been shown that the decline in quality of relationships between parents may adversely affect the quality of parent-child

relationships. Parent-child relationship quality in this thesis is used as an indicator of attachment security in adolescence along with peer relationship quality tested in the next section. The association between parental separation and parent-child relationship quality is tested using ordered logistic regression in both cohorts. Different scales were used in the NCDS and BCS70 (see section 6.4.1); in the NCDS the average parent-child relationship quality score ranges from 1-5 (via increments of 0.5) and in the BCS70 parent-child relationship quality factor scores were divided into tertiles. The results of the analysis are given in table 11.1. The results show that, among participants in both the NCDS and BCS70, those who experienced separation reported significantly poorer quality parent-child relationships compared to those who grew up with both parents. There was no difference between men and women in these two cohorts in this respect. These results cannot be compared directly between cohorts because of the different variables which were available for use in each.

11.3 Parental separation and peer relationship quality

Peer relationship quality indicators were used as an additional indicator of attachment security in adolescence in the NCDS and BCS70. As they were all binary variables the associations with parental separation were tested using logistic regression and the results are given in table 11.2 for both cohorts. The table shows that both boys and girls who experience parental separation are more likely to be reported as frequently fighting other children at age 16 years than those who grew up with both parents. The association was similar for both genders contrary to what was anticipated. Those who experienced separation in childhood were also more likely to be reported as bullying other children at age 16 years and the association did not differ statistically by gender. Similarly those children who experienced parental separation are more likely to be reported as being unpopular with other children than those who grew up in intact families and this association does not differ for boys and girls. In the BCS70 those who experienced separation were also more likely to be reported as preferring to be alone than those who had not. This was not statistically significant in the NCDS. These results therefore may indicate a less secure attachment style among young people who have experienced parental separation with consequences for forming and maintaining relationships with their peers.

Table 11.1 – Association between parental separation (0-16 yrs) and poor parent-child relationship quality (16 yrs) in the NCDS and BCS70

NCDS Men (5,396):	Frequency (%)	Odds ratio of poorer quality parent-child relations	95% CI	p value	BCS70 Men (5,207):	Frequency (%)	Odds ratio for poorer quality parent-child relations	95% CI	p value
Parental separation (0-16 yrs)					Parental separation (0-16 yrs)				
Yes	9.1	1.96	1.53, 2.51	<0.001	Yes	20.5	1.25	1.01, 1.55	0.041
No	90.9	Ref			No	79.6	Ref		
Women (5,527):					**Women (5,458):**				
Parental separation (0-16 yrs)					Parental separation (0-16 yrs)				
Yes	9.1	1.36	1.06, 1.76	0.017	Yes	20.1	1.28	1.10, 1.50	0.002
No	90.9	Ref			No	79.9	Ref		
Both genders (10,923):					**Both genders (10,714):**				
Parental separation (0-16 yrs)					Parental separation (0-16 yrs)				
Yes	9.1	1.62	1.35, 1.94	<0.001	Yes	20.3	1.27	1.09, 1.47	0.003
No	90.9	Ref			No	79.7	Ref		
Interaction between separation and gender				0.068	**Interaction between separation and gender**				0.706

NB: Different items used to measure parent-child relationship quality in either cohort

Table 11.2 – Association between parental separation (0-16 yrs) and peer relationship quality (16 yrs) in the NCDS and BCS70

Child fights others	NCDS			BCS70		
	Frequency (%)	Odds ratio for reporting child fights others (95% CI)		Frequency (%)	Odds ratio for reporting child fights others (95% CI)	
Men			p value			p value
Parental separation (0-16 yrs)						
No	90.9	Ref		79.6	Ref	
Yes	9.1	1.58 (1.16, 2.00)	0.009	20.5	1.57 (1.22, 2.02)	0.001
Women						
Parental separation (0-16 yrs)						
No	90.9	Ref		79.9	Ref	
Yes	9.1	1.49 (1.10, 2.00)	0.009	20.1	1.46 (1.13, 1.89)	0.005
Both (10,923)						
Parental separation (0-16 yrs)						
No	90.9	Ref		79.7	Ref	
Yes	9.1	1.52 (1.22, 1.92)	<0.001	20.3	1.51 (1.27, 1.81)	<0.001
Interaction between separation and gender			0.769			0.686
Child bullies others						
	Frequency (%)	Odds ratio for reporting child bullies others (95% CI)		Frequency (%)	Odds ratio for reporting child bullies others (95% CI)	
Men			p value			p value
Parental separation (0-16 yrs)						
No	90.9	Ref		79.6	Ref	
Yes	9.1	1.56 (1.51, 2.75)	<0.001	20.5	2.02 (1.41, 2.90)	<0.001
Women						
Parental separation (0-16 yrs)						
No	90.9	Ref		79.9	Ref	
Yes	9.1	1.91 (1.70, 3.14)	<0.001	20.1	2.28 (1.58, 3.30)	<0.001
Both						
Parental separation (0-16 yrs)						
No	90.9	Ref		79.7	Ref	
Yes	9.1	1.73 (1.32, 2.71)	<0.001	20.3	2.14 (1.59, 2.87)	<0.001
Interaction between separation and gender			0.495			0.577

Child prefers to be alone						
Men	**Frequency (%)**	**Odds ratio for reporting child prefers to be alone (95% CI)**	**p value**	**Frequency (%)**	**Odds ratio for reporting child prefers to be alone (95% CI)**	**p value**
Parental separation (0-16 yrs)						
No	90.9	Ref		79.6	Ref	
Yes	9.1	1.07 (0.85, 1.35)	0.568	20.5	1.07 (0.90, 1.28)	0.415
Women						
Parental separation (0-16 yrs)						
No	90.9	Ref		79.8	Ref	
Yes	9.1	1.05 (0.82, 1.35)	0.673	20.2	1.18 (0.99, 1.42)	0.057
Both						
Parental separation (0-16 yrs)						
No	90.9	Ref		79.7	Ref	
Yes	9.1	1.06 (0.90, 1.26)	0.484	20.3	1.13 (1.00, 1.28)	0.050
Interaction between separation and gender			0.932			0.430
Child is not much liked						
Men	**Frequency (%)**	**Odds ratio for reporting child is not much liked (95% CI)**	**p value**	**Frequency (%)**	**Odds ratio for reporting child not much liked (95% CI)**	**p value**
Parental separation						
No	90.9	Ref		79.6	Ref	
Yes	9.1	1.80 (1.10, 2.95)	0.020	20.5	1.50 (1.08, 2.09)	0.017
Women						
Parental separation (0-16 yrs)						
No	90.9	Ref		79.8	Ref	
Yes	9.1	1.29 (0.69, 2.40)	0.430	20.2	1.53 (1.10, 2.14)	0.012
Both						
Parental separation						
No	90.9	Ref		79.7	Ref	
Yes	9.1	1.58 (1.05, 2.39)	0.028	20.3	1.52 (1.20, 1.93)	0.001
Interaction between separation and gender			0.375			0.934

11.4 Parental separation and adult partnership status

The association between parental separation and adult partnership status was tested using multinomial logistic regression and the results are given in table 11.3. Being married is taken as the reference category as this is the modal partnership status at this age. Column interactions have been calculated in order to test for gender differences within each category of partnership status, comparing to the category of married in each case.

In the NCDS support is found for the 'intergenerational transmission' of divorce as those who experienced parental separation during childhood were more likely to be separated, divorced or remarried compared to married. There were no gender differences seen. In the BCS70 those who experienced their parent's separation were more likely to be separated, divorced, single or cohabiting compared to married. Again no gender differences were seen. Cohabitations are known to be less stable than marriages and are perhaps indicative of a less secure attachment style. Therefore it is possible that the quality of parent-child relationships and peer relationships, both thought to be indicators of attachment security in adolescence, are linked to adult partnership status, but in a way that changes with social norms.

11.5 Parent-child relationship quality and adult partnership status

The association between parent-child relationship quality and adult partnerships status was tested using multinomial logistic regression as it was thought that partnership status should be treated as an unordered categorical variable, for example not assuming that one partnership status was favourable or more 'healthy' than any other. The results are given in table 11.4. The highest quality of parent-child relationships is taken as the reference category in both cohorts.

Table 11.3 – Association between parental separation (0-16 yrs) and adult partnership status (30/33 yrs) in the NCDS and BCS70

NCDS		Partnership status RRR (95% CI)				
Men (5,396)	**Frequency (%)**	**Cohabiting**	**Single**	**Married**	**Remarried**	**Separated/ divorced**
Parental separation (0-16 yrs)						
Yes	9.1	1.30 (0.84, 2.02)	0.92 (0.66, 1.28)	Ref	1.39 (0.89, 2.19)	1.94 (1.40, 2.67)***
No	90.9	1.00	1.00	Ref	1.00	1.00
Women (5,527)						
Parental separation (0-16 yrs)						
Yes	9.1	1.22 (0.74, 2.02)	0.98 (0.67, 1.43)	Ref	1.56 (1.11, 2.19)**	1.57 (1.87, 2.08)**
No	90.9	1.00	1.00	Ref	1.00	1.00
Both genders (10,923)						
Parental separation (0-16 yrs)						
Yes	9.1	1.27 (0.90, 1.79)	0.94 (0.72, 1.23)	Ref	1.49 (1.14, 1.96)**	1.72 (1.40, 2.11)***
No	90.9	1.00	1.00	Ref	1.00	1.00
Interaction between separation and partnership status (column interactions)		0.906	0.719		0.608	0.418
BCS70						
Men (5,207)						
Parental separation (0-16 yrs)						
Yes	20.5	1.14 (0.91, 1.42)	1.08 (0.90, 1.31)	Ref	1.50 (0.78, 2.89)	1.48 (1.06, 2.06)*
No	79.6	1.00	1.00	Ref	1.00	1.00
Women (5,458)						
Parental separation (0-16 yrs)						
Yes	20.1	1.27 (1.03, 1.57)*	1.25 (1.01, 1.53)*	Ref	1.37 (0.80, 2.34)	1.30 (0.98, 1.73)
No	79.9	1.00	1.00	Ref	1.00	1.00
Both genders (10,714)						
Parental separation (0-16 yrs)						
Yes	20.3	1.21 (1.05, 1.39)*	1.16 (1.01, 1.32)*	Ref	1.42 (0.94, 2.25)	1.37 (1.10, 1.70)**
No	79.7	1.00	1.00	Ref	1.00	1.00
Interaction between separation and partnership status (column interactions)		0.364	0.199		0.887	0.651

*p≤0.05; **p≤0.01; ***p≤0.001

Table 11.4 – Association between parent-child relationship quality (16 yrs) and adult partnership status (30/33 yrs) in the NCDS and BCS70

NCDS	Partnership status RRR (95% CI)				
Men (5,396)	Cohabiting	Single	Married	Remarried	Separated/ divorced
Poor parent-child rel (16 yrs)	1.15 (0.97, 1.37)	1.03 (0.90, 1.17)	Ref	1.11 (0.92, 1.34)	**1.31 (1.13, 1.51)***
Women (5,527)					
Poor parent-child rel (16 yrs)	1.56 (1.31, 1.85)***	1.20 (1.05, 1.38)**	Ref	1.35 (1.17, 1.57)***	1.21 (1.07, 1.37)**
Both (10,923)					
Poor parent-child rel (16 yrs)	1.33 (1.17, 1.50)***	1.10 (1.00, 1.20)	Ref	1.26 (1.12, 1.41)***	1.25 (1.14, 1.38)***
Interaction between parent-child relationship and gender	0.012	0.097		0.091	0.467
BCS70					
Men (5,207)					
Poor parent-child rel (16 yrs)	1.12 (1.00, 1.24)*	1.08 (0.98, 1.20)	Ref	1.05 (0.71, 1.55)	0.96 (0.77, 1.20)
Women (5,458)					
Poor parent-child rel (16 yrs)	1.17 (1.04, 1.32)*	1.16 (1.05, 1.28)***	Ref	1.21 (0.91, 1.62)	1.03 (0.89, 1.21)
Both (10,714)					
Poor parent-child rel (16 yrs)	1.17 (1.08, 1.27)***	1.15 (1.07, 1.24)***	Ref	1.13 (0.90, 1.43)	0.99 (0.88, 1.13)
Interaction between parent-child relationship and gender	0.522	0.336		0.554	0.585

*p≤0.05; **p≤0.01; ***p≤0.001

In both cohorts there is an association between parent-child relationship quality and partnership status. In particular in the NCDS poorer quality parent-child relations are associated with the reduced likelihood of being married compared to being in other partnership types. There was a statistically significant gender interaction found which suggests that the association between parent-child relationships and being in a cohabiting relationship compared to being married is stronger for women compared to men in the NCDS. In the BCS70 the chances of being in a cohabitating relationship or being single increases with increasingly poor quality parent-child relationship with no statistically significant gender differences seen. In the BCS70 poorer quality parent-child relationships do not increase the likelihood of being separated, divorced or remarried in contrast to findings for the NCDS. The cohort differences seen here may be due to differences in partnership status norms; for example, fewer BCS70 participants were married by age 30 (42.3%) than NCDS participants married by age 33 years (63.8%) therefore BCS70 participants are less likely to be remarried, separated or divorced as fewer will have married in the first place. Cohabitations are more common in this cohort (21.5% in BCS70 compared to 5.5% in the NCDS) and as previously mentioned these are known to be less stable than marriages and if separation occurred participants would be classified as 'single' rather than 'separated/divorced'. It is therefore possible that those who had poorer quality parent-child relationships in the later cohort a type of partnership that is indicative of a less secure attachment style. These relationships are also at higher risk of breakdown, but one which is more likely to be classified as a return to the status of being single.

11.6 Peer relationship quality and adult partnership status

The other indicator of attachment security at age 16 years is peer relationship quality and it is hypothesised that these variables will be associated with adult partnership status, particularly those partnerships which may be indicative of a less secure attachment style. Similar to the section above this association was tested using multinomial logistic regression assuming no ordering of partnership status. The associations are shown in tables 11.5a and 11.5b.

Table 11.5a – Association between peer relationship quality (16 yrs) and adult partnership status (33 yrs) in the NCDS

NCDS	Partnership status RRR (95% CI)				
Men (5,396)	**Cohabiting**	**Single**	**Married**	**Remarried**	**Separated/divorced**
Child fights others	1.13 (0.76, 1.66)	0.90 (0.66, 1.22)	Ref	1.05 (0.68, 1.60)	1.16 (0.85, 1.60)
Child bullies others	1.04 (0.58, 1.86)	0.84 (0.53, 1.35)	Ref	1.46 (0.89, 2.39)	1.28 (0.82, 2.00)
Child is not much liked	1.17 (0.57, 2.38)	1.67 (1.13, 2.47)**	Ref	1.13 (0.58, 2.20)	1.05 (0.61, 1.79)
Child prefers to be alone	1.25 (0.97, 1.59)	1.55 (1.28, 1.89)***	Ref	0.95 (0.72, 1.26)	1.03 (0.82, 1.30)
Women (5,527)					
Child fights others	0.91 (0.57, 1.46)	1.07 (0.79, 1.45)	Ref	1.06 (0.75, 1.51)	1.17 (0.90, 1.53)
Child bullies others	1.19 (0.62, 2.27)	0.91 (0.56, 1.48)	Ref	1.31 (0.82, 2.10)	1.49 (1.02, 2.18)*
Child is not much liked	1.34 (0.56, 3.19)	1.33 (0.75, 2.37)	Ref	1.34 (0.71, 2.55)	1.34 (0.74, 2.42)
Child prefers to be alone	1.03 (0.77, 1.38)	1.30 (1.06, 1.60)*	Ref	0.85 (0.67, 1.07)	0.96 (0.79, 1.16)
Both genders (10,923)					
Child fights others Gender-fights interaction P value	1.02 (0.75, 1.37) 0.564	0.96 (0.77, 1.19) 0.323	Ref	1.07 (0.82, 1.40) 0.854	1.18 (0.97, 1.44) 0.848
Child bullies others Gender-bullies interaction P value	1.11 (0.71, 1.73) 0.696	0.88 (0.64, 1.22) 0.775	Ref	1.36 (0.98, 1.91) 0.812	1.39 (1.03, 1.86)* 0.521
Child is not much liked Gender-liked interaction P value	1.28 (0.76, 2.15) 0.837	1.62 (1.18, 2.24)** 0.466	Ref	1.20 (0.77, 1.86) 0.741	1.16 (0.78, 1.72) 0.557
Child prefers to be alone Gender-alone interaction P value	1.18 (0.97, 1.44) 0.711	1.49 (1.30, 1.71)*** 0.530	Ref	0.87 (0.73, 1.03) 0.418	0.97 (0.84, 1.13) 0.086

*p≤0.05; **p≤0.01; ***p≤0.001; Effects compare those who are reported as having the peer relationship difficulty compared to those who don't

Table 11.5b – Association between peer relationship quality (16 yrs) and adult partnership status (30 yrs) in the BCS70

BCS70	Partnership status RRR (95% CI)				
Men (5,207)	**Cohabiting**	**Single**	**Married**	**Remarried**	**Separated/ divorced**
Child fights others	1.06 (0.78, 1.46)	1.16 (0.88, 1.53)	Ref	0.69 (0.20, 2.43)	1.66 (1.05, 2.64)*
Child bullies others	1.02 (0.70, 1.46)	1.09 (0.79, 1.52)	Ref	1.29 (0.43, 3.89)	1.30 (0.72, 2.34)
Child is not much liked	0.99 (0.66, 1.50)	1.46 (1.08, 1.96)**	Ref	0.79 (0.14, 4.45)	1.52 (0.86, 2.67)
Child prefers to be alone	1.03 (0.85, 1.26)	1.31 (1.11, 1.54)***	Ref	0.73 (0.39, 1.37)	0.95 (0.71, 1.27)
Women (5,458)					
Child fights others	1.19 (0.91, 1.57)	1.29 (1.01, 1.66)*	Ref	1.46 (0.76, 2.81)	1.21 (0.82, 1.78)
Child bullies others	1.47 (1.00, 2.15)*	1.45 (1.01, 2.09)*	Ref	0.97 (0.33, 2.82)	1.55 (0.93, 2.57)
Child is not much liked	1.22 (0.83, 1.80)	1.38 (0.99, 1.93)	Ref	1.49 (0.59, 3.75)	1.08 (0.62, 1.89)
Child prefers to be alone	1.11 (0.94, 1.31)	1.32 (1.13, 1.55)***	Ref	1.17 (0.75, 1.83)	1.01 (0.79, 1.29)
Both (10,714)					
Child fights others Gender-fights interaction P value	1.13 (0.91, 1.39) 0.381	1.22 (1.01, 1.47)* 0.328	Ref	1.16 (0.64, 2.11) 0.245	1.38 (1.03, 1.86)* 0.371
Child bullies others Gender-bullies interaction P value	1.23 (1.00, 1.64) 0.275	1.28 (1.00, 1.64)* 0.396	Ref	1.12 (0.54, 2.30) 0.636	1.39 (0.93, 2.09) 0.804
Child is not much liked Gender-liked interaction P value	1.10 (0.82, 1.50) 0.269	1.44 (1.15, 1.81)** 0.959	Ref	1.23 (0.59, 2.59) 0.503	1.25 (0.85, 1.85) 0.490
Child prefers to be alone Gender-alone interaction P value	1.10 (0.96, 1.25) 0.661	1.36 (1.22, 1.52)*** 0.936	Ref	0.96 (0.67, 1.38) 0.262	0.97 (0.80, 1.17) 0.814

*p≤0.05; **p≤0.01; ***p≤0.001; Effects compare those who are reported as having the peer relationship difficulty compared to those who don't

Those participants who were reported by their mothers as preferring to be alone and not being liked by other children, were significantly more likely to be single as opposed to married at age 33 years. Also those children who were reported as bullying others at age 16 years were more likely to be separated or divorced. This may be indicative of a less secure attachment style or also of a certain style of dealing with problems which may increase the likelihood of divorce or separation. In the BCS70 there was also no statistically significant gender interactions and those who were reported as having peer relationship problems for each of the four variables were significantly more likely to be single at age 30. In addition, those who were reported as frequently fighting others were more likely to be separated or divorced by age 30 years and those who were reported as bullying other children were also more likely to be cohabiting although only marginally so (p=0.046). Again these peer problems may indicate both less healthy strategies for dealing with relationship problems and also a less secure attachment style. In the NCDS no statistically significant gender-peer relationship interactions were found (see p values for gender-peer relationship quality indicators under effect sizes for both genders in table 11.5a).

The conceptual model guiding this analysis suggests that part of the association between parental separation and adult partnership status may be explained by a less secure attachment style, and this can be measured by both parent-child relationship quality and the quality of peer relationships in adolescence. The framework also allowed for a 'direct' pathway between parental separation and adult partnership status unmediated by these factors. The association between parental separation and adult partnership status was therefore tested using multinomial logistic regression adjusting for peer and parent-child relationships. The results are given in tables 11.6a and 11.6b. The top row for each cohort shows the previous effect estimates for comparison. In both cohorts adjusting for both peer and parent-child relationship indicators barely changes the association between parental separation and adult partnership status, therefore suggesting little role for these as mediators. It is also possible that these are not particularly good indicators of attachment security at age 16 years. Specific pathways are tested further using path analysis and the results given in chapter 12.

Table 11.6a – Association between parental separation (0-16 yrs) and adult partnership status (33 yrs) in the NCDS controlling for peer and parent-child relationship quality

NCDS		Partnership status RRR (95% CI)				
Men (5,396)	Frequency (%)	Cohabiting	Single	Married	Remarried	Separated/ divorced
Parental separation (0-16 yrs)						
Yes	9.1	1.15 (0.68, 1.95)	0.89 (0.57, 1.40)	Ref	1.47 (0.88, 2.47)	2.02 (1.40, 2.93)***
No	90.9	1.00	1.00	Ref	1.00	1.00
Women (5,527)						
Parental separation (0-16 yrs)						
Yes	9.1	1.22 (0.71, 2.12)	0.91 (0.56, 1.47)	Ref	1.59 (1.04, 2.44)*	1.62 (1.15, 2.28)**
No	90.9	1.00	1.00	Ref	1.00	1.00
Both genders (10,923)						
Parental separation (0-16 yrs) – 'unadjusted' association from table 11.3						
Yes	9.1	1.27 (0.90, 1.79)	0.94 (0.72, 1.23)	Ref	1.49 (1.14, 1.96)**	1.72 (1.40, 2.11)***
No	90.9	1.00	1.00	Ref	1.00	1.00
Parental separation (0-16 yrs) – adjusted for peer and parent-child relationships						
Yes	9.1	1.17 (0.80, 1.72)	0.90 (0.64, 1.27)	Ref	1.53 (1.10, 2.12)*	1.79 (1.40, 2.30)***
No	90.9	1.00	1.00	Ref	1.00	1.00
Interaction between separation and gender		0.751	0.878		0.680	0.378

*p≤0.05; **p≤0.01; ***p≤0.001

Table 11.6b – Association between parental separation (0-16 yrs) and adult partnership status (30 yrs) in the BCS70 controlling for peer and parent-child relationship quality

BCS70	Frequency (%)	Partnership status RRR (95% CI)				
Men (5,207)		Cohabiting	Single	Married	Remarried	Separated/divorced
Parental separation (0-16 yrs)						
Yes	20.5	1.12 (0.90, 1.41)	1.06 (0.87, 1.29)	Ref	1.48 (0.76, 2.88)	1.45 (1.03, 2.03)*
No	79.6	1.00	1.00	Ref	1.00	1.00
Women (5,458)						
Parental separation (0-16 yrs)						
Yes	20.1	1.23 (0.99, 1.52)	1.20 (0.98, 1.48)	Ref	1.33 (0.78, 2.29)	1.27 (0.95, 1.70)
No	79.9	1.00	1.00	Ref	1.00	1.00
Both genders (10,714)						
Parental separation (0-16 yrs) – 'unadjusted' association from table 11.3						
Yes	20.3	1.21 (1.05, 1.39)*	1.16 (1.01, 1.32)*	Ref	1.42 (0.94, 2.25)	1.37 (1.10, 1.70)**
No	79.7	1.00	1.00	Ref	1.00	1.00
Parental separation (0-16 yrs) – adjusted for peer and parent-child relationships						
Yes	20.3	1.18 (1.01, 1.36)*	1.12 (0.98, 1.29)	Ref	1.39 (0.93, 2.10)	1.34 (1.07, 1.67)*
No	79.7	1.00	1.00	Ref	1.00	1.00
Interaction between separation and gender		0.504	0.361		0.840	0.603

*p≤0.05; **p≤0.01; ***p≤0.001

11.7 Relational factors and adult psychological distress

In order for there to be a relational mechanism acting in the overall association between parental separation and adult psychological distress, relational factors must be associated with psychological distress. In this thesis the adulthood relational factor thought to be associated with psychological distress is partnership status; in particular whether those who are single, separated or divorced are more likely to be distressed. This association has been shown in many previous studies (see section 2.3.2.3) and is tested in this thesis using logistic regression. The results are given in table 11.7.

In the NCDS both men and women who were separated or divorced were more likely than married people, to report psychological distress. The association between partnership status and psychological distress differed for men and women. Single men were more likely to report being psychologically distressed but this was not the case for women. In addition, women who were remarried were also more likely than other married women to report psychological distress and this was not the case for men. As anticipated in the BCS70, unlike the NCDS, both single men and single women had increased odds of reporting psychological distress than married people. In addition cohabiting people were more likely to report psychological distress than those who were married. There was also a statistically significant gender difference in the association between adult partnership status and reporting of psychological distress. In this cohort it appears that the gender difference is due to differences in the excess risk of psychological distress for those who were remarried compared to married; remarried women were more likely to be psychologically distressed than other married women but there was no corresponding difference between these categories for men. Unlike the NCDS, both single men and single women had increased odds of reporting psychological distress than married people. In addition, cohabiting people were more likely to report psychological distress than those who were married. This was not the case in the NCDS but this may reflect the small numbers of people who were cohabiting in the earlier cohort (5.5% of participants cohabiting at age 33 in the NCDS and 21.5% in the BCS70) and consequently reduced statistical power.

Table 11.7 – Association between adult partnership status (30/33 yrs) and psychological distress (30/33 yrs) in the NCDS and BCS70

NCDS Men	Frequency (%)	Odds ratio for reporting psychological distress	p value	BCS70 Frequency (%)	Odds ratio for reporting psychological distress	p value
Partnership status (30/33 yrs)						
Cohabiting	6.5	1.18 (0.66, 2.12)	0.576	23.6	1.35 (1.05, 1.74)	0.020
Single	14.5	2.40 (1.71, 3.37)	<0.001	32.3	1.88 (1.51, 2.35)	<0.001
Married	63.6	Ref		37.7	Ref	
Remarried	5.8	1.35 (0.76, 2.40)	0.309	1.2	0.38 (0.09, 1.55)	0.175
Separated/divorced	9.7	2.39 (1.63, 3.52)	<0.001	5.2	2.81 (1.97, 3.99)	<0.001
Women						
Partnership status (30/33 yrs)						
Cohabiting	4.6	1.29 (0.82, 2.04)	0.271	19.6	1.42 (1.15, 1.75)	0.001
Single	9.8	1.19 (0.84, 1.67)	0.330	24.1	1.81 (1.50, 2.18)	<0.001
Married	64.5	Ref		46.6	Ref	
Remarried	8.3	1.43 (1.01, 2.02)	0.043	1.9	1.89 (1.14, 3.14)	0.013
Separated/divorced	12.9	2.89 (2.29, 3.66)	<0.001	7.7	1.68 (1.27, 2.24)	<0.001
Both genders						
Partnership status (30/33 yrs)						
Cohabiting	5.5	1.16 (0.81, 1.66)	0.409	21.5	1.33 (1.14, 1.56)	<0.001
Single	12.1	1.57 (1.24, 1.98)	<0.001	28.1	1.75 (1.53, 2.02)	<0.001
Married	64.1	Ref		42.3	Ref	
Remarried	7.0	1.49 (1.11, 2.01)	0.008	1.6	1.39 (0.88, 2.20)	0.157
Separated/divorced	11.3	2.85 (2.33, 3.48)	<0.001	6.5	2.06 (1.66, 2.56)	<0.001
Interaction between partnership status and gender			p=0.022			p=0.035

11.8 Mediation by relational factors across the life course

The final stage of the regression analysis looking at relational pathways is to test the relationship between parental separation and psychological distress controlling for all relational factors – peer relationship variables, parent-child relationships and adult partnership status. This was done using logistic regression and the results are given in table 11.8. These analyses are additionally adjusted for confounders (mother's age, psychological distress and education) and father's social class.

After adjustment for relational factors the association between parental separation and reporting of psychological distress attenuates but still remains statistically significant. This therefore suggests that the relational factors investigated do not completely explain the relationship between parental separation and psychological distress in these two cohorts. In the NCDS parent-child relationship quality, whether the child is liked, whether the child fights, partnership status, mother's educational level and father's social class at birth are all significantly associated with psychological distress even after adjustment for other relational factors, parental separation and confounders. In the BCS70 every variable in the model was significantly associated with adult psychological distress with the exception of whether the child was reported as bullying others, mother's education and mother's age. Despite the significant differences by gender seen for the relationship between adult partnership status and psychological distress in both cohorts and between parent-child relationship quality and adult partnerships in the NCDS the association between parental separation and psychological distress did not differ by gender in either cohort (p=0.277 NCDS, p=0.568 BCS70). Therefore the results are presented for both genders together.

These results provide some support for hypothesis 3a as they indicate that relational factors may play a role in the association between parental separation and adult psychological distress, although this needs to be further tested using path analysis. Regarding support for hypothesis 3b, most associations did not differ by gender. Despite this the relationship between adult partnership status and adult psychological distress was stronger for men than women in the NCDS (driven by the increased odds of reporting of psychological distress for single men), which goes against the hypothesis. Conversely, when testing this same association in the BCS70, a stronger association was seen for women compared to men (driven by increased odds of reporting of psychological distress for remarried women). Also in support of hypothesis 3b the

association between parent-child relationship quality and adult partnerships (in particular the increased likelihood of being in a cohabiting relationship as opposed to being married) was stronger for women compared to men.

Table 11.8 – Association between parental separation (0-16 yrs) and adult partnership status (30/33 yrs) controlling for relational factors

Both genders	NCDS Odds ratio for reporting psychological distress (95% CI)	P value	BCS70 Odds ratio for reporting psychological distress (95% CI)	P value
Parental separation (0-16 yrs) – unadjusted for relational factors				
Yes	1.75 (1.35, 2.26)	<0.001	1.50 (1.25, 1.83)	<0.001
No	Ref		Ref	
Parental separation (0-16 yrs) – adjusted for relational factors				
Yes	1.54 (1.11, 2.13)	0.009	1.40 (1.17, 1.69)	<0.001
No	Ref		Ref	
Poor parent-child relationship (16 yrs)	1.21 (1.08, 1.36)	0.001	1.30 (1.16, 1.45)	<0.001
Peer relationships (16 yrs)				
Child prefers to be alone				
Yes	1.05 (0.86, 1.28)	0.645	1.22 (1.02, 1.39)	0.033
No	Ref		Ref	
Child is not much liked by others				
Yes	1.95 (1.26, 3.01)	0.003	1.76 (1.39, 2.24)	<0.001
No	Ref		Ref	
Child bullies others				
Yes	1.01 (0.63, 1.60)	0.976	0.95 (0.68, 1.34)	0.781
No	Ref		Ref	
Child fights others				
Yes	1.67 (1.26, 2.23)	<0.001	1.49 (1.15, 1.93)	0.004
No	Ref		Ref	
Partnership status (33 yrs)				
Cohabiting	1.00 (0.64, 1.56)	0.993	1.27 (1.08, 1.49)	0.005
Single	1.42 (1.05, 1.90)	0.021	1.66 (1.44, 1.92)	<0.001
Married	Ref		Ref	
Remarried	1.29 (0.89, 1.86)	0.175	1.30 (0.81, 2.08)	0.277
Separated/divorced	2.49 (1.95, 3.17)	<0.001	1.96 (1.57, 2.45)	<0.001
Mother's age (0 yrs) – per 1 yr increase	1.02 (1.00, 1.05)	0.101	0.99 (0.98, 1.01)	0.292
Mother's education (0 yrs)				
Mother left at minimum age	1.59 (1.23, 2.08)	0.001	1.12 (0.97, 1.30)	0.108
Stayed beyond minimum age	Ref		Ref	

Mother's psych distress (7 yrs)				
Yes	0.96 (0.48, 1.94)	0.912	1.83 (1.52, 2.21)	<0.001
No	Ref		Ref	
Father's social class (0 yrs)				
I	0.50 (0.25, 0.98)	<0.001*	0.69 (0.50, 0.97)	<0.001*
II	0.55 (0.38, 0.81)		0.72 (0.58, 0.91)	
IIINM	0.91 (0.64, 1.28)		0.81 (0.67, 1.00)	
IIIM	Ref		Ref	
IV	1.21 (0.92, 1.60)		1.07 (0.90, 1.26)	
V	1.64 (1.23, 2.18)		1.15 (0.93, 1.40)	

* P value for trend

11.9 Is age of child at separation important?

Previous literature suggests that parental separation occurring during early childhood may have more of a detrimental effect upon the child and their development of secure attachments than when occurring in later childhood. The first association tested, in order to ascertain whether there was support for this hypothesis in these two cohorts, was between the age of the child at the time of separation and parent-child relationship quality. The results are given in table 11.9.

The results do not appear to support this hypothesis, as the association between parental separation and parent-child relationship quality is not modified by the age of the child at the time of separation. In addition, there were no differences by gender. In the NCDS there is an indication of a trend with the association between parental separation and parent-child relationships appearing to increase with increasing age; that is, if the child is older at the time of separation it appears to have a more adverse effect upon the reporting of parent-child relationships.

The next association tested was that between the age of the child at separation and peer relationships. This was tested using logistic regression and the results are given in table 11.10. Again the results show that there is no difference in this association by the age of the child at the time of separation, as those participants who were aged 0-5/7 years do not differ statistically from those participants who experienced separation at a later age in either cohort. Therefore hypothesis 3c is not supported with regards to the outcome of peer relationship quality.

Table 11.9 – Association between age of the child at separation (0-16 yrs) and parent-child relationship quality (16 yrs) in the NCDS and BCS70

NCDS Men	Odds ratio for poorer quality parent-child relations	95% CI	p value trend	BCS70 Men	Odds ratio for poorer quality parent-child relations	95% CI	p value trend
Parental separation				**Parental separation**			
0-7 yrs	Ref		0.192	0-5 yrs	Ref		0.873
7-11 yrs	1.22	0.70, 2.14		5-10 yrs	1.27	0.81, 1.99	
11-16 yrs	1.39	0.85, 2.29		10-16 yrs	1.04	0.67, 1.61	
Women				**Women**			
Parental separation				**Parental separation**			
0-7 yrs	Ref		0.862	0-5 yrs	Ref		0.918
7-11 yrs	0.99	0.60, 1.64		5-10 yrs	1.12	0.74, 1.70	
11-16 yrs	1.05	0.63, 1.73		10-16 yrs	1.05	0.68, 1.63	
Both				**Both**			
Parental separation				**Parental separation**			
0-7 yrs	Ref		0.192	0-5 yrs	Ref		0.873
7-11 yrs	1.09	0.74, 1.61		5-10 yrs	1.18	0.86, 1.63	
11-16 yrs	1.22	0.85, 1.75		10-16 yrs	1.04	0.76, 1.42	
Interaction between age at separation and gender			0.706	**Interaction between age at separation and gender**			0.844

Table 11.10 – Association between age of child at separation (0-16 yrs) and peer relationship quality (16 yrs) in the NCDS and BCS70

	NCDS		BCS70	
Child fights others **Men**	**Odds ratio for reporting child fights others (95% CI)**	**p value trend**	**Odds ratio for reporting child fights others (95% CI)**	**p value trend**
Parental separation (0-16 yrs)				
0-7 yrs 7-11 yrs 11-16 yrs	Ref 0.84 (0.42, 1.66) 0.76 (0.37, 1.54)	0.437	Ref 1.02 (0.51, 2.04) 0.94 (0.42, 2.08)	0.827
Women				
Parental separation (0-16 yrs)				
0-7 yrs 7-11 yrs 11-16 yrs	Ref 0.71 (0.34, 1.49) 1.12 (0.56, 2.27)	0.804	Ref 0.88 (0.50, 1.55) 0.95 (0.49, 1.83)	0.951
Both				
Parental separation (0-16 yrs)				
0-7 yrs 7-11 yrs 11-16 yrs	Ref 0.77 (0.48, 1.26) 0.94 (0.57, 1.54)	0.745	Ref 0.94 (0.60, 1.47) 0.94 (0.58, 1.53)	0.823
Interaction between age at separation and gender		0.586		0.895
Child bullies others **Men**	**Odds ratio for reporting child bullies others (95% CI)**	**p value trend**	**Odds ratio for reporting child bullies others (95% CI)**	**p value trend**
Parental separation (0-16 yrs)				
0-7 yrs 7-11 yrs 11-16 yrs	Ref 1.01 (0.33, 3.15) 1.18 (0.46, 2.99)	0.754	Ref 1.18 (0.51, 2.76) 0.93 (0.34, 2.53)	0.741
Parental separation (0-16 yrs)				
0-7 yrs 7-11 yrs 11-16 yrs	Ref 0.84 (0.28, 2.51) 1.48 (0.62, 3.56)	0.400	Ref 0.96 (0.45, 2.06) 0.94 (0.44, 1.99)	0.833
Parental separation (0-16 yrs)				
0-7 yrs 7-11 yrs 11-16 yrs	Ref 0.92 (0.41, 2.05) 1.32 (0.70, 2.49)	0.410	Ref 1.06 (0.57, 1.98) 0.93 (0.47, 1.82)	0.702
Interaction between age at separation and gender		0.847		0.827
Child prefers to be alone **Men**	**Odds ratio for reporting child prefers to be alone (95% CI)**	**p value trend**	**Odds ratio for reporting child prefers to be alone (95% CI)**	**p value trend**
Parental separation (0-16 yrs)				
0-7 yrs 7-11 yrs 11-16 yrs	Ref 1.16 (0.67, 1.99) 1.35 (0.80, 2.26)	0.257	Ref 0.78 (0.51, 1.18) 0.82 (0.54, 1.23)	0.437
Women				
Parental separation (0-16 yrs)				
0-7 yrs 7-11 yrs 11-16 yrs	Ref 0.79 (0.45, 1.36) 0.66 (0.39, 1.09)	0.103	Ref 0.96 (0.62, 1.49) 0.86 (0.53, 1.41)	0.496

	Odds ratio for reporting child is not much liked (95% CI)	p value trend	Odds ratio for reporting child is not much liked (95% CI)	p value trend
Both				
Parental separation (0-16 yrs)				
0-7 yrs	Ref		Ref	
7-11 yrs	0.95 (0.63, 1.43)	0.773	0.86 (0.63, 1.18)	0.313
11-16 yrs	0.95 (0.66, 1.36)		0.84 (0.60, 1.16)	
Interaction between age at separation and gender		0.145		0.677
Child is not much liked **Men**	**Odds ratio for reporting child is not much liked (95% CI)**	**p value trend**	**Odds ratio for reporting child is not much liked (95% CI)**	**p value trend**
Parental separation (0-16 yrs)				
0-7 yrs	Ref		Ref	
7-11 yrs	1.29 (0.41, 4.04)	0.925	0.87 (0.38, 1.99)	0.457
11-16 yrs	1.03 (0.35, 3.02)		0.72 (0.28, 1.84)	
Women				
Parental separation (0-16 yrs)				
0-7 yrs	Ref		Ref	
7-11 yrs	1.12 (0.25, 4.92)	0.942	0.94 (0.41, 2.19)	0.947
11-16 yrs	0.93 (0.20, 4.37)		0.97 (0.41, 2.26)	
Both				
Parental separation (0-16 yrs)				
0-7 yrs	Ref		Ref	
7-11 yrs	1.20 (0.45, 3.17)	0.990	0.90 (0.48, 1.66)	0.516
11-16 yrs	0.99 (0.41, 2.36)		0.82 (0.45, 1.51)	
Interaction between age at separation and gender		0.987		0.869

Finally the association between the age of the child at separation and adult partnership status is tested. It is thought that if the child experiences separation in early childhood it will disrupt the security of their attachment style and therefore the type of partnership they form as an adult. This was tested using multinomial logistic regression and the results are given in tables 11.11a and 11.11b. Again these results suggest no variation by the age of the child at the time of separation. Also there were no statistically significant interaction terms suggesting that this does not differ for men and women. Therefore in summary these results do not support hypothesis 3c as the age of the child does not seem to matter with regards to relational factors.

Table 11.11a – Association between age of child at separation (0-16 yrs) and adult partnership status (33 yrs) in the NCDS

NCDS	Partnership status RRR (95% CI)				
Men	**Cohabiting**	**Single**	**Married**	**Remarried**	**Separated/ divorced**
Parental separation (0-16 yrs)					
0-7 yrs	1.00	1.00	Ref	1.00	1.00
7-11 yrs	0.70 (0.27, 1.82)	0.69 (0.28, 1.67)	Ref	0.47 (0.15, 1.44)	0.70 (0.32, 1.56)
11-16 yrs	0.54 (0.18, 1.69)	1.13 (0.48, 2.63)	Ref	0.71 (0.27, 1.87)	1.56 (0.80, 3.04)
Women					
Parental separation (0-16 yrs)					
0-7 yrs	1.00	1.00	Ref	1.00	1.00
7-11 yrs	0.77 (0.22, 2.73)	1.66 (0.56, 4.93)	Ref	0.98 (0.42, 2.29)	0.79 (0.40, 1.55)
11-16 yrs	1.34 (0.45, 3.95)	1.73 (0.61, 4.91)	Ref	1.57 (0.73, 3.36)	0.64 (0.31, 1.32)
Both genders					
Parental separation (0-16 yrs)					
0-7 yrs	1.00	1.00	Ref	1.00	1.00
7-11 yrs	0.73 (0.35, 1.54)	1.00 (0.50, 1.98)	Ref	0.73 (0.38, 1.40)	0.75 (0.44, 1.28)
11-16 yrs	0.82 (0.38, 1.75)	1.32 (0.70, 2.49)	Ref	1.15 (0.65, 2.05)	1.01 (0.61, 1.69)
Interaction between separation and gender	0.544	0.476		0.451	0.077

Table 11.11b – Association between age of child at separation (0-16 yrs) and adult partnership status (30 yrs) in the BCS70

BCS70 Men	Partnership status RRR (95% CI)				
	Cohabiting	Single	Married	Remarried	Separated/divorced
Parental separation (0-16 yrs)					
0-5 yrs	1.00	1.00	Ref	1.00	1.00
5-10 yrs	0.95 (0.53, 1.71)	0.93 (0.53, 1.54)	Ref	NA	0.65 (0.29, 1.43)
10-16 yrs	0.77 (0.38, 1.52)	0.80 (0.45, 1.38)	Ref	NA	0.56 (0.23, 1.40)
Women					
Parental separation (0-16 yrs)					
0-5 yrs	1.00	1.00	Ref	1.00	1.00
5-10 yrs	0.86 (0.49, 1.51)	0.91 (0.51, 1.62)	Ref	0.59 (0.14, 2.38)	0.97 (0.43, 2.17)
10-16 yrs	0.94 (0.53, 1.65)	0.82 (0.44, 1.53)	Ref	1.32 (0.35, 4.95)	0.87 (0.37, 2.02)
Both genders					
Parental separation (0-16 yrs)					
0-5 yrs	1.00	1.00	Ref	1.00	1.00
5-10 yrs	0.90 (0.62, 1.31)	0.92 (0.61, 1.32)	Ref	1.01 (0.32, 3.20)	0.81 (0.47, 1.39)
10-16 yrs	0.85 (0.55, 1.32)	0.81 (0.53, 1.20)	Ref	1.63 (0.47, 5.71)	0.71 (0.38, 1.32)
Interaction between separation and gender	0.743	0.998		0.504	0.704

11.10 Are there differences by cohort?

If the results for each cohort are compared, there appears to be little difference with regards to the associations tested on the relational pathway in each. In each cohort parental separation is associated with poorer quality parent-child relationships, peer relationships and adult partnerships. Although there are differences with regards to the distribution of partnership types between the cohorts parental separation appears to be associated with being in partnership forms indicative of a less secure attachment style and this appears to differ somewhat between the cohorts; for example in the NCDS this is being divorced or separated whereas in the BCS70 this may be being in a cohabiting relationship or being single.

Despite there being an anticipation that with increasing services such as family counselling or mediation available to those undergoing separation or divorce, perhaps these are not being taken up or are not effective in mitigating the impact of separation on family relationships and consequently the relationships the child forms with others. Therefore the association between separation and relational factors appears not to have changed over time. This is perhaps not surprising as this may be an impact of separation which is less amenable to change over time and may go some way to explaining why the 'reduced effect' hypothesis was not support by the data used in this thesis.

11.11 Summary of objective 3 results

The results in this chapter have shown support for a relational pathway between parental separation and adult psychological distress. Parental separation was associated with reduced quality parent-child relationships and also peer relationships (hypothesis 3a). Having experienced parental separation was also associated with being in a less stable form of adult partnership, for example those who experienced separation were more likely to be separated, divorced or in a cohabiting partnership. Some gender differences were found in that women who reported poorer quality parent-child relationships at age 16 years were more likely to be cohabiting compared to men in the NCDS (hypothesis 3b). However there was also evidence to the contrary suggesting that men might be more affected, as single men were significantly more likely than women to be psychologically distressed in the NCDS. Also in the BCS70 separated or divorced men were more likely to be psychologically distressed compared to women. Therefore hypothesis 3b is partially supported.

With respect to hypothesis 3c, no differences by the age of the child were found in any of the investigated associations with parent-child relationship quality, peer relationship quality or adult partnerships. This may have been due to reduced statistical power in these analyses as they involved the sub-sample of those participants who experienced parental separation only. Finally hypothesis 3d suggested that the associations with relational factors would be stronger in the NCDS and this was found not to be the case and in fact no differences were seen between the cohorts. It is possible that the lack of differences between cohorts in relational pathways may be driving the absence of support for the 'reduced effect' hypothesis in this thesis.

Chapter 12. Are material and relational pathways operating between parental separation and psychological distress interlinked across the life course and do they vary by cohort, age and gender?

Previous research investigating the mechanisms relating parental separation and adult psychological distress has typically investigated socioeconomic/material and relational mechanisms as two distinct pathways. However these mechanisms are likely to be associated with one another and a true 'life course' approach needs to measure both direct and indirect effects across time. This chapter therefore presents the results of objective 4 which is concerned with whether relational and material pathways interlink across the life course and whether there is evidence for change over time by comparing results for the NCDS and the BCS70. Gender differences are also tested. The interlinking associations tested were those between both parent-child relationship and peer relationship quality and educational attainment, the association between educational attainment and adult partnership status, and the association between adolescent material disadvantage and both peer and parent-child relationship quality.

12.1 Statistical analysis methods

Two main stages of the analysis for objective 4 were conducted: regression using STATA and path analysis in Mplus (Muthen and Muthen 2010). The regression analyses were conducted in a manner similar to those in previous chapters, with logistic regression being used where binary outcomes were used, ordered logistic regression used for ordinal outcomes and multinomial logistic regression used for categorical variables. Wald tests were conducted to test for gender interactions.

Path analysis allows for the testing of several associations simultaneously and therefore allowed the whole conceptual model to be tested in order to ascertain whether material and relational pathways were linked and whether they were involved in the association between parental separation and adult psychological distress. Path analysis also allows for variables to be temporally ordered and therefore in these respects is preferable to simple regression. Data were converted into Mplus format using the 'stata2mplus' command. This was done for each of the 20 imputed datasets separately for both cohorts. A text file was then created listing these 20 datasets and when the 'type=imputation' option was used in Mplus these imputed datasets could be read into

the programme. This allows the analysis of each of the 20 datasets to be carried out in MPlus and the results to be combined using Rubin's rules (see section 7.4).

Probit regression was used in the path analysis, using the inverse standard normal distribution of the probability (UCLA 2011b). This method was chosen as coefficients can be easily multiplied or added together, as appropriate, to assess direct and indirect mechanisms. Both standardised[24] and unstandardised probit estimates were calculated for each association. Standardised estimates are labelled with a β prefix in tables in this chapter and can be used to compare across variables measured on different scales. In order to make the estimates more interpretable the standardised probit estimates were converted into standardised logit estimates using the following formula (Amemiya 1981;Gayle and Lambert 2009):

$$\beta\text{logit} = (\beta\text{probit} * 1.6)$$

These logit estimates were then additionally converted into odds ratios by exponentiation.

Currently Mplus version 6.1 does not permit nominal variables, such as housing tenure and adult partnership status, to be used as mediators as they would be according to the conceptual model of this thesis. One solution to this problem is to order categories of the variables. This was not done, as previously mentioned in section 11.5 with regards to partnership status, as it was felt that it should not be assumed that one partnership status was superior to another and also that the ordering chosen may vary between cohorts. Instead a series of dummy variables were created for each of these variables. These were entered into the path analysis simultaneously with the original form of the variable; in associations where these two variables were the dependent variables they were treated in the original categorical format but in associations where these were the independent variables the dummy variables were used to predict psychological distress.

The modelling strategy involved specifying the entire path model as outlined in the conceptual model (see fig. 3.1). The model was then refined by inspecting the modification indices and model fit statistics. Only sensible modifications were made as indicated by the modification indices. These changes were those which made sense

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[24] STDYX standardisation was used whereby estimates were standardised on both the X and Y variables

theoretically, for example not those suggesting a pathway working backwards across the life course. The model fit statistics used were the Root Mean Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI). A model with a good fit would be indicated by a RMSEA value of less than 0.05, and a CFI and TLI value of greater than 0.95 (Hu and Bentler 1999). Based on the model fit and modification indices paths were also added. Statistically non-significant associations were removed one by one starting with the association which was the least statistically significant (a p value closest to 1) in order to identify the mechanisms through which parental separation resulted in increased risk of psychological distress. This was repeated until all associations were statistically significant at the 5% level. This process allowed for the evaluation of which mechanisms were operating between parental separation and adult psychological distress and whether material and relational pathways were interlinked across the life course.

In order to assess whether material or relational mechanisms were more important in the association between parental separation and psychological distress, their relative weight was tested using the 'model constraint' command in MPlus. This performs a Wald test, testing whether the difference between all relational and material associations is equal to zero, by testing the null hypothesis that each set of pathways contributes an equal amount in explaining the association between parental separation and adult psychological distress (an example of this analysis is given in appendix 6).

Assessment of the conceptual model in this thesis required the separation of direct and indirect mechanisms acting between parental separation and adult psychological distress. This is referred to as the 'decomposition of effects' in path analysis and is one of the main advantages of using this method over simple regression. The indirect effect refers to the association between two variables which is operating through one or more other (mediating) variables. An example in this thesis would be the association between parental separation and psychological distress which is operating through both material and relational mechanisms.

The direct effect refers to the association between two variables which is not operating through any other variables, although it should be noted that this may be due to additional factors not accounted for in this model. An example in this thesis would be the direct association between parental separation and psychological distress. The total

effect is therefore the sum of the direct and indirect effects. In this example the total effect[25] would be that of parental separation on psychological distress through both material and relational mechanisms and also through a potential direct association.

It was not possible to look at the decomposition of effects in Mplus using imputed data and therefore this was only carried out using the first imputed dataset for each model as this was likely to be very similar to the results that would be expected averaged across all 20 imputed datasets. The percentage of the total effect explained by both the direct and indirect mechanisms was calculated in order to allow for a direct comparison between these and to assess the overall importance of material and relational mechanisms. Because of the gender and cohort differences shown in previous chapters, the analyses were stratified by gender and cohort, leading to the production of four models – NCDS men, NCDS women, BCS70 men and BCS70 women. The results of regression analyses are presented in appendix 5 and the path analysis results are presented in this chapter. Only path analysis results are presented here as this represents a more appropriate manner of testing the conceptual model. The full model tested is presented in figure 12.1.

12.2 Path analysis results

The results are presented for the four final models in turn

12.2.1 Path analysis results for NCDS men

The first model presented in figure 12.2 is for men of the NCDS. Several pathways were removed as they were not statistically significant. For example with regards to material pathways, the pathway acting through adolescent material disadvantage has been deleted. Additionally with regards to relational pathways all paths via peer relationship quality were removed. It can be seen that there is evidence that material and relational pathways are involved in the association between parental separation and adult psychological distress and that these interlink across the life course. Table 12.1 shows the results for this model. The standardised ('probit') and standardised ('βprobit') estimates are those derived directly from the MPlus outputs. The provision of the standardised estimates allows for the direct comparison of associations.

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[25] The term 'effect' used in path modelling is a 'shorthand' term frequently used in the path analysis literature and does not necessarily imply a claim of causation. It is therefore used in the acceptable statistical sense rather than to imply causation as is often implied in social science.

Fig. 12.1 – Path model tested to evaluate role of material and relational pathway between parental separation and adult psychological distress
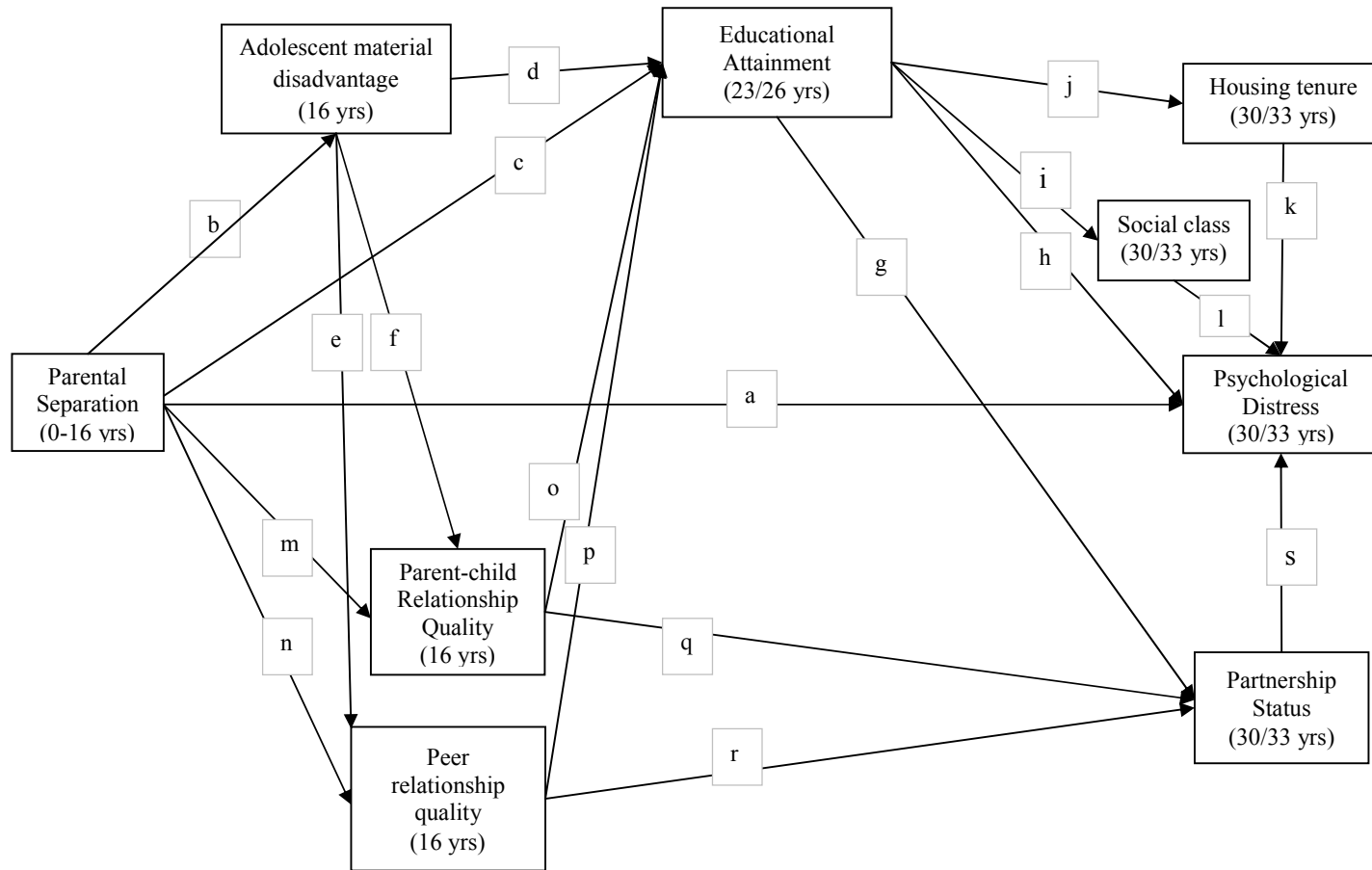
Children in separated families were 14% less likely to have high educational qualifications. For each increasing level of educational attainment there was an increased chance of being in a more advantaged social class of just under 11% and an 11% reduced risk of being divorced or separated at age 33. Overall, cohort members whose parents separated were almost 10% more likely to be psychologically distressed at age 33. The results indicate that, even after taking into account the indirect pathways acting through material and relational factors, there is still an association between parental separation and adult psychological distress. This is represented as association 'a' in both the diagram and table. The estimates in the table show that those experiencing parental separation are more likely to report psychological distress at age 33 years after accounting for the other factors in the model. This association, referred to as the 'direct effect' in path analysis terminology accounts for 40.7%[26] of the total effect of parental separation upon psychological distress.

The results for NCDS men suggest that the 'indirect effect' of parental separation, acting through material and relational factors, is more important than the 'direct effect', explaining 59.3% of the total effect of parental separation in the specified model. Some of this 'indirect effect' is accounted for by interlinking material and relational factors. For example, there is a statistically significant association between parent-child relationship quality at age 16 years and educational attainment by age 23 years in that those who report poorer quality relationships with their parents are less likely to have educational qualifications compared to those who report very high quality relationships. The other statistically significant material-relational association is that between educational attainment and partnership status with the results showing that those who earn educational qualifications are less likely to be divorced or separated compared to married. These results therefore suggest that material and relational pathways are not distinct mechanisms and educational attainment is the key factor that these inter-linkages operate through. In general associations involving educational attainment are the strongest in the model – this is assessed by comparing standardised probit estimates in table 12.1. The strongest association shown is that between educational attainment and social class and this association is in the direction expected.

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[26] The direct effect was calculated by the following formula: direct effect = total effect – indirect effect. The percentage was then calculated by dividing the direct effect by the total effect. The direct effect is that part of the association between parental separation and adult psychological distress which is not explained by the material and relational factors investigated.

Fig. 12.2 – Final model showing material and relational pathways linking parental separation and psychological distress for NCDS men
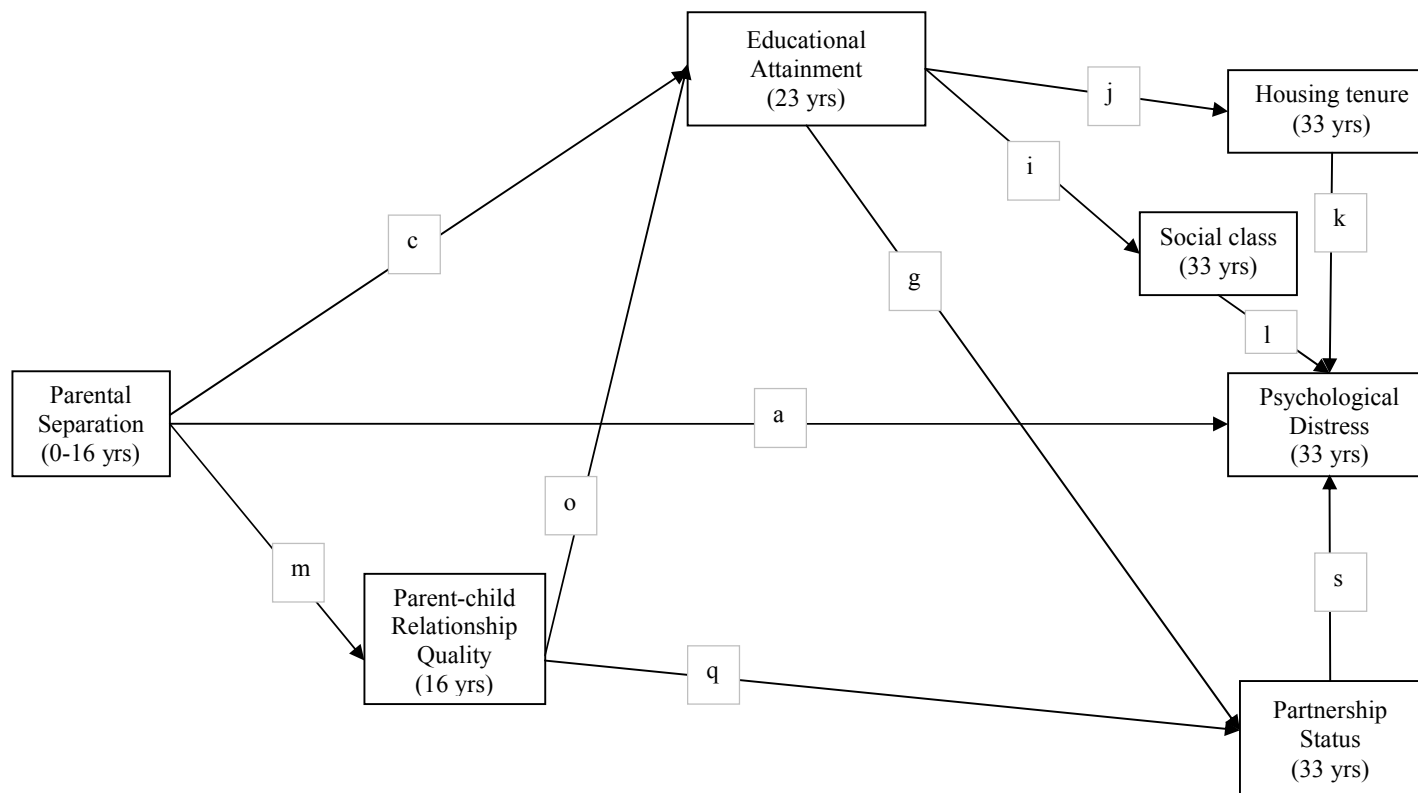
Model fit: RMSEA=0.006, CFI=0.988, TLI=0.980, R^2 for psychological distress=0.207

Interpreting the odds ratio for this association suggests that for each increasing category of educational attainment NCDS men are 66% less likely to be in lower social classes. In general the material pathways appear to have larger unstandardised probit estimates, and therefore be more strongly associated, than relational pathways. Confirmation of this was seen when testing the relative weight of material and relational pathways, as it was found that material mechanisms were more important (see appendix 6).

Table 12.1 – Effect estimates for the final model for NCDS men

Path	Association	Probit estimate	βprobit, standardised	βlogit (OR), standardised	P value
a	Separation → psych distress	0.036	0.051	0.082 (1.09)	0.002
c	Separation → educational att.	-0.353	-0.096	-0.154 (0.86)	<0.001
g	Educ. Att. → parstat (married)	Ref	Ref	Ref	Ref
	Educ. Att. → parstat (cohabiting)	-0.017	0.021	0.034 (1.03)	0.816
	Educ. Att. → parstat (single)	0.034	-0.043	-0.069 (0.93)	0.349
	Educ. Att. → parstat (remarried)	-0.002	-0.040	-0.064 (0.94)	0.119
	Educ. Att. → parstat (divorced/sep)	0.020	-0.072	-0.115 (0.89)	0.002
i	Educ. Att. → social class	-0.692	-0.571	-1.107 (0.33)	<0.001
j	Educ. Att. → tenure (own)	Ref	Ref	Ref	Ref
	Educ. Att. → tenure (priv. rent)	0.167	0.442	0.707 (2.03)	0.002
	Educ. Att. → tenure (social)	-0.157	-0.462	-0.739 (0.48)	<0.001
	Educ. Att. → tenure (other)	-0.001	-0.009	-0.014 (0.99)	0.626
k	Tenure (own) → psych distress	Ref	Ref	Ref	Ref
	Tenure (priv. rent) → psych distress	-0.047	-0.091	-0.144 (0.87)	0.668
	Tenure (social) → psych distress	0.060	0.103	0.165 (1.18)	<0.001
	Tenure (other) → psych distress	0.030	0.013	0.021 (1.02)	0.323
l	Social class → psych distress	0.007	0.043	0.069 (1.07)	0.019
m	Separation → poor par-child relations	0.305	0.115	0.184 (1.20)	<0.001
o	Poor par-child relations → educ. Att.	-0.055	-0.040	-0.064 (0.94)	0.028
q	Poor par-child relations → partstat (marr)	Ref	Ref	Ref	Ref
	Poor par-child relations → parstat (cohab)	0.002	0.007	0.011 (1.01)	0.923
	Poor par-child relations → parstat (single)	-0.002	-0.005	-0.008 (0.99)	0.803
	Poor par-child relations → parstat (remarr)	0.002	0.006	0.010 (1.01)	0.738
	Poor par-child relations → parstat (div/sep)	0.018	0.045	0.072 (1.07)	0.005
s	Parstat (married) → psych distress	Ref	Ref	Ref	Ref
	Parstat (cohab) → psych distress	-0.017	-0.022	-0.035 (0.97)	0.668
	Parstat (single) → psych distress	0.034	0.060	0.096 (1.10)	0.002
	Parstat (remarr) → psych distress	-0.002	-0.002	-0.003 (1.00)	0.891
	Parstat (div/sep) → psych distress	0.020	0.029	0.046 (1.05)	0.045

'Direct' effect – 40.7% of total effect
'Indirect' effect – 59.3% of total effect

The individual associations tested in regression analyses in previous chapters were largely confirmed in the full path model shown in this chapter. For example, those who had experienced separation of their parents had poorer quality parent-child relationships in adolescence, did less well in education and were more psychological distressed. In addition interlinking material and relational associations were seen, as hypothesised.

12.2.2 Path analysis results for NCDS women

The second model presented is that for NCDS women (see fig. 12.3). The major notable difference between men and women in the NCDS is that the direct pathway between parental separation and adult psychological distress is no longer statistically significant for NCDS women. It may therefore be deduced that there is no additional effect of parental separation on risk of reporting psychological distress, other than those transmitted through the material and relational pathways considered in this thesis. The total effect, which in this case is the same as the indirect effect of parental separation, is $\beta_{probit}=0.031$ (p<0.001). This means that those have experienced parental separation during childhood are 12% more likely to report psychological distress (OR=1.12) but that this is explained by poorer parent-child relationships, poorer educational attainment, being more likely to experience one's own partnership breakdown and being more likely to live in social housing.

Again some factors were removed from the model. As in the model for men there were no statistically significant pathways through adolescent material disadvantage or peer relationships. In addition, adult social class, measured according to their own occupation, played no role in mediating the relationship between parental separation and psychological distress in this cohort of women. The final model produced again provides support for the hypotheses tested under objective 4, investigating inter-linkages between material and relational factors. Women in the NCDS who reported poorer quality parent-child relationships at age 16 years tended to do less well in education and those who had fewer educational qualifications were more likely to be separated or divorced by age 33.

Similar to the results for men, the purely material pathways (i.e. those not additionally working through relational factors) were found to be more important than purely relational pathways. To some extent this may reflect that material factors are more objectively and easily measured than the relational factors investigated. Again, the

strongest association seen in the overall model is a material one – the association between educational attainment and housing tenure; those with higher educational qualifications are more likely to be living in privately-rented accommodation and are less likely to be living in social housing compared to the reference category of home ownership. This suggests that the most important reason, for women whose parents separate to report being psychologically distressed as an adult, is because they did less well in education and consequently were more likely to be living in social housing.

Table 12.2 – Effect estimates for the final model for NCDS women

Path	Association	Probit estimate	βprobit	βlogit (OR)	P value
c	Separation → educational att.	-0.500	-0.136	-0.218 (0.80)	<0.001
g	Educ. Att. → parstat (married)	Ref	Ref	Ref	Ref
	Educ. Att. → parstat (cohabiting)	0.001	0.005	0.008 (1.01)	0.769
	Educ. Att. → parstat (single)	-0.010	-0.035	-0.056 (0.95)	0.435
	Educ. Att. → parstat (remarried)	-0.013	-0.050	-0.080 (0.92)	0.044
	Educ. Att. → parstat (divorced/sep)	-0.049	-0.152	-0.243 (0.78)	0.006
h	Educational att. → psych distress	-0.033	-0.121	-0.194 (0.82)	<0.001
j	Educ. Att. → tenure (own)	Ref	Ref	Ref	Ref
	Educ. Att. → tenure (priv. rent)	0.157	0.398	0.637 (1.89)	0.001
	Educ. Att. → tenure (social)	-0.131	-0.423	-0.677 (0.51)	<0.001
	Educ. Att. → tenure (other)	0.001	0.005	0.008 (1.01)	0.761
k	Tenure (own) → psych distress	Ref	Ref	Ref	Ref
	Tenure (priv. rent) → psych distress	-0.054	-0.078	-0.125 (0.88)	0.066
	Tenure (social) → psych distress	0.073	0.095	0.152 (1.16)	0.021
	Tenure (other) → psych distress	0.002	0.001	0.002 (1.00)	0.974
m	Separation → poor par-child relations	0.154	0.055	0.088 (1.09)	0.001
o	Poor par-child relations → educational att.	-0.098	-0.075	-0.120 (0.89)	<0.001
q	Poor par-child relations → parstat (married)	Ref	Ref	Ref	Ref
	Poor par-child relations→ parstat (cohab)	0.020	0.073	0.117 (1.12)	0.263
	Poor par-child relations → parstat (single)	0.007	0.019	0.030 (1.03)	0.430
	Poor par-child relations → parstat (remarr)	0.016	0.046	0.074 (1.08)	0.017
	Poor par-child relations → parstat (div/sep)	0.008	0.020	0.032 (1.03)	0.216
s	Parstat (married) → psych distress	Ref	Ref	Ref	Ref
	Parstat (cohab) → psych distress	0.004	0.003	0.005 (1.00)	0.859
	Parstat (single) → psych distress	-0.031	-0.033	-0.053 (0.95)	0.171
	Parstat (remarr) → psych distress	-0.007	-0.007	-0.011 (0.99)	0.663
	Parstat (div/sep) → psych distress	0.088	0.103	0.165 (1.18)	0.001

'Direct' effect – 0% of total effect
'Indirect' effect – 100% of total effect

Fig. 12.3 – Final model showing material and relational pathways linking parental separation and psychological distress for NCDS women
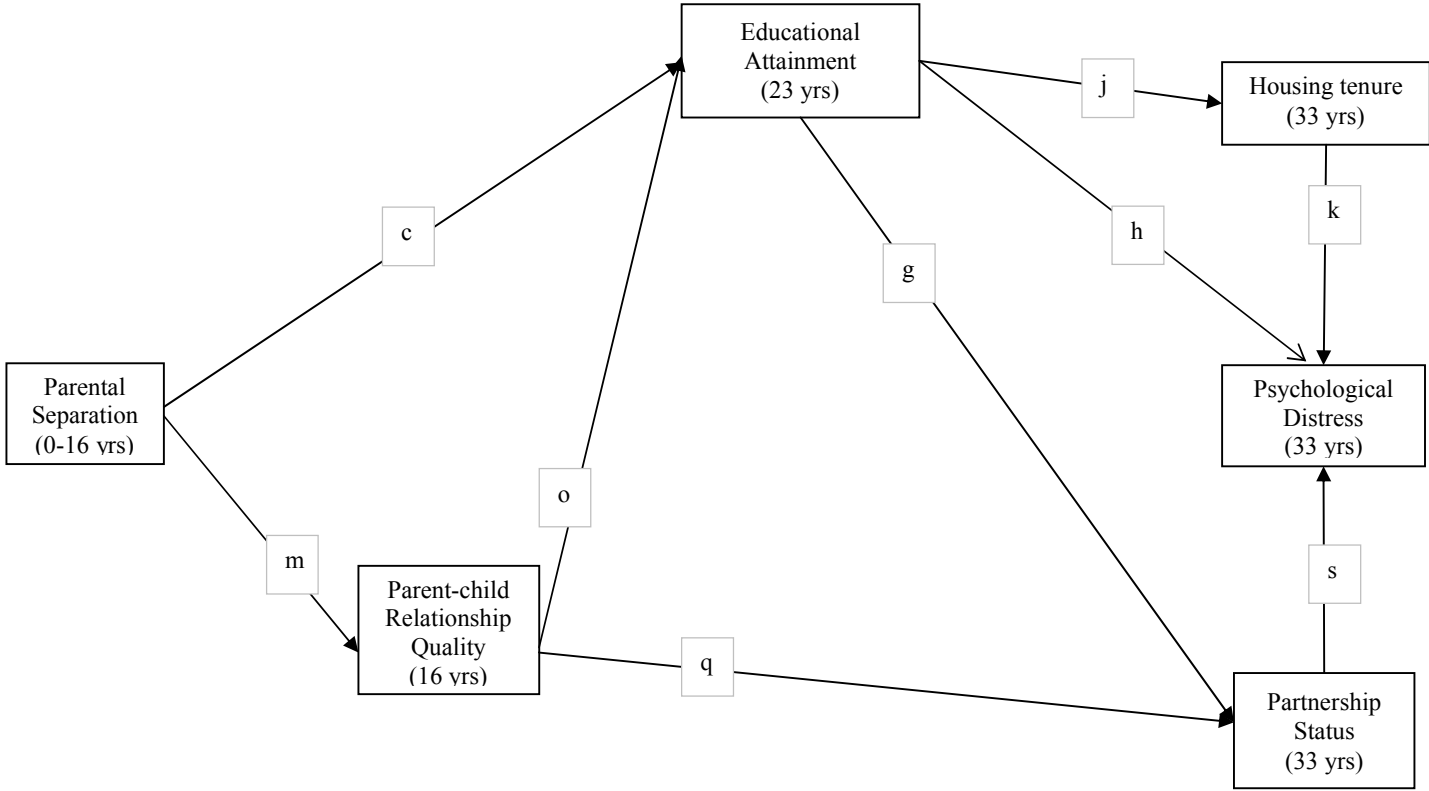
Model fit: RMSEA=0.004, CFI=0.945, TLI=0.908, R^2 for psychological distress=0.075

12.2.3 Path analysis results for BCS70 men

The third model is that for men of the BCS70. The results are given in figure 12.4 and the estimates are given in table 12.3. In contrast to results for men born in 1958, in men born in 1970 there is a significant pathway (labelled 'b') from parental separation to adolescent material disadvantage. However there is no statistically significant association between parental separation and adult social class. As in the NCDS, there is not a statistically significant pathway to quality of peer relationships in adolescence after taking into consideration other factors in the model. The relationship between parent-child relationships and partnership status was also not important for BCS70 men and was therefore removed. Poor parent-child relationships were found not to be significantly associated with low educational attainment in this sample. The modification indices suggested the inclusion of a path between parent-child relationship quality and psychological distress and this has been labelled as 't' in the figure.

Unlike previous models there appears to be less support for the inter-linkages between material and relational mechanisms in BCS70 men, with one exception; in this group there was a significant pathway between educational attainment (a material factor) and partnership status (a relational factor). This suggests that the tendency of men with fewer educational qualifications to be separated or divorced is part of the pathway from parental separation to poorer psychological health at age 30.

Similar to NCDS men, material and relational factors do not fully explain the relationship of parental separation with adult psychological distress. In fact 72.6% of the total effect remained unexplained. In the later cohort of men, therefore, material and relational factors as measured in this study do not explain much of the association between parental separation and adult psychological distress.

Similar to previous models, the strongest association seen in the model is one involving educational attainment; those who are more materially disadvantaged at age 16 years tended to have lower educational qualifications by the age of 26 years than those who were more advantaged. Again, material mechanisms were found to be more important than relational factors, although it should be noted that relational mechanisms still play some part in explaining the association between parental separation and adult psychological distress.

Fig. 12.4 – Final model showing material and relational pathways linking parental separation and psychological distress for BCS70 men
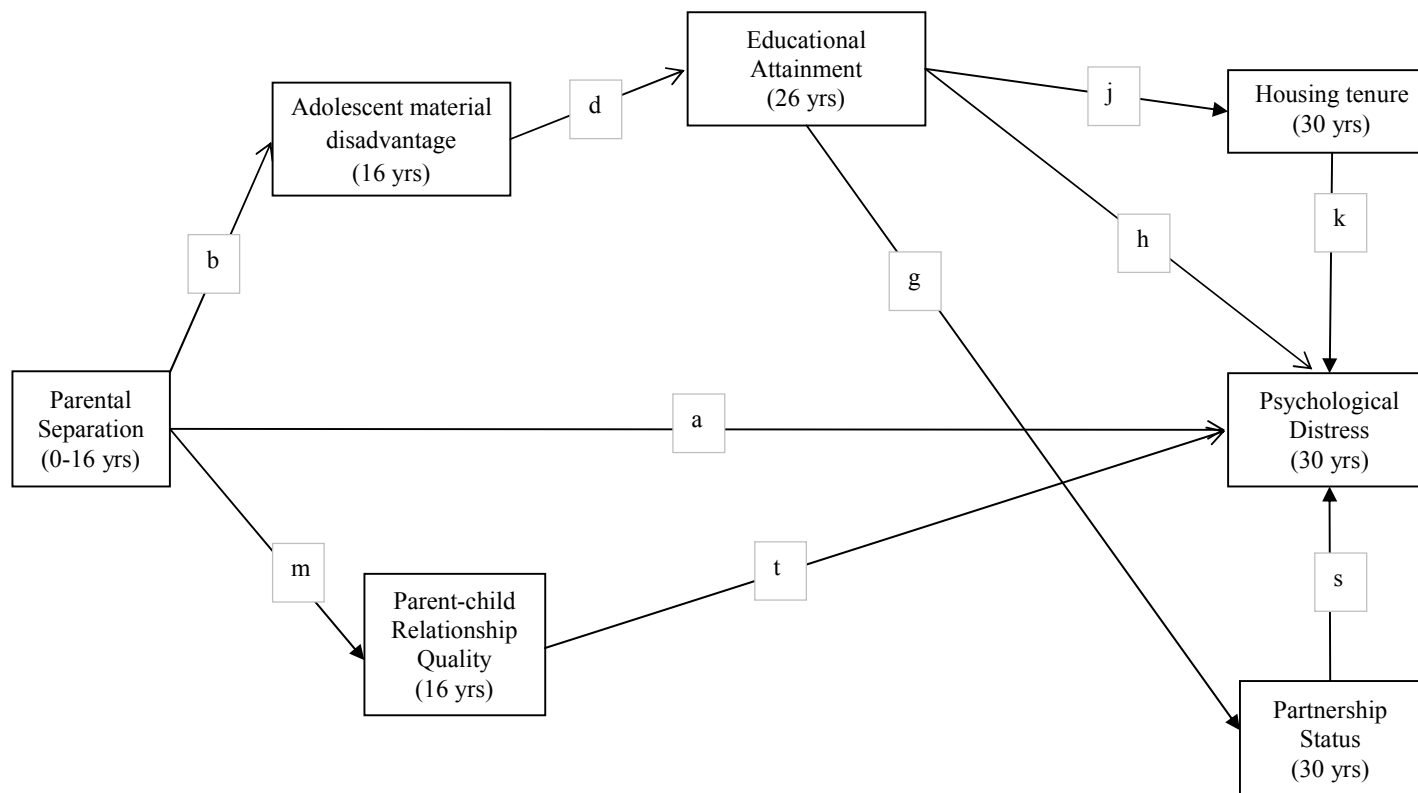
Model fit: RMSEA=0.008, CFI=0.814, TLI=0.733, R^2 for psychological distress=0.052

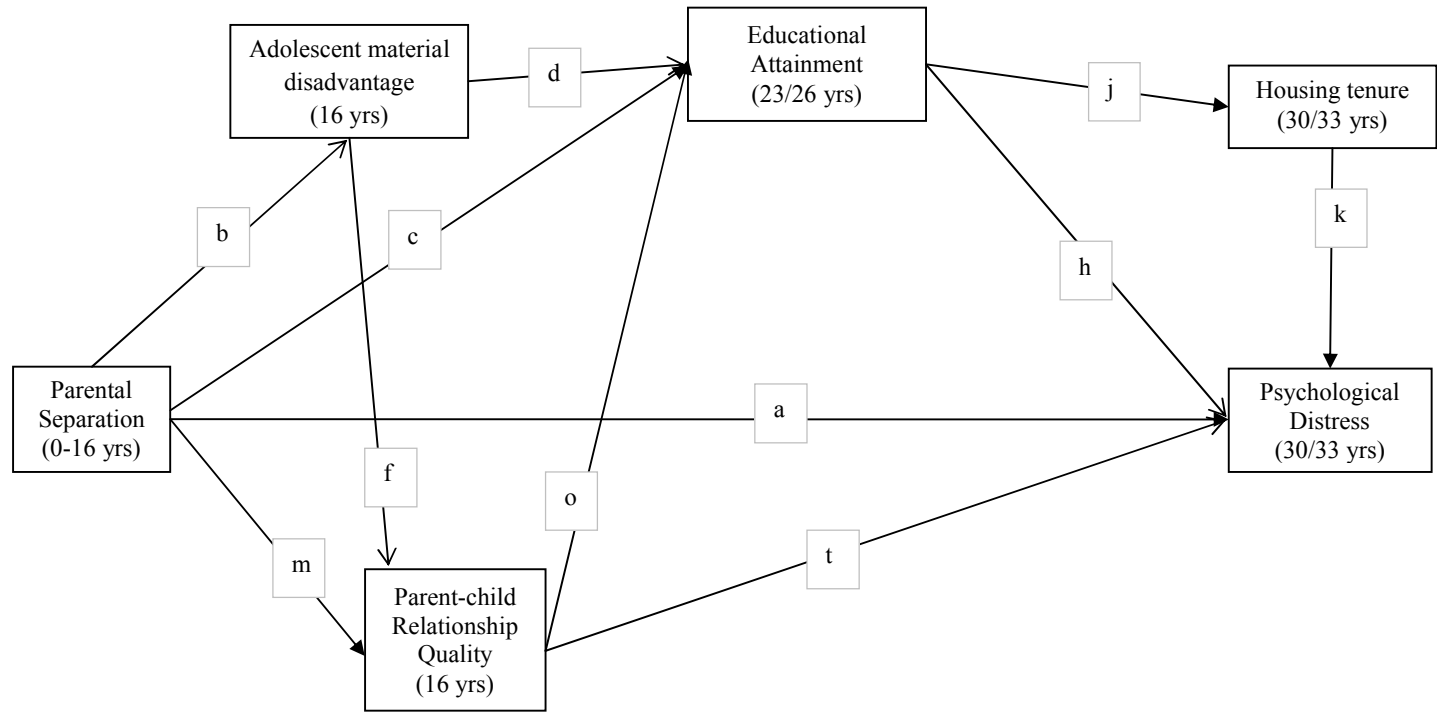**Table 12.3 – Effect estimates for the final model for BCS70 men**

Path	Association	Probit estimate	βprobit	βlogit (OR)	P value
a	Separation → psych distress	0.046	0.056	0.090 (1.09)	0.003
b	Separation → adolescent material disadvantage	0.351	0.332	0.531 (1.70)	<0.001
d	Adolescent material disadvantage → educational attainment	-1.074	-0.415	-0.664 (0.51)	0.001
g	Educ. Att. → parstat (married)	Ref	Ref	Ref	Ref
	Educ. Att. → parstat (cohabiting)	0.006	0.015	0.024 (1.02)	0.628
	Educ. Att. → parstat (single)	-0.004	-0.010	-0.016 (0.98)	0.955
	Educ. Att. → parstat (remarried)	-0.004	-0.039	-0.062 (0.94)	0.254
	Educ. Att. → parstat (divorced/sep)	-0.014	-0.070	-0.112 (0.89)	0.006
h	Educ. Att. → psych distress	-0.031	-0.111	-0.178 (0.84)	<0.001
j	Educ. Att. → tenure (own)	Ref	Ref	Ref	Ref
	Educ. Att. → tenure (priv. rent)	0.017	0.055	0.088 (1.09)	0.018
	Educ. Att. → tenure (social)	-0.074	-0.254	-0.406 (0.67)	<0.001
	Educ. Att. → tenure (other)	-0.008	-0.029	-0.046 (0.96)	0.292
k	Tenure (own) → psych distress	Ref	Ref	Ref	Ref
	Tenure (priv. rent) → psych distress	0.040	0.044	0.070 (1.07)	0.002
	Tenure (social) → psych distress	0.098	0.101	0.162 (1.18)	<0.001
	Tenure (other) → psych distress	0.036	0.036	0.058 (1.06)	0.012
m	Separation → poor par-chil relations	0.092	0.047	0.075 (1.08)	0.004
s	Parstat (married) → psych distress	Ref	Ref	Ref	Ref
	Parstat (cohab) → psych distress	-0.006	-0.009	-0.014 (0.99)	0.555
	Parstat (single) → psych distress	0.040	0.062	0.099 (1.10)	0.947
	Parstat (remarr) → psych distress	-0.098	-0.035	-0.056 (0.95)	0.165
	Parstat (div/sep) → psych distress	0.070	0.050	0.080 (1.08)	<0.001
t	Poor par-child relations → psych distress	0.028	0.072	0.115 (1.12)	0.001

'Direct' effect – 72.6% of total effect

'Indirect' effect – 37.4% of total effect

12.2.4 Path analysis results for BCS70 women

The final model presented is that for the women of the BCS70 given in figure 12.5. Unlike the model for the NCDS women, this final model has a statistically significant direct effect of parental separation upon adult psychological distress after controlling for other factors in the model. Pathways acting through peer relationships were found not to be statistically significant, nor were pathways acting through social class and partnership status at age 30 years. Similar to the model for BCS70 men, a path was included between parent-child relationship quality and psychological distress as suggested by the modification indices.

In women born in 1970, the inter-relationship of material and relational factors are more important, for example that between adolescent material disadvantage and parent-child relationship quality. Overall the model is somewhat more complex and provides further support for the notion that material and relational mechanisms should not be treated as distinct. Similar to the model for BCS70 men, when decomposing the effects of parental separation, the 'direct' effect of separation upon psychological distress in adulthood is greater (66.6% of the total effect) than the total 'indirect' effect acting through material and relational factors. This is even so despite the increased complexity of indirect pathways. Again the material mechanism was found to be more important than the relational. Consistent with this, the strongest association seen was that between two material factors – adolescent material disadvantage and educational attainment (see table 12.4); those who were more advantaged at age 16 years were significantly more likely to have higher educational qualifications than those who were less advantaged.

Fig. 12.5 – Final model showing material and relational pathways linking parental separation and psychological distress for BCS70 women

Model fit: RMSEA=0.013, CFI=0.872, TLI=0.725, R^2 for psychological distress=0.040

Table 12.4 – Effect estimates for the final model for BCS70 women

Path	Association	Probit estimate	βprobit	βlogit (OR)	P value
a	Separation → psych distress	0.045	0.051	0.082 (1.09)	0.009
b	Separation → adolescent material disadvantage	0.294	0.239	0.382 (1.47)	0.001
c	Separation → educational attainment	-0.189	-0.071	-0.114 (0.89)	0.007
d	Adolescent material disadvantage → educational attainment	-0.704	-0.324	-0.518 (0.60)	<0.001
f	Adolescent material disadvantage → poor par-child relations	-0.101	-0.061	-0.098 (0.91)	0.002
h	Educ. Att. → psych distress	-0.033	-0.099	-0.158 (0.85)	<0.001
j	Educ. Att. → tenure (own) Educ. Att. → tenure (priv. rent) Educ. Att. → tenure (social) Educ. Att. → tenure (other)	Ref 0.013 -0.113 0.004	Ref 0.045 -0.332 0.019	Ref 0.072 (1.07) -0.530 (0.59) 0.030 (1.03)	Ref 0.258 <0.001 0.705
k	Tenure (own) → psych distress Tenure (priv. rent) → psych distress Tenure (social) → psych distress Tenure (other) → psych distress	Ref 0.027 0.095 0.021	Ref 0.024 0.099 0.014	Ref 0.038 (1.04) 0.158 (1.17) 0.022 (1.02)	Ref 0.087 <0.001 0.916
m	Separation → poor par-child relations	0.079	0.038	0.061 (1.06)	0.032
o	Poor par-child relations → educ. Att.	-0.073	-0.056	-0.090 (0.91)	0.004
t	Poor par-child relations → psych distress	0.035	0.082	0.131 (1.14)	0.001

'Direct' effect – 66.6% of total effect
'Indirect' effect – 33.3% of total effect

12.3 Summary of objective 4 results

The results of the path analyses have shown that parental separation is associated with increased reporting of psychological distress in adulthood in both cohorts. Contrary to what was seen in previous chapters the results indicate gender differences in the final models. This is seen as differing pathways between parental separation and adult psychological distress for men and women. This is likely to be as a consequence of simultaneously estimating all the associations, which simple regression does not allow.

In NCDS women, the association could be fully explained by pathways hypothesised by the conceptual model, but this wasn't the case for other groups. The pathways involved were more complex in some groups than others, and appear to be particularly complex for BCS70 women for whom there were more linkages between material and relational factors across the life course. Hypothesis 4 was therefore supported by the results in this thesis – that material and relational factors acting across the life course would be linked and would explain part of the association between parental separation and adult psychological distress.

In both men and women in the BCS70, hypothesised pathways explained less than half of the total association between parental separation and adult psychological distress. This was not the case in the NCDS with 'indirect' pathways being more important than the 'direct' association. Peer relationships were found not to mediate the association between parental separation and adult psychological distress. Similarly adolescent material disadvantage was found not be involved in mediating the association between parental separation and psychological distress in the NCDS. In addition social class was found not be involved in mediating the association for BCS70 men or women.

Somewhat surprisingly adult partnership status was not involved for BCS70 women, with the relational pathway acting entirely through poor quality parent-child relationships and the way in which this linked to poorer educational attainment and directly to the increased risk of reporting psychological distress at age 30 years.

Whilst the R^2 terms presented for each of the final models is relatively low (range 0.040-0.207) this should not be a cause for concern. These figures represent the proportion of the variance in psychological distress which is explained by the factors in the models and therefore is likely to be low as there are likely to be many other factors

involved which are not of interest in this project. The research questions being tested by these models is what factors are important in explaining the association between parental separation and psychological distress.

In all models it was seen that material pathways appear to be more important than relational ones and also the strongest associations seen in each model were those between two factors on the material pathway, particularly those acting through educational attainment. This may be due in part to more objective measurements of material concepts, such as social class and housing tenure, than relational concepts, such as peer and parent-child relationship quality for which the data used from the cohorts were not designed to measure.

Chapter 13 Discussion

This chapter discusses the various strengths and limitations of this work and then summarises and interprets the main findings with respect to existing evidence. Ideas for future work are then presented.

13.1 Methodological considerations

The findings of this study should be in interpreted bearing in mind various methodological issues. This thesis has many methodologically strong aspects but like most work there are limitations and each of these aspects will be considered in turn.

13.1.1 Strengths

One of the major strengths of this thesis is the use of three of the British birth cohorts. As mentioned in chapter 5 these cohorts are all multidisciplinary, particularly following the birth sweeps which were quite medical in focus, making them appropriate for testing the hypotheses in this thesis and to address some of the limitations identified by the literature review. All of the variables used in this thesis were prospectively measured, unlike many of the previous datasets used by researchers, thereby minimising the chances of the results being affected by recall bias. These cohorts are inherently longitudinal and therefore allow for the temporal ordering of variables along the pathway from parental separation to adult psychological distress, a limitation of many previous studies. This therefore allows for the use of more appropriate statistical methods, such as path analysis, which makes use of this temporal ordering in specifying the pathways and the way in which these interact across the life course. Many previous studies use simple regression analyses which are not as appropriate for investigating mediating pathways, as detailed mechanisms cannot be specified and the ordering of variables is not taken into account.

In addition, these three cohorts are ideally placed in time in order to test whether the association between parental separation and adult psychological distress has changed over time, being nested either side of divorce reform and the subsequent large increase in divorces occurring in England and Wales in the early 1970s. The two later cohorts also contain approximately comparable measures in order to test the later hypotheses in this thesis regarding material and relational pathways, which has not previously been attempted. Also these three cohorts have large sample sizes which are representative of

the British population of comparable ages who have grown up within Great Britain and therefore it is likely that many of the findings contained in this thesis can be applied to these groups. Many previous studies rely on convenience samples of, for example, college students in the US who are unlikely to be representative of the wider population, as to be in college they are likely to be a relatively homogenous group, unlike the wider population for which birth cohorts are likely to be more useful.

One of the other major strengths of this thesis is the attempt made to account for missing data by employing multiple imputation with chained equations. This is preferable to previous work using complete case analyses which assume that the missing data are missing completely at random (MCAR), which is highly unlikely to be the case in this instance. The assumption of missing at random (MAR) is more likely to hold in the case of the birth cohorts and therefore the results obtained using multiply-imputed data are likely to be less biased than those obtained using complete case analyses. In addition using multiply imputed datasets increases the sample size available for analysis and consequently statistical power.

13.1.2 Limitations

There are several limitations to consider when interpreting the results of this thesis, many of which involve the availability of measures in the datasets used. These are dealt with first, followed by issues pertaining to the methods used in this work.

Comparability

Related to the issue of availability of measures, the outcome measures used in this study differed between the NSHD and the latter two cohorts used; the Present State Examination was used in the NSHD and the Malaise Inventory was used in the NCDS and BCS70. Binary versions of these differing measures were used which have been shown in validation studies to indicate psychological distress and were thought to be the most appropriate way in which to compare these in this thesis. In addition, the age 30 sweep was chosen over the age 34 sweep in the BCS70 as the Malaise Inventory measures are directly comparable between this sweep and the NCDS at age 33 (see section 6.2.2), therefore preventing further comparability issues. The three measures used in this thesis have already been directly compared in previous work (Wadsworth et al. 2003b), however caution should be exercised when making direct comparisons for associations across cohorts where psychological distress has been used.

Marriages vs. cohabitations

Again with regards to data availability issues, it was not possible to look at any differential associations of separations of marital and non-marital relationships. In the NSHD all mothers were married for those children who were followed-up beyond birth. In the NCDS and BCS70 it was not possible to differentiate between the type of relationship in each sweep. It has previously been shown that children of cohabiting couples fare poorer than children of married couples (Brown 2004; Manning 2002; Manning and Lichter 1996), however it is not known whether there is any differential impact in the breakdown of these relationships. It is known however that cohabitations tend to be less stable than marriages (Bumpass and Lu 2000) and this is a current area of research. In the two earlier cohorts used there are likely to be few cohabiting partnerships in order to have sufficient power to test these potential differences.

Parental conflict

One of the key measures that would have been good to include in this project is parental conflict. It is possible that divorce or separation in this project is a proxy for this and that it is actually the level of conflict surrounding the separation process rather than the actual separation itself which makes children more likely to be disadvantaged, particularly with regards to relational mechanisms and psychological distress. In the NCDS, at the age of 7 years, a health visitor-assessed variable is available which provides information on whether 'domestic tension' is present in the family. This variable was not used as it has no comparable equivalent in the BCS70 and also it may not be apparent during an interview whether domestic tension is present, unlike parental separation which is much more obvious and less sensitive (this was taken from the same group of questions at age 7 years in the NCDS). The problem of not being able to disentangle parental conflict and divorce using the British birth cohorts has previously been noted by Ni Bhrolchain (2001).

Much of the research conducted investigating the relative importance of parental divorce and parental conflict, finds that both factors impact upon child outcomes (Forehand et al. 1994; Jekielek 1998; Morrison and Coiro 1999; Riggio 2004) but it has been suggested that it is the level of family conflict which may have more of an impact upon child outcomes than the separation itself (Amato, Spencer Loomis, and Booth 1995; Cummings and Davies 2002; McIntosh 2003; Morrison and Coiro 1999; Vandewater and Lansford 1998). For example a comparison of children living in high-

conflict married families and low-conflict divorced families finds that it is the former who are less adjusted (Mechanic and Hansell 1989). Most of the previous research comparing the relative associations for parental separation and parental conflict involves the use of psychological outcomes. However there has been work done which looks at the association between parental divorce and educational attainment in the NCDS which was able to look at test scores before and after divorce (Elliott and Richards 1991). This study found that children who went on to experience parental divorce had poorer test scores both pre- and post-divorce compared to children who remained living with two parents, perhaps pointing towards parental conflict for being responsible for this. With respect to material pathways, which were found to be more important in this thesis, it is likely that the resultant single parenthood has a greater impact upon these than parental conflict. One way in which this thesis could be developed further, attempting to get around the issue of unavailability of conflict measures, would be to compare the relative impact of parental death and parental separation. Both of these situations result in the loss of a parental figure but parental separation is more likely to be accompanied by conflict (Rodgers, 1990).

Parent-child relationship quality

Another issue of lack of data availability is that of parent-specific parent-child relationship quality in the BCS70. In the NCDS information is available on the quality of relationship the cohort child has with their mother and their father, however this level of detail was not available in the BCS70 and so it was not possible to investigate whether the association between parental separation and parent-child relationship quality was being driven by poorer father-child relationships. In the post-hoc analysis conducted earlier in this chapter, poorer father-child relationships were reported compared to mother-child relationships as a consequence of parental separation. However as contact between both parents and children following separation was likely to be more greatly encouraged in the BCS70 it is thought that there would be less of a difference seen for the mother and father. In addition, directly comparable measures were not available between the two cohorts, therefore caution has been exercised in comparing the cohorts with respect to parent-child relationship quality.

Peer relationship quality

Another issue of data availability surrounds the way in which peer relationship quality was measured. The items investigated were taken from the Rutter behaviour scale at age

16 years assessed by the mother. These items were not initially designed to be indicators of the quality of relationships between the cohort child and their peers. Unfortunately more formal measures of adolescent attachment, such as the Attachment Interview for Childhood and Adolescence (AICA), were not available in either cohort. This also applies to the parent-child relationships variables used. Despite this the measures chosen are thought to be the best way in which to indicate attachment security at age 16 years from the information available and take account of the transitional nature of attachment bonds from parents to peers (Allen et al. 2004). The peer relationship variables were reported by the mother and therefore for the mother to be aware of these problems perhaps the most severe cases may be represented by this.

Pre-separation material disadvantage

Some caution is also required in making inter-cohort comparisons of father's social position which was taken into account as a pre-separation risk factor. In the NSHD this was measured in 1946 and therefore immediately following the Second World War. Measuring father's social position at that point may not have accurately represented the father's usual occupation or position. Other studies which use the NSHD take father's social position from the age 4 year sweep however in this thesis a measure of disadvantage was required prior to parental separation. It would not have been appropriate to have used social position at age 4 as separation may have occurred by that point and the father's social position may not have been recorded.

Family transitions

The remaining issues regarding measures refer to the way in which the parental separation variables were derived. Firstly this variable does not take into account multiple family transitions. This could provide the basis of future work to look at multiple transitions and possibly to compare those experiencing multiple transitions with those experiencing single transitions. It is thought that it is multiple transitions which affect child outcomes the most (Amato and Booth 1991a; Aquilino 1996; Fergusson, Horwood and Lynskey 1992; Kurdek, Fine and Sinclair 1995; Pong and Ju 2000; Pryor and Rodgers 2001; Wu and Martinson 1993). Multiple transitions are hypothesised to be more likely to occur to members of the BCS70 as family instability is likely to be higher in this cohort.

In addition, the parental separation measure used does not take into account re-partnering of parents. The evidence surrounding the consequences of remarriage, following parental divorce, on children is somewhat inconclusive. For example it has been shown that remarriage is beneficial to children who have experienced parental separation with regards to the reporting of depression (Aseltine 1996), however some work shows that remarriage may be associated with even poorer outcomes for children who experience parental divorce (Ahrons 2006; Elliott and Richards 1991). Conversely work comparing the NCDS and BCS70 finds that remarriage does not affect the relationship between parental divorce and adult psychological distress (Chase-Lansdale, Cherlin, and Kiernan 1995; Rodgers, Power, and Hope 1997). This also links to the impact of multiple transitions as remarriages are known to be less stable than first marriages (Hetherington, Cox and Cox 1985). The work presented in this thesis could be extended in the future to look at the effect of remarriage and perhaps how this has changed over time.

Testing the 'reduced effect' hypothesis

Next, looking at conceptual limitations in this thesis the first involves the testing of the 'reduced effect' hypothesis using the NSHD, NCDS and BCS70. It is possible that the effect of the Divorce Reform Act which was implemented in 1971 on factors, such as reducing stigma, thought to reduce the association between parental separation and adult psychological distress, may not be picked up by these cohorts. The introduction of a later cohort, such as the Millennium Cohort Study (MCS), may be better placed in order to pick up the 'reduced effect', than the BCS70, as there is likely to have been a significant lag effect of the change in law. However MCS members are not yet old enough to capture psychological distress in their 30s.

Life course processes

Because of the way in which this thesis looks at the age of the child at the time of parental separation, it is impossible to disentangle the life course processes of accumulation and sensitive periods. It is likely that a combination of the two processes apply, as children who experience parental separation during a crucial period of development (sensitive period), which is earlier in life, may also experience a longer period being disadvantaged relative to others (accumulation). Unfortunately there also appears to be a statistical power issue with the age of child measure, and this is

particularly likely to be the case in the NCDS and NSHD where fewer separations occurred.

Mother's psychological distress

It is also possible that mother's psychological distress may lie on the pathway between parental separation and adult psychological distress, particularly influencing factors such as the quality of parent-child relationships. However mother's psychological distress is measured in different ways in the three cohorts and these measures are not available at directly comparable sweeps, therefore mother's psychological distress was not investigated as being on the pathway. Future work is required in order to assess whether this factor is important as a pathway variable, perhaps using other cohorts.

Missing data and multiple imputation

Regarding the multiple imputation method employed in this project – multiple imputation by chained equations – the assumption underlying this method is that the missing data are missing at random (MAR). This means that the missing values are missing at random, given observed values of other variables. In reality the missingness mechanism in these cohorts are unlikely to be entirely MAR, however this assumption is likely to be more valid than an assumption of missing completely at random (MCAR) which is highly unlikely with regards to these datasets. It is also possible that the data were MNAR, that the missingness mechanism is not accounted by observed characteristics in the dataset. In reality missing data do not fall neatly under a single missingness mechanism; for example it is likely that variables collected in the cohorts explain a substantial proportion of why the data are not complete, especially as these datasets are multi-disciplinary. Therefore the inclusion of a large number of variables in the imputation model which were found to predict both missingness and missing values increases the plausibility of the MAR assumption.

Varying degrees of imputation were required for missing information on parental separation across the three cohorts. In particular, a difference was seen between the NSHD and the two later cohorts; in the NSHD only 2 participants were missing information on parental separation (see section 6.1.1) but this was considerably larger in the NCDS and BCS70. Therefore it is possible that a greater degree of variation in the proportion of those experiencing parental separation is seen in the latter two cohorts.

However as previously noted, it is likely that including sufficient information in the imputation models allows for reasonable prediction of values for parental separation.

Path models

Results of the path analysis need to be interpreted cautiously. The final models were driven by the data with the final models representing the significant pathways between parental separation and adult psychological distress for each cohort. Therefore it is not possible to generalise the results of this thesis to other populations directly. However these models provide an indication that both material and relational factors are likely to be involved and the fact that these were involved in all four models suggests that this is likely to be the case for other cohorts and populations. In addition, the path analyses did not control for potential confounding factors which were controlled for in the regression analyses. Few studies have taken this analytical approach and consequently, at the present time, there is little guidance regarding the treatment of confounders. The decision was made not to control for confounders as those included in this study are unlikely to confound every association in the path diagrams tested. Finally due to current limitations with the MPlus programme, this stage of the analysis was conducted using the first imputed dataset in each cohort. However the results that would have been obtained across all 20 datasets are likely to be very similar. Despite the limitations identified in this section, it is felt that this thesis represents a valuable addition to this field of research making good use of Britain's cohort studies.

13.2 Summary and interpretation of main findings

This section is structured by objective following the structure of the results in preceding chapters.

13.2.1 Parental separation and adult psychological distress (objective 1)

The first objective of this thesis sought to investigate whether parental separation, occurring in childhood, was associated with increased reporting of psychological distress in adulthood in three of the British birth cohorts, and to assess whether this differed by gender, age of the child and cohort. The results presented in this thesis show that this association exists in all three cohorts. This is consistent with the majority of research presented in section 2.2 and provides further weight to the evidence base in Great Britain. Much of the research which has been conducted, looking at the association between separation and later life outcomes, has typically involved relatively

small samples e.g.(Angarne-Lindberg and Wadsby 2009; Jonsson, Njardvik, Olafsdottir, and Gretarsson 2000; Kim, Capaldi and Stoolmiller 2003), retrospective measures e.g.(Amato 1991; Chapman, Whitfield, Felitti, Dube, Edwards, and Anda 2004; Gahler 1998; Jonsson, Njardvik, Olafsdottir, and Gretarsson 2000) and unrepresentative samples e.g (Jonsson, Njardvik, Olafsdottir, and Gretarsson 2000; Kim, Capaldi, and Stoolmiller 2003; Oakley Browne, Joyce, Wells, Bushnell, and Hornblow 1995), and this study has addressed these issues in its design, still finding that the association exists.

Secondly it was hypothesised that the association would be greater for women than for men, as the inconsistent evidence investigating this aspect appeared to lean in this direction (see section 2.5.1). However it was found that there was no difference between men and women with regards to the association between separation and psychological distress. Previous studies have also found no gender differences (Amato 1991; Amato and Booth 1991a; Amato and Keith 1991; Amato and Sobolewski 2001; Kendler, Sheth, Gardner, and Prescott 2002; Kessler, Davis, and Kendler 1997; Rodgers, Power, and Hope 1997; Wallerstein 1991; Zill, Morrison, and Coiro 1993). It has been shown that girls are more likely to emotionally support a parent but that boys are more likely to witness conflict, and it may be possible that potential differences exist. However with regards to adult psychological distress they may not differ from one another or these potential gender differences may have equally negative impacts upon psychological distress.

Thirdly, with regards to the age of the child at separation it was found that this did not moderate the association between parental separation and adult psychological distress. This goes against the suggestion in Bowlby's attachment theory that parental separation occurring in early childhood or infancy is likely to have a greater effect upon the formation of attachment between parents and child, and consequently upon psychological distress in adulthood (see section 2.6). In addition, previous studies, whilst being few in number, appear to point towards separations in early childhood having a greater effect than those occurring in later childhood (Allison and Furstenburg 1989; Rodgers 1990; Wallerstein 1991; Woodward, Fergusson, and Belsky 2000). The results in this thesis therefore suggest that parental separation is likely to have a negative effect regardless of the age at which it occurs. However as previously mentioned, it is possible that there was insufficient statistical power to detect a

difference between age groups, particularly in the earlier two cohorts where fewer separations occurred, and this may be why no difference was seen between age groups. Finally with regards to cohort differences, the 'reduced effect' hypothesis was tested by formally comparing the association between parental separation and adult psychological distress across the three cohorts used in order to assess whether this had reduced over time. The descriptive results section (chapter 8) showed that the proportion of those experiencing parental separation approximately doubled from one cohort to next. The 'reduced effect' hypothesis proposes that as separations become more common in society, they will have less of an effect upon children involved. The results presented in this thesis found that this hypothesis was not supported, as the association between parental separation and psychological distress in adulthood had not reduced over time. This finding supports other work which has investigated this with the British birth cohorts but using other outcomes (Ely, Richards, Wadsworth and Elliott 1999; Sigle-Rushton, Hobcraft and Kiernan 2005), despite extending this previous work methodologically by accounting for missing data, formally testing cohort differences and investigating parental separation from 0-16 years.

This finding suggests that, despite increasing divorce rates in society over the period of interest, the association has not reduced but that more people have been affected. It is possible that there is no reducing effect of separation due to social changes acting in opposite directions (Ely, Richards, Wadsworth and Elliott 1999), such as changing social attitudes, the increased acceptability of divorce, and increasing relative financial hardship which cancel one another out leading to no net change. It has also been suggested that the level of conflict in the later cohorts was higher, particularly due to increased use of legal proceedings, which may have been one reason why the associations with separation did not decrease (Dronkers 2011).

13.2.2 The investigation of material factors (objective 2)

The conceptual model on which this work is based hypothesises that it is not parental separation or divorce *per se* which increases the likelihood of reporting psychological distress in adulthood but that separation acts through intervening material and relational mechanisms. These were tested in this thesis, starting firstly with material mechanisms. The results of the regression analyses (chapter 10) in this thesis show that all individual associations exist in the NCDS and BCS70.

An association between parental separation and adolescent material disadvantage was found, supporting previous work (DWP 2011; Elliott, Richards, and Warwick 1993; Maclean and Eekelaar 1983; Pryor and Rodgers 2001; Sweeting and West 1995). The majority of children who experience separation are likely to be living in single mother-headed households which experience a particularly large decline in income and living standards (Aassve, Betti, Mazzuco, and Mencarini 2007; Burkhauser, Duncan, Hauser, and Berntsen 1991; Finnie 1993; Jarvis and Jenkins 1999; Osborne, Butler, and Morris 1984; Smock 1994; Uunk 2004). It is also possible that material disadvantage precedes parental separation and an attempt was made to account for this effect by controlling for father's social class at birth, however separation was still associated with psychological distress after accounting for this. Those who experienced higher levels of material disadvantage at age 16 years were less likely to have any qualifications at age 23/26 years compared to those who were more advantaged, showing evidence for another material pathway. This could have been due to many reasons such as increased need for the child to enter employment at an earlier age, reduced parental involvement in homework due to a potential need to work longer hours and reduced resources available to the family for purchasing educational materials.

An additional link between parental separation and educational attainment was found which was not explained wholly by adolescent material disadvantage. This link has been shown by many previous studies (Amato and Keith 1991; Chase-Lansdale, Cherlin, and Kiernan 1995; Elliott and Richards 1991; Ely, Richards, Wadsworth, and Elliott 1999; Huurre, Junkkari, and Aro 2006; Kendler, Gardner, and Prescott 2002; Kendler, Gardner, and Prescott 2006; Kuh and Maclean 1990; Maier and Lachman 2000; McLeod 1991; Ross and Mirowsky 1999). In both cohorts with the relevant data, educational attainment was the link between material disadvantage in adolescence and material disadvantage in adulthood. Reduced educational attainment in turn was associated with increased likelihood of living in social housing and being more likely to be in manual social classes.

It has previously been shown that children who experience parental separation are more likely to end up living in social housing as they were more likely to have no educational qualifications (Kiernan 1997). These variables (educational attainment, housing tenure and occupational social class) in turn were associated with increased reporting of adult psychological distress, as found in many previous studies (Everson, Maty, Lynch, and

Kaplan 2002; Gilman, Kawachi, Fitzmaurice and Buka 2002; Laaksonen et al. 2007; Ladin 2008; Lorant et al. 2003; Lynch, Kaplan, and Oliver 2004; Marmot, Shipley, Brunner, and Hemingway 2001; Miech and Shanahan 2000; Muntaner, Eaton, Miech, and O'Campo 2004; Power and Manor 1992; Ross and Mirowsky 2006).

All of the hypothesised material associations existed in both cohorts providing evidence that material mechanisms may be involved in mediating the association between parental separation and psychological distress. In the final regression analyses presented controlling for all material factors and confounders simultaneously a reduction in association was seen suggesting that these factors were involved. Mediation by material and socioeconomic factors has been shown by previous studies (Amato 1991; Ross and Mirowsky 1999). This thesis extends this previous work by employing a longitudinal, prospective design which is more appropriate in determining the specific temporal ordering of variables along a material pathway which was later tested (see chapter 12).

With regards to differences by the age of the child at the time of separation it was found that there were no differences by age in the NCDS but in the BCS70 those who experienced separation between the ages of 10-16 years were more likely to be materially disadvantaged at age 16 years. This is therefore working in the opposite direction to that expected. The life course concept of accumulation suggests that separations occurring in early childhood will be associated with increased material disadvantage at age 16 years, as the longer the child spends in a single parent family will increase the risk of living in more disadvantaged conditions. The results of this thesis may suggest that parental separation leads to a transient drop in living standards which therefore recover to some extent before age 16 years when material disadvantage was measured. This could be due to remarriage of the custodial parent and hence the restoration of a dual income household. Remarriage was one aspect of parental separation which this thesis did not investigate (see section 13.2.2).

Thirdly, with regards to gender, some differences were found in material associations between men and women. For example the association between material disadvantage and educational attainment was greater for women in the NCDS. This finding has been found in other studies (Laaksonen, Rahkonen, Martikainen and Lahelma 2005; Mandemakers, Monden and Kalmijn 2010). This finding may represent a reduced priority for women to remain in full-time education where material disadvantage was

relatively high compared to men, and instead to seek employment. In this cohort it is likely that men would have been more encouraged to remain in education, compared to women, in order to obtain more financially rewarding employment. In the BCS70 a difference was found between men and women with regards to the association between educational attainment and social class in that women with no qualifications were significantly more likely to be in lower social classes than men with no qualifications. This may reflect the disadvantaged position of women in the labour market during this period (Woods, Makepeace, Joshi and Dolton 2003). It is also possible that this is due to reclassification of many traditionally male routine occupations from previously manual RGSC categories, particularly social class IIIM, to social class II.

Finally when the results for the two cohorts were compared several differences were seen, which generally pointed towards stronger associations in the NCDS. The first was in the association between material disadvantage in adolescence and educational attainment which was stronger in the NCDS compared to the BCS70. The results suggest that material disadvantage was a greater barrier to achieving any educational qualifications in the earlier cohort and this has been found in previous work involving comparisons of these cohorts (Makepeace et al. 2003). The association between educational attainment and housing tenure was also stronger in the NCDS showing that those with no educational qualifications were more than four times more likely to be living in social housing (see table 10.5). This is likely to reflect changes in the allocation of social housing in the 1980s which favoured the most disadvantaged and would therefore represent the high likelihood of those with no qualifications living in this type of accommodation (Lupton et al. 2009). This is also likely to be reflected in the stronger association between housing tenure and psychological distress seen in the NCDS, particularly for those in social housing. Also the social class gradient appears to be stronger in the NCDS than the BCS70. This finding is supported by previous work which finds that the social gradient in psychological distress in the BCS70 is weaker than the NCDS (Sacker and Wiggins 2002).

Conversely, two material associations were found to be stronger in the BCS70 compared to the NCDS – the association between parental separation and material disadvantage in adolescence and also that between educational attainment and social class. The first suggests that the association between parental separation and material disadvantage has become stronger over time. As mentioned in chapter 12 this is likely

to be due to changes in society, perhaps increases in dual-earner households and a polarisation between dual-earner and no-earner households, which increased social inequality particularly for those with children (Dearden, Goodman and Saunders 2003). These changes may have led to greater differentiation and inequality between separated and intact families. The findings for the second association suggest that those with no qualifications in the BCS70 were more likely to be in manual social classes than those with no qualifications in the NCDS. This association is particularly pronounced for women. This association has previously been shown using these two cohorts (Woods, Makepeace, Joshi, and Dolton 2003). The descriptive statistics in table 8.1 show a decreasing proportion of those with no qualifications between the cohorts and an increase in the proportion of those with higher qualifications in line with the expansion of higher education (Burgess 1994). These results appear to show a widening in the educational gradient of occupational social class in that those with no qualifications are increasingly likely to be in lower grade jobs.

13.2.3 The investigation of relational factors (objective 3)

The second mechanism investigated was that involving relational factors between parental separation and adult psychological distress. Again the results of the regression analyses show that all relational associations existed in these two cohorts, thereby suggesting that the proposed relational pathway is plausible. Parental separation was found to be associated with reduced quality of parent-child relationships at age 16 years. It has previously been proposed that a reduction in the quality of parent-parent relationships may 'spillover' to affect the quality of other family relationships (Engfer 1988; Erel and Burman 1995), such as those between parents and children. It is likely that the reduction in quality is driven to some extent by reduced contact with the non-custodial parent (Darlington 2001; Sobolewski and Amato 2007). It was not possible to investigate the associations between parental separation and quality of father-child and mother-child relationships in the BCS70, however this was possible in the NCDS. A post-hoc analysis found that children who experienced separation reported poorer relationships with both their mother and father compared to those who did not. The association was stronger with regards to fathers, suggesting that parental separation may lead to a larger reduction in father-child relationship quality (OR=1.84, 95% CI: 1.58, 2.14) than mother-child relationship quality (OR=1.26, 95% CI: 1.08, 1.47). These associations did not differ for boys and girls.

In this thesis the quality of parent-child relationships was used as an indicator of attachment security, with those with good quality relationships being thought to be more securely attached than those who reported poor quality relationships. Therefore if this is the case, the results would appear to suggest that parental separation reduces the security of attachment between parents and child. This change is thought to be driven by reduced physical and emotional availability of parents during and following separation (Davies and Cummings 1994; Emery 1982; Emery and Dillon 1994; Feeney and Monin 2008; Lewis, Feiring, and Rosenthal 2000).

Parental separation was also found to be associated with indicators of peer attachment security or quality. Parental separation appears to increase the likelihood that the child will be reported by his or her mother as frequently being involved in fights, bullying others, preferring to be alone and not being liked by others. Little research has previously investigated whether parental separation affects peer relationships but that which does supports the findings in this thesis, indicating that children who experience separation are more likely to be aggressive, withdrawn and less popular (Hetherington 1989; Wallerstein 1991).

Parental separation was also found to be associated with adult partnership status, finding that those who came from a divorced family were more likely themselves to experience divorce or separation. This 'intergenerational transmission' of divorce supports the findings from many previous studies which have typically looked at this association using samples from other countries (Amato 1993; Amato 1996; Amato and Booth 1991a; Diekmann and Engelhardt 1999; Dronkers and Harkonen 2008; Glenn and Kramer 1985; Greenberg and Nay 1982; Hayashi and Strickland 1998; Keith and Finlay 1988; Kulka and Weingarten 1979; Lyngstad and Engelhardt 2009; McLanahan and Bumpass 1988; Mueller and Pope 1977; Rodgers 1994; Ross and Mirowsky 1999; Tucker et al. 1997; Wauterickx, Gouwy, and Bracke 2006; Wolfinger 1999). It was thought that children experiencing parental separation would be more likely to be in less secure partnership forms. These partnerships are likely to differ over time in response to changing attitudes and norms. In support of this idea, parental separation in the NCDS predicted increased likelihood of remarriage and separation/divorce, and in the BCS70 parental separation predicted cohabitation, being single and separation/divorce. It is possible that those who are cohabiting in the BCS70 will go on to marry as cohabitation has increasingly become a precursor to marriage (Stanley, Rhoades, and Markman

2006) and it has previously been shown that children who experience parental separation in childhood are more likely to cohabit prior to marriage (Kiernan 1997; Ongaro and Mazzuco 2009).

The quality of parent-child relationships at age 16 years was also associated with adult partnership status in that those reporting poorer relations with their parents were more likely to remarried or separated/divorced in the NCDS and were more likely to be cohabiting or single in the BCS70. As previously proposed, poor quality parent-child relationships are thought to be an indicator of insecure attachment. Those who are insecurely attached are more likely to form less stable relationships (Banse 2004;Crowell et al. 2009; Mikulincer, Florian, Cowan and Cowan 2004), for example marriages which are prone to separation and cohabitations (which are known to be less stable than marriages) (Rhoades, Stanley and Markman 2009b). Also, children who get on less well with their parents may leave the parental home earlier and perhaps partner earlier. A young age at partnership formation is known to be a risk factor for relationship breakdown (Harkonen and Dronkers 2006). Also an association between parent-child relationship quality and adult psychological distress was shown independent of the child's own partnership status in adulthood, suggesting that the quality of parent-child relationships may have an enduring effect upon psychological health.

In addition, the quality of peer relationships was also associated with adult partnership status suggesting that those who were reported as having problems in peer relationships were more likely to be single in their early 30s. In addition, those who frequently bullied others in the NCDS and frequently fought others in the BCS70 were more likely to be separated or divorced. This may represent conflict-focussed strategies for dealing with relationship problems which may result in separation. These peer relationship variables are all thought to be indicators of attachment and therefore the processes above are likely to be involved.

Finally, partnership status was associated with psychological distress in that those who were single or separated/divorced were more likely to report psychological distress than participants who were married. This is line with the findings of previous studies (Aseltine and Kessler 1993; Booth and Amato 1991b; Hope, Rodgers and Power 1999; Prince et al. 1999). In the BCS70, those who were cohabiting were also more likely to

report psychological distress than those who were married, providing evidence for the 'cohabitation gap' with regards to psychological health. It should be noted that these two variables were both taken from the same sweep and regression cannot determine the direction of the association; it is therefore possible that psychological distress predicts partnership status.

In the final stage of the regression analyses for relational pathways, all relational factors were entered simultaneously into a model in order to assess whether relational factors may explain some of the association between parental separation and adult psychological distress. The results of this analysis suggest that relational mechanisms may explain part, but not all, of this association. This therefore indicates that relational factors may be involved in transmitting the effect of parental separation on adult psychological distress, but that additional factors appear to also be involved. There is evidence from previous research to suggest that relational factors explain this association (Amato and Sobolewski 2001; Glenn and Kramer 1985; Neighbors, Forehand and Bau 1997; Palosaari, Aro, and Laippala 1996; Peterson and Zill 1986), thereby providing support for the findings within this thesis. The mediating role of relational factors was further investigated using more appropriate statistical methods and the results are discussed in the next section.

Gender differences were again tested in objective 3 and a stronger association between the quality of parent-child relationships and adult partnership status was found for women compared to men in the NCDS. In particular it was seen that women with poorer quality parent-child relationships at age 16 years were more likely to be cohabiting at age 33 years. Conversely, a stronger association was seen for men compared to women for that between partnership status and psychological distress in both cohorts. This difference appears to be driven in the NCDS by the strong relationship between being a single man and the increased likelihood of reporting psychological distress, and this difference has been noted in previous studies (Fuhrer, Stansfeld, Chemali, and Shipley 1999; Murphy 2007). In the BCS70 this gender difference appears to be driven by the increased reporting of psychological distress for separated/divorced and remarried men.

Age differences were also investigated with regards to relational mechanisms and these were found not be important. It is surprising that age differences were not found

considering the ideas proposed in Bowlby's attachment theory and previous research has indicated that parental separation occurring in early childhood has a greater detrimental effect upon parent-child attachment (Woodward, Fergusson, and Belsky 2000). This again may represent a statistical power problem, particularly in the NCDS where fewer separations were experienced.

In keeping with the life course approach, and drawing from the depiction of this by Bronfenbrenner (fig. 1.3), all associations were considered as situated within the social context at the time of data collection. Cohort differences were seen with regards to the association between adult partnership status and psychological distress and this is likely to reflect differing partnership norms. For example in the NCDS those who were separated or divorced, particularly women, were more likely to be distressed than those who were separated or divorced in the BCS70. This difference may be motivated by increased stigma surrounding parental separation in the late 1980s and early 1990s (partnership status was measured in 1991 in the NCDS).

13.2.4 Linkages between material and relational pathways (objective 4)

The fourth objective of this thesis was to examine whether material and relational pathways between parental separation and adult psychological distress interlinked across the life course. The regression results presented in appendix 5 suggest that material disadvantage is associated with poorer quality parent-child and peer relationships. With regards to parent-child relationship quality, this finding links to aspects of the 'Family Stress Model' (Conger et al. 1992). The quality of parent-child relationships and of peer relationships were associated with educational attainment in both cohorts. These associations have previously been shown in other studies (Acock and Demo 1994; Coleman and Glenn 2009; Doyle, Moretti, Voss, and Margolese 2000; Kiernan 1997; Sanz-De-Galdeano and Vuri 2007). Also a link was shown between educational attainment and adult partnership status, in that those with no qualifications and also those with higher level qualifications were more likely to be single than married. This association was particularly strong for women in the NCDS and is likely to reflect, to some extent, the 'career women' of the time who chose to remain in education for longer and to focus on their careers, at least before the age of 33 years. In addition, an educational gradient in the risk of being separated of divorced was also seen, with increasing educational level having a reducing association with separation. This finding is confirmed by other work (Kendler, Gardner, and Prescott 2002).

The whole conceptual model was tested using path analysis, as this was a more appropriate method than simple regression, showing a comprehensive picture of the association between parental separation and adult psychological distress. Four models were produced as a result of this analysis. The models show that the mechanisms acting between parental separation and adult psychological distress are relatively complex, particularly in the NCDS. After taking account of material and relational factors for NCDS women there was not a statistically significant association between separation and psychological distress suggesting that these mechanisms mediated this association. This is line with the 'unhealthy life career' hypothesis (Sweeting and West 1995) which suggests that effects of family of origin are transmitted to health through chains of psychosocial and material factors, such as those investigated in this thesis.

Despite this complexity, the models produced for NCDS men and women were relatively similar. With regards to the material pathways adolescent material disadvantage was found not to be important when considering other factors in the model and the material pathway was found to be largely acting through educational attainment in that parental separation predicted poorer attainment which then went on to predict increased likelihood of living in social housing and being in lower social classes (indicators of adult material disadvantage) and consequently psychological distress. This material pathway is supported by the work of Ross and Mirowsky using a US sample which finds that the association between parental separation and adult psychological distress is partially mediated by education, occupational status and economic status (Ross and Mirowsky 1999). That study only uses simple regression and therefore this thesis is better placed to investigate the mechanisms involved between parental separation and psychological distress using path analysis which allows the research to specify the ordering and direction of paths involved.

With regards to the relational pathways in the NCDS, parent-child relationship quality and adult partnership were found to be important. In contrast to previous research, there was no 'direct' association between parental separation and adult partnership status, but this appeared to be acting entirely through parent-child relationship quality. This may provide some support for the idea that parental separation affects the security of attachment bonds formed between parents and children, which is transmitted across the life course into the types of relationships formed with partners. There is evidence from other work to suggest that later social relationships can 'undo' some of the

psychological distress caused by parental separation (Rutter 2006). Peer relationships, however, were not found to be important after taking account of other factors in the models. This may be because more important or more easily measured mechanisms, such as material pathways, may outweigh harder to capture pathways such as those acting through peer relationships. It is also possible that attachment security is captured more adequately by the quality of parent-child relationships and therefore the peer relationship pathway is non-significant. In the NCDS two of the interlinking material-relational pathways remained statistically significant for both men and women – the association between parent-child relationship quality and educational attainment, and also the association between educational attainment and adult partnership status. These results therefore support the idea that material and relational pathways should not be considered as distinct mechanisms acting across the life course.

In the BCS70 the relational pathway was somewhat simpler to that seen in the NCDS. No association was seen for men or women between parent-child relationship quality and adult partnership status after taking account of other associations in the model. Instead parent-child relationships at age 16 years were found to be associated with adult psychological distress. This would therefore appear to go against the attachment hypothesis as this is unlikely to change across time and between cohorts. However it is possible that other mechanisms in the model become more important and therefore outweigh the importance of these associations.

Adolescent material disadvantage remained in the two BCS70 models (this was not the case in the NCDS). It has previously been suggested that relative material disadvantage may have increased over this period of time (Dearden, Goodman, and Saunders 2003) and therefore it is possible that separated families differed more with regards to material circumstances to intact families in this later cohort. In the BCS70, educational attainment was found for both men and women to be a way in which adolescent material disadvantage translated into adult material disadvantage as hypothesised. The interlinking material and relational pathways appear to differ for men and women in the BCS70; for BCS70 men there was an association between educational attainment and adult partnership status, with those who were more educated being significantly less likely to be separated or divorced. This association was not seen for BCS70 women after taking account of other factors in the model. The interlinking material and relational associations were those between adolescent material disadvantage and parent-

child relationship quality, and also that between parent-child relationship quality and educational attainment.

In both the NCDS and BCS70, material mechanisms were found to be more important than relational mechanisms. As previously noted, this may be due to measurement issues in capturing relational factors, such as attachment security with parents and peers, using secondary data. Therefore it is likely that material concepts are more objectively and easily measured and will appear to be more important in the models. When the effects of parental separation were decomposed into those acting through 'direct' and 'indirect' means, it was seen that in the NCDS 'indirect' mechanisms were more important however the 'direct' mechanisms were more influential in the BCS70. The BCS70 models were of poorer fit than those for NCDS participants and it is possible that additional factors were of importance in this cohort, for example multiple family transitions which are likely to be higher in number in this cohort. However, due to limitations with the MPlus programme, this was only tested on one imputed dataset rather than across all twenty for each cohort. Despite this, the results are likely to be very similar and draw the same conclusions as those utilising pooled results from all imputations.

In summary this thesis shows that parental separation is associated with adult psychological distress in three of the British birth cohorts and that this association has not reduced over time. This relationship appears to be transmitted at least partially through material and relational factors acting across the life course and the mechanisms involved are complex, varying across time and for men and women.

13.3 Future work

This thesis has identified several opportunities for future research. The first set of these would be to extend the parental separation measure used in order to investigate whether multiple family transitions have a greater effect than single transitions. As mentioned previously, this may have to be conducted using a later cohort than those used in this study as family transitions, particularly in the NSHD and NCDS, were relatively few in number. Also it would be good to look at the impact of remarriage or repartnership on the children involved, as the evidence on this is somewhat inconclusive. In addition it would be interesting, particularly within the context of more recent family trends to

investigate whether the breakdown of cohabitations and marriages differ for the wellbeing of children involved.

Again, perhaps using other datasets, it would be good to begin disentangling the effect of parental separation and parental conflict in order to assess whether it is the physical separation of the surrounding family environment which is most important for the children involved. This could also be investigated in the current cohorts by comparing parental deaths and parental divorces as previously discussed.

There is a relatively strong body of evidence surrounding the relationship between parental separation and adult psychological distress and less is known about whether separation is associated with physical health conditions in adulthood. It is possible that the social environment experienced during childhood gets 'under the skin' through socio-biological mechanisms, such as those acting through stress responses (e.g. hypothalamic-pituitary axis activity) and the uptake of risky health behaviours such as smoking. It would be possible to examine this using the biomedical data available in the NSHD, NCDS and potentially Add Health[27].

Finally an investigation of the sub-sample of those participants who experienced parental separation but who did not report psychological distress in adulthood, could be undertaken in order to assess potential resilience factors (Coleman and Glenn 2009). This analysis may provide evidence for the targeting of interventions, finding out how the life courses of these participants differed from those who did report psychological distress. The comparison of descriptive results for this sub-sample shows that those who do not report psychological distress, but who did experience separation, in the NCDS and BCS70 were more likely to have educational qualifications, and consequently to be in higher social classes and to own their own homes. With regards to the relational factors investigated in this project, they were less likely to have peer relationship problems and were more likely to be married and less likely to be single or divorced than those who experienced separation but reported psychological distress in their 30s. These results therefore suggest that education may be a way of breaking the chain of disadvantage for those children who experience separation.

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[27] National Longitudinal Study of Adolescent Health: recruited adolescents in grades 7-12 in 1994/5

Chapter 14 Implications and conclusions

14.1 Implications of findings

The findings of this thesis have many implications for both policy and practice, with the aim of reducing the increased likelihood of disadvantage that children experience across their lives as a consequence of parental separation. The findings highlight a need to support families undergoing separation in order to minimise the long-term impacts upon children, especially as the findings suggest an increase in the proportion of children who experience family breakdown. This could perhaps be achieved through clearer signposting of available services, as highlighted by Gingerbread and One Parent Families in research involving separated families (Peacey and Hunt 2009) and increased affordability and availability of mediation services.

From this project it is impossible to determine whether the effect of parental separation is actually due to parental conflict due to lack of availability of conflict variables in the datasets used. Research has previously shown that parental conflict has long-term implications for children (Coleman and Glenn 2010). It is therefore possible that parental conflict is partly responsible for the associations seen and this would suggest that reducing parental conflict may help with children's adjustment to separation. Conflict management programmes, such as the 'Kids in Divorce and Separation Programme (K.I.D.S.)' in the US, have been shown to be useful in helping separating parents (Mooney, Oliver and Smith 2009; Reynolds, Harold and Pryor 2001). These types of programmes aim to improve conflict management and reduction skills, and raise awareness of the effect of conflict upon children (Pryor and Rodgers 2001) and may be beneficial in the UK setting.

Material pathways were found to be particularly important in explaining the association between parental separation and adult psychological distress and therefore measures aimed at reducing the impact of separation upon these factors are likely to reduce the impact upon psychological distress and other domains of life. The Child Support Agency was introduced in 1991 following the passing of the Child Support Bill in the same year (Millar and Whiteford 1993). Any potential benefit from this was therefore too late for the participants of the cohorts used in this thesis whose families would have been reliant upon other social security benefits, such as Supplementary benefit. The effectiveness of UK child support arrangements have been frequently questioned

(Bradshaw, Ditch, Holmes and Vilhiteford 1993; Bradshaw and Skinner 2000; McLaughlin 1999; Millar and Ridge 2001; Peacey and Hunt 2009; Skinner and Meyer 2006; Wikeley et al. 2001), particularly as child support payments are often not received by lone parents. It has been argued that child support has failed to be sufficiently child-focused (Ridge 2005) and alternative schemes have been proposed which are likely to have a more positive effect upon children. One such suggestion involves the introduction of a state-guaranteed payment which the government would have reimbursed by the non-resident parent, ensuring that money was actually available to the child's resident parent (Ridge 2005). In families where child support arrangements have been effective this has also resulted in more contact with the father (Pryor and Rodgers 2001), thereby representing a material-relational crossover effect and suggesting that child support arrangements have greater potential than just increasing financial resources for children. In addition, child support payments have also been positively linked to academic achievements with children receiving such support doing better at school than those who do not (Argys, Peters, Brooks-Gunn and Smith 1998; King 1994). Increasing child support payment compliance may therefore be a method in which the effects of parental separation may be reduced.

Educational attainment was found to be one of the most important factors in all of the final models in this thesis suggesting that if educational attainment is more equal between children from intact and separated families parental separation may have less of a negative effect. In the post-hoc analysis, briefly discussed in the future work section of the discussion (section 13.3), one of the key differences between those children who did and did not go on to report psychological distress but who did experience separation in childhood was educational attainment. Educational attainment has important implications for the level of adult material disadvantage, as found in this thesis, and also for adult psychological distress. This finding suggests that supporting children and adolescents who have experienced separation with regards to their educational attainment may limit the long-term detrimental effects of separation.

The maintenance of contact between the non-resident parent and children is a current area of interest in family research. This thesis has shown that parent-child relationship quality is important, and in the NCDS was shown to be largely driven by the quality of father-child relations. If contact is maintained, perhaps in conjunction with conflict management programmes, contact centres or family mediation (Peacey and Hunt 2009),

the effect of parental separation through this mechanism may be reduced. In particular early intervention shortly following separation has been found to be particularly effective in increasing father contact in the long-term (Ahrons and Tanner 2003; Cookston, Braver and Griffin 2007; Cowan, Cowan, Pruett and Pruett 2007).

With regards to the timing of interventions, the life course approach would suggest that approaches for improving outcomes for children who experience parental separation early in life, would have the greatest impact. However this thesis has shown that parental separation occurring at any age should be supported. Early interventions are likely to minimise the chain of disadvantage that this thesis has shown for children who experience separation. This could even go as far as identifying partnerships at risk of separation, perhaps through the education of family doctors, health visitors and other professionals who are regularly in contact with couples (Pryor and Rodgers 2001), particularly those undergoing the transition to parenthood, a period of particularly increased risk of relationship breakdown (Coleman and Glenn 2010). Increasing paternity leave provisions may also be an effective way of helping couples during the transition to parenthood and increased provision of working arrangements which promote work-life balance may also be beneficial (Pryor and Rodgers 2001).

14.2 Conclusions

This thesis shows that parental separation is associated with increased reporting of psychological distress in adulthood and that this association has not reduced over time despite more people being affected. Both material and relational pathways appear to be involved in explaining this association. The mechanisms acting across the life course are complex, differing by cohort and gender. Material pathways were shown to be more important than relational mechanisms in both the NCDS and BCS70, however there was much linkage between material and relational factors across the life course.

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APPENDIX 1

Present State Examination (PSE)

1. What is it like when you worry?

2. Have you had headaches or other aches or pains during the past month?

3. Have you been getting exhausted and worn out during the day or evening even when you haven't been working very hard?

4. Have you had difficulty in relaxing during the past month?

5. Have you been so fidgety and restless that you couldn't sit still?

6. Do you feel that you are physically ill in any way?

7. Do you tend to worry over your physical health?

8. Do you often feel on edge, or keyed up, or mentally tense or strained?

9. Have there been times lately when you have been very anxious or frightened?

10. Have you had the feeling that something terrible might happen?

11. Have you had times when you felt shaky, or your heart pounded, or you felt sweaty, and you simply had to do something about it?

12. Do you tend to get anxious in certain situations, such as travelling or being alone, or being in a lift or tube train?

13. What about meeting people e.g. going into a crowded room, making conversation?

14. Do you have any special fears, like some people are scared of feathers, or cats, or spiders, or birds?

15. Do you avoid any of these situations because you know you will get anxious?

16. Can you think clearly or is there any interference with your thoughts?

17. Do your thoughts tend to be muddled or slow?

18. What has you concentration been like recently?

19. Do you tend to brood on things?

20. Have your interests changed at all?

21. Do you keep reasonably cheerful or have you been very depressed or low-spirited recently?

22. Have you cried at all?

23. How do you see the future?

24. Have you felt that life wasn't worth living?

25. Which seems worse, the depression or the anxiety?

26. Is the depression worse at any particular time of day?

27. Have you wanted to stay away from other people?

28. What is your opinion of yourself compared to other people?

29. How confident do you feel in yourself?

30. Are you self-conscious in public?

31. Do you have the feeling that you are being blamed for something or even accused?

32. Do you tend to blame yourself at all?

33. What has you appetite been like recently?

34. Have you had any trouble getting off to sleep during the past month?

35. Do you seem to be slowed down in your movements, or have too little energy recently?

36. Do you wake early in the morning?

37. Has there been any change in your interest in sex?

38. Does the depression or tension get worse just before the start of the monthly period?

39. Have you been very much more irritable than usual recently?

40. Have you sometimes felt particularly cheerful and on top of the world without reason?

41. Have you felt particularly full of energy lately, or full of exciting ideas?

42. Have you ever seemed super-efficient at work, or as though you had special powers or talents quite out of the ordinary?

43. Do you find that you have to keep on checking things that you know you have already done?

44. Do you spend a lot of time on personal cleanliness, like washing over and over again even though you know you are clean?

45. Do you find it difficult to make decisions even about trivial things?

46. Have you had the feeling recently that things around you were unreal?

47. Have you yourself felt unreal, that you were not a person, not in the living world?

48. Does your imagination every play tricks on you?

49. Have there been any periods in which you completely forgot what happened?

50. Rate drug abuse during month

51. How much do you usually drink each day?

52. Has there been any time in the past year when you have felt consistently sad and low spirited for a considerable period?

53. Has there been any time during the past year when you have felt anxious or fearful or nervous over a considerable period?

54. Has there been any time during the past year when you have felt full to overflowing of energy or exciting ideas for days at a stretch?

55. May I ask if you are seeing a doctor for your nerves?

APPENDIX 2

Rutter's Malaise Inventory

1. Do you often have backache?

2. Do you feel tired most of the time?

3. Do you often feel depressed?

4. Do you often have bad headaches?

5. Do you often get worried about things?

6. Do you usually have great difficulty in falling or staying asleep?

7. Do you usually wake unnecessarily early in the morning?

8. Do you wear yourself out worrying about your health?

9. Do you often get into a violent rage?

10. Do people annoy or irritate you?

11. Have you at times had a twitching of the face, head or shoulders?

12. Do you suddenly become scared for no good reason?

13. Are you scared to be alone when there are not friends near you?

14. Are you easily upset or irritated?

15. Are you frightened of going out alone or of meeting people?

16. Are you constantly keyed up and jittery?

17. Do you suffer from indigestion?

18. Do you suffer from an upset stomach?

19. Is your appetite poor?

20. Does every little thing get on your nerves and wear you out?

21. Does your heart often race like mad?

22. Do you often have bad pain in your eyes?

23. Are you troubled with rheumatism or fibrosis?

24. Have you ever had a nervous breakdown?

Taken from (CLS 2008)

APPENDIX 3

Rutter Behaviour Scale items in the NCDS at age 16 years

46 Below are a series of descriptions of behaviour often shown by young people. Please ask the informant(s) about each one and ring the appropriate number to show the degree to which this description is true of the study child.

			Doesn't apply	Applies somewhat	Certainly applies
N2517	a)	Very restless. Has difficulty staying seated for long	1	2	3
N2518	b)	Squirmy, fidgety child	1	2	3
N2519	c)	Often destroys own or others' property	1	2	3
N2520	d)	Frequently fights or is extremely quarrelsome with other children	1	2	3
N2521	e)	Not much liked by other children	1	2	3
N2522	f)	Often worried, worries about many things	1	2	3
N2523	g)	Tends to do things on own—rather solitary	1	2	3
N2524	h)	Irritable. Is quick to 'fly off the handle'	1	2	3
N2525	i)	Often appears miserable, unhappy, tearful or distressed	1	2	3
N2526	j)	Has twitches, mannerisms or tics of the face or body	1	2	3
N2527	k)	Frequently sucks thumb or fingers	1	2	3
N2528	l)	Frequently bites nails or fingers	1	2	3
N2529	m)	Is often disobedient	1	2	3
N2530	n)	Cannot settle to anything for more than a few moments	1	2	3
N2531	o)	Tends to be fearful or afraid of new things or new situations	1	2	3
N2532	p)	Fussy or over-particular	1	2	3
N2533	q)	Often tells lies	1	2	3
N2534	r)	Bullies other children	1	2	3

Source: NCDS3 (1974) Maternal Self-Completion Questionnaire

APPENDIX 4

Rutter Behaviour Scale items in the BCS70 at age 16 years

A5. Below is a series of descriptions of behaviour sometimes shown by young people. Please say whether, in respect of your teenager, the descriptions certainly applies, applies somewhat or doesn't apply.

Answer (1) - (19) and tick one box on each line	Certainly Applies	Applies Somewhat	Doesn't Apply
1. Very restless. Often running about or jumping up and down. Hardly ever still (PAS.1)	☐	☐	☐
2. Is squirmy/fidgety (PAS.2)	☐	☐	☐
3. Often destroys others or own belongings (PAS.3)	☐	☐	☐
4. Frequently fights with others (PAS.4)	☐	☐	☐
5. Not much liked by others (PAS.5)	☐	☐	☐
6. Often worried, worries about many things (PAS.6)	☐	☐	☐
7. Tends to do things on own, rather solitary (PAS.7)	☐	☐	☐
8. Irritable. Is quick to fly off the handle (PAS.8)	☐	☐	☐
9. Often appears miserable, unhappy, tearful or distressed (PAS.9)	☐	☐	☐
10. Sometimes takes things belonging to others (PAS.10)	☐	☐	☐
11. Has twitches, mannerisms or tics of the face and body (PAS.11)	☐	☐	☐
12. Frequently sucks thumb or fingers (PAS.12)	☐	☐	☐
13. Frequently bites nails or fingers (PAS.13)	☐	☐	☐
14. Is often disobedient (PAS.14)	☐	☐	☐
15. Cannot settle to anything for more than a few moments (PAS.15)	☐	☐	☐
16. Tends to be fearful or afraid of new things or new situations (PAS.16)	☐	☐	☐
17. Is fussy or overparticular (PAS.17)	☐	☐	☐
18. Often tells lies (PAS.18)	☐	☐	☐
19. Bullies others (PAS.19)	☐	☐	☐

Source: BCS70 3 (1986) Maternal Self-Completion Questionnaire

APPENDIX 5 – Regression analysis for objective 4

Hypothesis 4a and 4b – Material and relational pathways between parental separation and adult psychological distress will be linked and differ by gender

The first interlinking pathway is that between material disadvantage in adolescence and parent-child relationship quality. This is tested using ordered logistic regression in both cohorts (see table a). In both cohorts those who are more materially disadvantaged were more likely to report poorer quality parent-child relationships and this did not differ for boys and girls. Next the association between material disadvantage and peer relationship quality was tested using ordered logistic regression. The results are given in table b.

Table a – Association between material disadvantage (16 yrs) and parent-child relationship quality (16 yrs)

NCDS Men (5,396)	Odds ratio for having an educational qualification	95% CI	P value
Material disadvantage			
More disadvantaged	1.02	0.91, 1.14	0.764
Less disadvantaged	Ref		
Women (5,527)			
Material disadvantage			
More disadvantaged	1.15	1.02, 1.29	0.021
Less disadvantaged	Ref		
Both (10,923)			
Material disadvantage			
More disadvantaged	1.09	1.00, 1.18	0.052
Less disadvantaged	Ref		
Gender*material disadvantage			0.136
BCS70 Men (5,207)			
Material disadvantage			
More disadvantaged	1.17	1.02, 1.34	0.022
Less disadvantaged	Ref		
Women (5,458)			
Material disadvantage			
More disadvantaged	1.27	1.11, 1.45	0.001
Less disadvantaged	Ref		
Both (10,714)			
Material disadvantage			
More disadvantaged	1.22	1.11, 1.34	<0.001
Less disadvantaged	Ref		
Interaction between gender and disadvantage			0.329

Table b – Association between material disadvantage (16 yrs) and peer relationship quality

NCDS				
Men (5,396)	**Frequently fights**	**Frequently bullies**	**Not much liked**	**Prefers to be alone**
Material disadvantage				
More disadvantaged	1.85 (1.51, 2.26)***	1.96 (1.45, 2.66)***	1.33 (0.95, 1.85)	0.94 (0.84, 1.06)
Less disadvantaged	Ref	Ref	Ref	Ref
Women (5,527)				
Material disadvantage				
More disadvantaged	1.81 (1.49, 2.19)***	2.20 (1.65, 2.93)***	1.39 (0.97, 2.00)	0.95 (0.84, 1.08)
Les disadvantaged	Ref	Ref	Ref	Ref
Both genders (10,923)				
Material disadvantage				
More disadvantaged	1.83 (1.59, 2.11)***	2.07 (1.67, 2.55)***	1.34 (1.06, 1.71)*	0.94 (0.87, 1.02)
Less disadvantaged	Ref	Ref	Ref	Ref
Gender*material disadvantage	0.892	0.587	0.844	0.900
BCS70				
Men (5,207)	**Frequently fights**	**Frequently bullies**	**Not much liked**	**Prefers to be alone**
Material disadvantage				
More disadvantaged	1.63 (1.29, 2.05)***	1.67 (1.29, 2.18)***	1.31 (0.99, 1.73)	1.05 (0.93, 1.20)
Less disadvantaged	Ref	Ref	Ref	Ref
Women (5,458)				
Material disadvantage				
More disadvantaged	2.03 (1.61, 2.56)***	1.87 (1.43, 2.43)***	1.64 (1.22, 2.21)***	1.23 (1.08, 1.40)**
Less disadvantaged	Ref	Ref	Ref	Ref
Both (10,714)				
Material disadvantage				
More disadvantaged	1.82 (1.54, 2.16)***	1.76 (1.47, 2.11)***	1.46 (1.18, 1.80)***	1.14 (1.04, 1.24)**
Less disadvantaged	Ref	Ref	Ref	Ref
Interaction between gender and disadvantage	0.160	0.569	0.260	0.104

*P≤0.05; **P≤0.01; ***P≤0.001

The results show that those who were more materially disadvantaged at age 16 years were also more likely to be reported by their mothers as being more likely to frequently fight and bully others and to not be very popular with others. In addition, in the BCS70, those who were more disadvantaged were more likely to reported as preferring to be alone than those adolescents who were more advantaged. The next stage of the analysis was to test the association between parent-child relationship quality and educational attainment. It is thought that poorer quality parent-child relations will be associated with a lower level of educational qualification by early adulthood, as it is likely that poorer quality parent-child relations are indicative of a low level of parental involvement or interest in the child's education. This was tested using ordered logistic regression in both cohorts and the results are given in table c.

Table c - Results of ordered logistic regression testing association between parent-child relationship quality (16 yrs) and educational attainment (23/26 yrs)

NCDS Men (5,396)	Odds ratio for having an educational qualification	95% CI	P value
Poor parent-child relationship	0.93	0.85, 1.00	0.062
Women (5,527)			
Poor parent-child relationship	0.84	0.78, 0.91	<0.001
Both (10,923)			
Poor parent-child relationship	0.87	0.83, 0.92	<0.001
Interaction between gender and parent-child relationships			0.832
BCS70 **Men (5,207)**			
Poor parent-child relationship	0.92	0.85, 1.00	0.041
Women (5,458)			
Poor parent-child relationship	0.85	0.78, 0.92	<0.001
Both (10,714)			
Poor parent-child relationship	0.88	0.83, 0.93	<0.001
Interaction between gender and parent-child relationships			0.595

NB ORs refer to increase in likelihood of having educational qualifications for each unit increase in parent-child relationship quality (i.e. as parent-child relationship quality deteriorates).

As parent-child relationships become increasingly poor, the odds of having an educational qualification reduces by approximately 12%. Overall this equates to a large effect between those with the best and worst quality relationships with their parents,

particularly in the NCDS, where parent-child relationship quality ranges from 1 to 5 with increments of 0.5 (there is a range of 1-3 in the BCS70). There are no differences by gender in either cohort.

The next stage in the analysis was to assess whether peer relationships were in turn related to educational attainment as another potential material-relational link in the pathway between parental separation and psychological distress. It was postulated that those who had poorer relationships with their peers would do less well in education and would therefore be less likely to have any educational qualifications. This was tested using ordered logistic regression and the results are given in table d.

In the NCDS those who were reported as often fighting, bullying and being unpopular with other children were less likely to have any educational qualifications than those who were not reported to have these problems. However those who preferred to be alone were more likely to have educational qualifications. This was the same in the BCS70, although there was not a statistically significant association between whether the child was reported as preferring to be alone and educational attainment. The strongest effect in each cohort was that between bullying and educational attainment. There were no gender differences in any of the associations tested.

Table d – Results of ordered logistic regression testing association between peer relationships (16 yrs) and educational attainment (23/26 yrs)

NCDS				*BCS70*	
	Odds ratio for educational qualifications (95% CI)	**P value**		**Odds ratio for educational qualifications (95% CI)**	**P value**
Men (5,396)			**Men (5,207)**		
Child fights others	0.50 (0.41, 0.61)	<0.001	Child fights others	0.67 (0.51, 0.86)	0.003
Child bullies others	0.40 (0.30, 0.52)	<0.001	Child bullies others	0.63 (0.48, 0.82)	0.001
Child is not much liked	0.55 (0.40, 0.75)	<0.001	Child is not much liked	0.75 (0.55, 1.04)	0.081
Child prefers to be alone	1.13 (1.01, 1.27)	0.038	Child prefers to be alone	1.08 (0.92, 1.25)	0.339
Women (5,527)			**Women (5,458)**		
Child fights others	0.45 (0.37, 0.54)	<0.001	Child fights others	0.55 (0.44, 0.70)	<0.001
Child bullies others	0.41 (0.32, 0.53)	<0.001	Child bullies others	0.54 (0.37, 0.78)	0.002
Child is not much liked	0.57 (0.40, 0.83)	0.003	Child is not much liked	0.71 (0.54, 0.94)	0.016
Child prefers to be alone	1.04 (0.92, 1.18)	0.512	Child prefers to be alone	0.91 (0.79, 1.05)	0.214
Both (10,923)			**Both (10,714)**		
Child fights others	0.47 (0.41, 0.54)	<0.001	Child fights others	0.61 (0.51, 0.72)	<0.001
Child bullies others	0.40 (0.33, 0.49)	<0.001	Child bullies others	0.58 (0.47, 0.72)	<0.001
Child is not much liked	0.57 (0.46, 0.72)	<0.001	Child is not much liked	0.73 (0.60, 0.89)	0.002
Child prefers to be alone	1.11 (1.01, 1.21)	**0.029**	Child prefers to be alone	0.99 (0.89, 1.10)	0.816
Interaction between gender and fights		0.460	**Interaction between gender and fights**		0.390
Interaction between gender and bullies		0.747	**Interaction between gender and bullies**		0.628
Interaction between gender and liked		0.863	**Interaction between gender and liked**		0.877
Interaction between gender and alone		0.134	**Interaction between gender and alone**		0.126

NB Category of "no qualifications" used as reference group for OR estimation

The association between educational attainment and adult partnerships was the final proposed interlinking association between material and relational pathways. This was tested using multinomial logistic regression and the results are given in table e.

In the NCDS, those who had no qualifications were more likely to be single, cohabiting or separated than those who had CSE or O-level qualifications. Those with A-levels or higher qualifications were more likely to be single or cohabiting than married but also significantly less likely to be separated or remarried. This may reflect that these participants have prioritised their education over forming serious partnerships or have experienced a wider set of options in terms of their transition to adulthood. This is likely to result in these people being less likely to be married and consequently less likely to be separated or divorced and consequently be why they are more likely to be single or cohabiting. A significant interaction was found between educational attainment and gender for those who were single, suggesting that women with A-level or higher qualifications were significantly more likely than men with these qualifications to be single as opposed to married.

Significant associations also exist between educational attainment and adult partnership status in the BCS70, although to a slightly lesser degree than in the NCDS. The results suggest that those who had no educational qualifications were more likely to be single than married. Also those with higher qualifications or degrees were more likely to be single or cohabiting and less likely to be separated or remarried.

The results presented in this section suggest that associations do exist between material and relational factors across the life course. These linkages are further tested using path analysis and the results presented in chapter 12.

Table e – Results of multinomial logistic regression testing the association between educational attainment (23/26 yrs) and adult partnership status (30/33 yrs)

NCDS	Adult partnership status RRR (95% CI)				
Men (5,396)	**Cohabiting**	**Single**	**Married**	**Remarried**	**Separated/ divorced**
Educational attainment					
No qualifications	1.39 (0.98, 1.98)	1.58 (1.23, 2.02)***	Ref	1.08 (0.73, 1.58)	1.36 (1.03, 1.79)*
CSE/O-level	1.00	1.00	Ref	1.00	1.00
A-level	0.92 (0.68, 1.25)	1.02 (0.83, 1.26)	Ref	0.80 (0.58, 1.09)	0.62 (0.47, 0.80)***
Higher qual/degree	1.33 (0.99, 1.78)	0.95 (0.76, 1.20)	Ref	0.52 (0.36, 0.77)***	0.60 (0.44, 0.80)***
Women (5,527)					
Educational attainment					
No qualifications	1.55 (1.06, 2.26)*	1.47 (1.11, 1.96)**	Ref	1.15 (0.85, 1.54)	1.40 (1.12, 1.75)**
CSE/O-level	1.00	1.00	Ref	1.00	1.00
A-level	1.40 (0.94, 2.08)	1.61 (1.22, 2.13)***	Ref	0.64 (0.45, 0.92)*	0.65 (0.48, 0.87)**
Higher qual/degree	1.40 (1.00, 1.95)*	1.70 (1.35, 2.15)***	Ref	0.56 (0.41, 0.75)***	0.44 (0.34, 0.58)***
Both (10,923)					
Educational attainment					
No qualifications	1.46 (1.13, 1.90)**	1.54 (1.28, 1.86)***	Ref	1.12 (0.88, 1.42)	1.38 (1.16, 1.64)***
CSE/O-level	1.00	1.00	Ref	1.00	1.00
A-level	1.14 (0.89, 1.45)	1.29 (1.10, 1.53)**	Ref	0.69 (0.55, 0.86)	0.60 (0.49, 0.73)***
Higher qual/degree	1.37 (1.10, 1.71)**	1.26 (1.07, 1.47)**	Ref	0.54 (0.43, 0.68)	0.50 (0.41, 0.62)***
Interaction between gender and educational attainment	0.937	0.002		0.216	0.407
BCS70					
Men (5,207)					
Educational attainment					
No qualifications	1.15 (0.81, 1.62)	1.09 (0.78, 1.52)	Ref	1.30 (0.42, 3.99)	1.74 (1.06, 2.84)*
CSE/O-level	1.00	1.00	Ref	1.00	1.00
A-level	0.93 (0.68, 1.28)	1.13 (0.86, 1.50)	Ref	0.68 (0.23, 1.99)	0.89 (0.52, 1.54)
Higher qual/degree	1.16 (0.94, 1.43)	1.27 (1.07, 1.51)**	Ref	0.36 (0.12, 1.06)	0.54 (0.33, 0.90)*

Women (5,458)					
Educational attainment					
No qualifications	1.13 (0.76, 1.68)	1.48 (1.04, 2.10)*	Ref	0.78 (0.22, 2.78)	1.26 (0.73, 2.20)
CSE/O-level	1.00	1.00	Ref	1.00	1.00
A-level	0.94 (0.72, 1.23)	1.18 (0.92, 1.52)	Ref	0.78 (0.38, 1.61)	0.81 (0.56, 1.17)
Higher qual/degree	1.20 (0.99, 1.46)	1.45 (1.23, 1.73)***	Ref	0.40 (0.17, 0.95)*	0.52 (0.36, 0.76)***
Both (10,714)					
Educational attainment					
No qualifications	1.18 (0.91, 1.53)	1.28 (1.01, 1.61)*	Ref	1.02 (0.45, 2.31)	1.45 (0.98, 2.15)
CSE/O-level	1.00	1.00	Ref	1.00	1.00
A-level	0.92 (0.75, 1.12)	1.13 (0.95, 1.35)	Ref	0.76 (0.41, 1.38)	0.85 (0.63, 1.15)
Higher qual/degree	1.18 (1.03, 1.36)*	1.35 (1.20, 1.53)***	Ref	0.39 (0.20, 0.76)**	0.53 (0.38, 0.75)***
Interaction between gender and educational attainment	0.956	0.777		0.872	0.651

*P≤0.05; **P≤0.01; ***P≤0.001

Hypothesis 4c – Material and relational factors will play a greater role in the association between parental separation and psychological distress in the NCDS

The final stage of the regression analysis testing material and relational pathways determines whether there is any indication that both material and relational factors are involved in the association between parental separation and psychological distress and whether this differs by cohort. Table f summarises the results of this analysis (full results are given in tables g and h). These results indicate that, after adjusting for both material and relational factors (model 4), the association between parental separation and psychological distress in the NCDS is no longer statistically significant. This suggests that material and relational factors are involved in the association between parental separation and psychological distress. A limitation of using regression methods to test this is that it is impossible to detail the pathways involved and this analysis was conducted merely as a preliminary step to the MPlus path analysis. This is tested in more detail in chapter 12. After adjusting for both material and relational factors in the BCS70, a statistically significant association between parental separation and psychological distress still remains. This is suggestive of either a direct effect or possibly of other mechanisms being involved in the association.

Ignoring statistical significance, the magnitude of effect of parental separation across both cohorts is very similar. This suggests that, after taking into account both the material and relational factors investigated, parental separation has a similar effect upon psychological distress in adulthood, either directly or through other factors which have not be investigated here. Another limitation of using logistic regression in this analysis is that it is not possible to determine whether material or relational factors are more important in the association between parental separation and psychological distress, as the reduction in odds ratios given above cannot be directly compared. This is again tested in chapter 12.

Table f – Results of logistic regression testing the association between parental separation (0-16 yrs) and psychological distress (30/33 yrs) adjusting for material and relational factors

NCDS	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)	Model 4 OR (95% CI)
Parental separation				
Yes	1.75 (1.35, 2.26)	1.42 (1.08, 1.86)	1.54 (1.35, 2.26)	1.30 (0.93, 1.81)
No	Ref	Ref	Ref	Ref
BCS70				
Parental separation				
Yes	1.50 (1.25, 1.80)	1.32 (1.08, 1.60)	1.40 (1.17, 1.69)	1.28 (1.06, 1.55)
No	Ref	Ref	Ref	Ref

NB ORs refer to effect of parental separation on adult psychological distress; all analyses controlled for confounders

Model 1 – Relationship between parental separation & psychological distress adjusted for confounders

Model 2 – Model 1 plus additionally adjusted for all material factors

Model 3 – Model 1 plus additionally adjusted for relational factors

Model 4 – Model 1 plus additionally adjusted for both relational and material factors

Table g - Final regression models adjusting for both material and relational factors – NCDS

Both genders (10,923)	Odds ratio for psychological distress	95% CI	P value
Parental separation (0-16 yrs) – unadjusted for material and relational factors			
Yes	1.75	1.35, 2.26	<0.001
No	Ref	Ref	
Parental separation (0-16 yrs) – adjusted for material and relational factors			
Yes	1.30	0.93, 1.81	0.126
No	Ref	Ref	
MATERIAL FACTORS			
Material disadvantage (16 yrs)			
More disadvantaged	1.22	0.96, 1.56	0.106
Less disadvantaged	Ref	Ref	
Educational attainment (23 yrs)			
No qualifications	1.68	1.31, 2.14	<0.001*
CSE 2-5/O-level	Ref	Ref	
A-level	0.62	0.43, 0.87	
Higher qualification/degree	0.65	0.44, 0.96	
Housing tenure (33 yrs)			
Owner	1.21	0.70, 2.08	0.495
Social housing	1.94	1.52, 2.47	<0.001
Privately-rented	Ref	Ref	Ref
Other	1.51	0.58, 3.89	0.395
Social class (33 yrs)			
I	0.52	0.23, 1.16	0.018*
II	0.86	0.63, 1.17	
IIINM	Ref	Ref	
IIIM	0.75	0.55, 1.02	
IV	1.23	0.92, 1.64	

	1.28	0.83, 1.96	
RELATIONAL FACTORS			
Peer relationship quality (16 yrs)			
Child fights others			
No	Ref	Ref	
Yes	1.41	1.05, 1.88	0.021
Child bullies others			
No	Ref	Ref	
Yes	0.88	0.56, 1.39	0.592
Child not much liked by others			
No	Ref	Ref	
Yes	1.84	1.14, 2.97	0.012
Child prefers to be alone			
No	Ref	Ref	
Yes	1.06	0.85, 1.32	0.619
Poor parent-child relationship quality (16 yrs)			
Poor parent-child relationships	1.20	1.07, 1.35	0.002
Partnership status (33 yrs)			
Married	Ref	Ref	Ref
Cohabiting	0.93	0.59, 1.47	0.761
Single	1.21	0.89, 1.63	0.218
Remarried	1.17	0.80, 1.69	0.416
Divorced/separated	2.03	1.58, 2.61	<0.001
CONFOUNDERS/PRE-SEPARATION RISK FACTORS			
Father's social class (0 yrs)			
I	0.75	0.37, 1.53	0.072*
II	0.72	0.48, 1.08	
IIINM	1.08	0.76, 1.53	
IIIM	Ref	Ref	
IV	1.04	0.78, 1.39	
V	1.19	0.88, 1.61	
Age of mother (0 yrs)			
Per 1 year increase	1.02	1.00, 1.03	0.084
Mother's psychological distress (7 yrs)			
Yes	0.90	0.44, 1.84	0.771
No	Ref	Ref	
Mother's education (0 yrs)			
Left at minimum age	Ref	Ref	
Stayed beyond minimum age	1.27	0.96, 1.67	0.094

* P value trend

Table h - Final regression models adjusting for both material and relational factors – BCS70

Both genders (10,714)	Odds ratio for psychological distress	95% CI	P value
Parental separation (0-16 yrs) – unadjusted for material and relational factors			
Yes	1.50	1.25, 1.85	<0.001
No	Ref	Ref	
Parental separation (0-16 yrs) – adjusted for material and relational factors			
Yes	1.28	1.06, 1.55	0.011
No	Ref	Ref	
MATERIAL FACTORS			
Material disadvantage (16 yrs)			
More disadvantaged	1.09	0.94, 1.28	0.258
Less disadvantaged	Ref	Ref	
Educational attainment (26 yrs)			
No qualifications	1.74	1.36, 2.24	<0.001*
CSE 2-5/O-level	Ref	Ref	

A-level	0.76	0.68, 0.98	
Higher qualification/degree	0.67	0.53, 0.83	
Housing tenure (30 yrs)			
Owner	0.67	0.56, 0.81	<0.001
Social housing	1.45	1.18, 1.79	<0.001
Privately-rented	Ref	Ref	Ref
Other	0.90	0.70, 1.15	0.384
Social class (30 yrs)			
I	0.63	0.40, 0.97	0.954*
II	0.94	0.79, 1.13	
IIINM	Ref	Ref	
IIIM	0.78	0.63, 0.97	
IV	0.98	0.77, 1.25	
V	0.78	0.49, 1.23	
RELATIONAL FACTORS			
Peer relationship quality (16 yrs)			
Child fights others			
No	Ref	Ref	
Yes	1.43	1.10, 1.85	0.009
Child bullies others			
No	Ref	Ref	
Yes	0.92	0.66, 1.29	0.615
Child not much liked by others			
No	Ref	Ref	
Yes	1.70	1.33, 2.18	<0.001
Child prefers to be alone			
No	Ref	Ref	
Yes	1.24	1.07, 1.43	0.004
Poor parent-child relationship quality (16 yrs)			
Poor parent-child relationships	1.29	1.16, 1.43	<0.001
Partnership status (30 yrs)			
Married	Ref	Ref	Ref
Cohabiting	1.19	1.00, 1.40	0.044
Single	1.42	1.22, 1.66	<0.001
Remarried	1.23	0.77, 1.98	0.392
Divorced/separated	1.59	1.26, 2.00	<0.001
CONFOUNDERS/PRE-SEPARATION RISK FACTORS			
Father's social class (0 yrs)			
I	0.89	0.63, 1.26	0.144*
II	0.83	0.66, 1.05	
IIINM	0.89	0.73, 1.10	
IIIM	Ref	Ref	
IV	1.00	0.84, 1.19	
V	1.02	0.83, 1.25	
Age of mother (0 yrs)			
Per 1 year increase	1.00	0.98, 1.01	0.431
Mother's psychological distress (5 yrs)			
Yes	1.73	1.44, 2.09	<0.001
No	Ref	Ref	
Mother's education (0 yrs)			
Left at minimum age	Ref	Ref	
Stayed beyond minimum age	1.00	0.86, 1.16	0.953

* P value trend

APPENDIX 6 – testing the relative weight of material and relational mechanisms: an example for NCDS men

As mentioned in section 12.1 the relative importance of material and relational pathways involved in explaining the association between parental separation and adult psychological distress was tested using the 'model constraint' option in MPlus, This uses a Wald test to test that there is no difference between these two groups of pathways. This is explained further here using the model for NCDS men (fig. 12.2 and table 12.1) as an example:

In Figure 12.2 the 'pure' material pathways are represented by arrows c, i, j, k and l, and the 'pure' relational pathways are represented by arrows m, q and s. Therefore the hypothesis test conducted testing the null hypothesis that there was no difference between these two groups of pathways was as follows:

$$0 = ((c*i*l) + (c*j*k)) - (m*q*s)$$

material   relational

This resulted in a highly significant P value of $p<0.001$ therefore suggesting that there was a statistically significant difference between these two pathways. A further analysis was then undertaken to assess which of these pathways was more important by calculating the overall material 'effect' and the overall relational 'effect' by hand from the standardised probit estimates in table 12.1.

The calculation is complex due to the use of categorical variables such as housing tenure. Therefore the association between educational attainment and each possible category of housing tenure, in this case, has to be taken into account as well as the association between each possible category of housing tenure and psychological distress. The calculation, therefore, for the pure material factors was a follows:

Material 'effect' = $(c * i * l) + ((c * j^{\text{privately rent}} * k^{\text{privately rent}}) + (c * j^{\text{social}} * k^{\text{social}}) + (c * j^{\text{other}} * k^{\text{other}}))$

= $(-0.096 * -0.571 * 0.043) + ((-0.096 * 0.442 * -0.091) + (-0.096 * -0.462 * 0.103) + (-0.096 * -0.009 * 0.013))$

=0.011

Relational 'effect' = $(m * q^{cohab} * s^{cohab}) + (m * q^{single} * s^{single}) + (m * q^{remarr} * s^{remarr}) +$
$(m * q^{div} * s^{div})$

= $(0.115 * 0.007 * -0.022) + (0.115 * -0.005 * 0.060) + (0.115 *$
$0.006 * -0.002) + (0.115 * 0.045 * 0.029)$

=0.0001

From these results the conclusion was reached that material pathways appear to be more important than relational pathways in the association between parental separation and adult psychological distress. This same process was repeated for NCDS women and BCS70 men and women.